Biodiversity Management Plan

for

113 Orchard Street, Warriewood

25th February 2025

GIS Environmental Consultants

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1. Introduction

The native vegetation on the property 113 Orchard Street, Warriewood has high conservation value as it contains Central Coast Escarpment Moist Forest (PCT 3230) and Coastal Enriched sandstone Forest (PCT 3592) that are in good condition and the site is suitable habitat for a wide variety of native flora and fauna including Threatened species.
Due to the ecological sensitivity of the property, Council has identified that a Biodiversity Management Plan is required to be part of the Development Application that has been lodged for replacement of the house, bushfire hazard reduction, construction of horse arena stables and paddocks, wastewater disposal system and associated works. This plan will become part of the approval and will require works for 5 years and for the life of the development.

This Biodiversity Management Plan (BMP) describes the:

- Existing ecological (biodiversity) values on the property that are required to be retained as specified by the DA approval Conditions of Consent,
- Impact avoidance and minimisation actions that are required to be carried out during construction to protect (mitigate impact on) the native bushland habitat that is required to be retained from accidental construction impact (including nest box installation, fauna rescue, temporary construction site fencing and clean water diversion, permanent marker bollard installation etc.),
- Thinning of vegetation to establish a bushfire fuel reduced Asset Protection Zone (APZ) in accordance with the approved fire report, approved arborist report and this BMP,
- Bushland management during construction and for a period of a minimum of 5 years to maintain and improve the habitat value and make the native ecological community on the property more resilient, thus requiring less maintenance,
- Requirements for the ongoing long-term ecological maintenance of the biodiversity values of the property to maintain biodiversity values,
- Supervision and monitoring of the impact avoidance, thinning, bushland management works, and providing guidance on appropriate actions for any unexpected environmental or ecological, and
- Certification as needed.

1.1 Background

This Biodiversity Management Plan is a requirement of the Development Application for the demolition and construction of a dwelling and new horse arena, stables, paddocks and associated works. The approved DA will have conditions of consent that require that the actions described in this plan are carried out. Various pieces of legislation also require the conservation and management of bushland on private land, including the Biosecurity Act 2015, which requires the removal of weeds, the National Parks and Wildlife Act 1974, and the Biodiversity Conservation Act 2016, which protect Threatened species, native species and ecological communities and the Council LEP and DCP.

1.2 These Works Are Separate to the Formal Biodiversity Offset

The works specified in this plan are not Biodiversity Offsets for the impact of the proposal as required by the Biodiversity Conservation Act. The Biodiversity Offsets for the direct impacts on native vegetation are calculated in the Biodiversity Development Assessment Report (GIS Environmental Consultants, February 2025).

1.3 Land to Which this Biodiversity Management Plan Applies

Map 1 shows the location and extent (0.54 ha) of the Biodiversity Management Area, consisting of Zone A and Zone B where the works described in this plan are to be carried out. The areas of biodiversity habitat required to be retained are Zone A (Environment Protection and Management Area, 4,116 sqm) and some trees and ground cover in Zone B (APZ Managed Habitat, 578 sqm, and EMA Managed Habitat, 739 sqm) shown on Map 1. The trees that will be protected are shown on Maps 2 and 3.

1.4 Bushfire Fuel Reduction Asset Protection Zone Requirements

The 'Pre Development Application Asset Protection Zone/Landscaping Report' by CBAA Bushfire Experts published on 11th January 2025 shows the extent and location of the APZ and the requirements for fuel reduction. The report in turn refers to a guideline by the Rural Fire Service named 'Planning for Bushfire Protection 2019'. These documents specify the fuel hazard reduction that must be undertaken. The majority of the APZ area described in the APZ Report will be managed as horse paddocks, landscaping or become hard surfaces such as buildings, paths, driveways etc. Compliance with the requirements of the fire report must be demonstrated at the time of issue of the occupation certificate and in perpetuity will need to be checked.

1.5 Objective of this Biodiversity Management Plan

This Biodiversity Management Plan prescribes methods and a timeline for the effective management of the biodiversity values on this property, specifically:

- Protection during construction of biodiversity values to be retained (as specified in the Conditions of Consent), including the habitat and biodiversity in all of Zone A and some trees and ground cover in Zone B;
- Careful management of the existing habitat in accordance with Conditions of Consent to establish the bushfire fuel levels in the Asset Protection Zone (APZ) in accordance with the approved fire report by qualified bushland managers;
- Restoration and regeneration of already disturbed habitat;
- Active management of habitat for 5 years and then ongoing management for the life of the development; and
- Monitoring to determine if quantifiable goals are being met and allow prescription of appropriate adaptive management where goals are not being achieved or there has been unexpected environmental events.

There will be additional tree protection during construction that is specified in the approved arborist report also available on Councils web site.

Existing Biodiversity values on this property include the existing native plants and animals, habitat for flora and fauna including vegetation structure and floristics, natural rock features, clean water (low nutrients and sediment), stormwater volumes etc.

The objectives will be achieved using:

- Baseline monitoring
- Installing nest boxes, Zone A
- Avoiding unintentional impact during to construction by installing temporary construction protection fencing, see Map 2
- Rescuing and relocating fauna in trees to be removed, Zone B and the Construction Area (Zone C)
- Establishing and maintaining the required fuel reduction Asset Protection Zone (APZ) for bushfire protection in the area shown on Map 1

- Management of weeds using bush regeneration techniques, Zones A, B and the Construction Area (Zone C)
- Preventing introduction of weed propagules and pathogens by implementing hygiene protocols
- Reducing stormwater pollution by diverting clean stormwater around the construction area, horse areas and the sewage wastewater dewatering areas
- Preventing erosion by maintaining a ground cover
- Preventing pollution of stormwater with the use of bioswales to filter fine sediments and remove nutrients from surface water
- Preventing damage to trees from horses by installing permanent trunk protection around tres within paddocks
- Installing permanent bollards and signage in the area shown on Map 3, protecting Zone A

1.6 Duration of this Biodiversity Management Plan

This plan is for a minimum of 5 years, after which, the owner of the land still has obligations under the NPWS Act, the Biosecurity Act and the Biodiversity Conservation Act to conserve and maintain the biodiversity values and a requirement to maintain the bushfire APZ.

1.7 Physical Features on the Site

1.7.1 Topography

The site is a lower slope with the lowest part of the property being the southeastern boundary at 18.98 AHD and the highest is the western boundary at 43.47 AHD.
The slope of the whole site is steep and approximately 21° (23%), ranging from 20-30°, with an aspect to the south-east.
The slope of the site is a constraint that has flow on effects for civil engineering, bushfire protection, wastewater, stormwater, and indirect ecological impacts.
Topographical features of the site locality are shown on the map in Figure 3.1 of the BDAR.

1.7.2 Hydrology

This site is approximately 150 metres northeast of Mullet Creek which feeds into South Creek and Narrabeen Lagoon. The site is also approximately 400 metres south of Fern Creek which feeds into Narrabeen Creek and South Creek. There is wetland habitat to the south and south-east of the site including the protected Warriewood Wetlands area.
The aspect of the site is south-east.
No springs or swamps were evident on the site during inspection or are evident from the type of vegetation on the site. No ground water dependent ecosystems occur on this site.
The proximity to all types of Hydrology features is shown on the map in Figure 3.1 of the BDAR.

1.7.3 Geology and Soils

The soil type is Watagan Soil Landscape, a thin colluvial soil, and it is on Hawkesbury Sandstone geology.

1.7.4 Fire History

The site shows signs of not being burnt in at least 20 years. Fire history records from NPWS were checked and they do not show any fires on this site.

1.7.5 Disturbance History

Historic disturbance on this property is of 3 types:

1. There is no evidence of disturbance in the western end of the property that is mapped as the Environment Protection Area (Zone A) on Map 1.

2. The central part of the site has had moderate disturbance by slashing of the shrub layer for bushfire protection.
3. The lower part of the site where the existing house, exotic mown lawn, planted exotic and native trees and driveway is highly disturbed and has been nearly totally cleared of native vegetation.

2 Map 1, Bushland Management Areas

3 Photo Page 1

4 Biodiversity Values on the Site

A more detailed description of the ecological values at the site is given in the report titled 'Biodiversity Development Assessment Report for the Demolition and Construction of a Dwelling, New Horse Arena, Stables, Paddocks and Associated Works at 113 Orchard Street, Warriewood' by GIS Environmental Consultants (25th February 2025) which can be found on the development application part of the Northern Beaches Council website.

4.1 Vegetation Communities on the Site

The vegetation on the site meets the definition of Central Coast Escarpment Moist Forest (PCT 3230) and Coastal Enriched Sandstone Forest (PCT 3592). There are no Threatened Ecological Communities on this site.

4.1.1 Coastal Enriched Sandstone Forest PCT 3592 Description – Zone A

A tall to very tall shrubby sclerophyll open forest found on slightly enriched Hawkesbury Sandstone soils on sheltered slopes and occasionally crests on the Sydney coastal sandstone plateaus. The tree canopy very frequently includes a high cover of *Angophora costata* commonly in combination with *Corymbia gummifera* and *Eucalyptus piperita*, with *Eucalyptus pilularis* occasionally locally abundant. A taller mid-stratum is characterised by very frequent however sparse cover of *Pittosporum undulatum* and *Allocasuarina littoralis* or *Allocasuarina torulosa*. A mid-dense lower shrub layer is comprised of dry sclerophyll species that commonly include *Leptospermum trinervium*, *Persoonia levis*, *Lomatia silaifolia*, *Acacia ulicifolia* and *Dodonaea triquetra*, with *Banksia serrata* and *Banksia spinulosa* recorded occasionally. The ground layer is typically a sparse cover of graminoids that almost always includes *Dianella caerulea* and *Lomandra longifolia* with the grass *Entolasia stricta* and fern *Pteridium esculentum,* with frequent occurrences of climbers such as *Smilax australis*. This PCT is primarily distributed at elevations of less than 200 metres asl downslope of shale soils on the north shore of Sydney and Sutherland and on the Narrabeen sandstone escarpment along the Pittwater Peninsular. It grades into a heathy forest PCT 3595 on rocky Hawkesbury Sandstone gullies or moist shrub and fern forest PCT 3176 with increased shelter in deeper gullies.

4.1.2 Central Coast Escarpment Moist Forest PCT 3230 Description – Zones A and B

A tall to very tall sclerophyll open forest with a sparse mixed mesophyll and sclerophyll mid-stratum and a ground layer of ferns and grasses. This PCT occurs on Narrabeen sandstone slopes and escarpments of the lower Hawkesbury, Pittwater, Brisbane Waters and Watagan Ranges, Central Coast region. The tree canopy is variable in composition and no set of eucalypt species is consistently recorded with a high cover. *Angophora floribunda* and *Syncarpia glomulifera* are common, however maybe a member of the upper canopy or as a small tree, sometimes both. There are a range of canopy species that also have high cover, however each occur no more than occasionally or rarely across the distribution of the PCT. These include *Eucalyptus pilularis*, *Eucalyptus piperita*, *Eucalyptus saligna* or *Eucalyptus deanei*, *Eucalyptus paniculata*, *Angophora costata*, *Eucalyptus umbra* or *Eucalyptus punctata*. A layer of small trees is almost always present and dominated by *Allocasuarina torulosa*, with a lower shrub layer very frequently including *Persoonia linearis*, commonly *Breynia oblongifolia*, occasionally with *Platysace lanceolatus*, *Myrsine variabilis* and *Synoum glandulosum* subsp. *glandulosum*. Occasionally there is a sparse cover of *Livistona australis*, typically with no more than one or two individuals. The ground layer is characterised by a high cover of ferns with *Pteridium esculentum* almost always present, commonly with a higher cover of *Calochlaena dubia* and occasionally *Blechnum cartilagineum*. Small mesic climbers are both diverse and very frequent including *Eustrephus latifolius*. Grasses also comprise a high proportion of the cover, very frequently including *Imperata cylindrica* and *Entolasia stricta*, commonly with *Microlaena stipoides*. Graminoids almost always include *Dianella caerulea* and very frequently *Lomandra longifolia*. This PCT is primarily found at low elevation Narrabeen escarpments and hills, commonly on lower slopes above the flooded

Hawkesbury and Pittwater valleys. It occurs typically on sheltered to intermediate easterly aspects or rarely on crests of the main range east of Gosford and in the Watagan Range, both identified as residual Hawkesbury Sandstone, however this may only be a thin layer above the Narrabeen stratum. A geological outlier occurs on a volcanic dyke at West Head in Kuring-Gai National Park. On Narrabeen shales in the Central Coast-Pittwater districts it is replaced by moist forest PCT 3234 on sheltered aspects or dry grassy forest PCT 3437 on drier aspects.

4.2 Plant Species (Floristics)

The native and exotic plant species that occur on the site and adjacent lands are listed in Appendix A. The list also contains the relative abundance of the species from the 20x20m plot that was in the development footprint and the Central Coast Escarpment Moist Forest (PCT 3230).

4.2.1 Floristics in Vegetation Zone A - Central Coast Escarpment Moist Forest

63 species of native plants and 10 species of non-native plants occur on the property.

Table 4.1. Plant Species List

with summaries of Status, Floristics (Composition) and Cover (Structure, Relative Abundar

113 Orchard St, Warriewood

6 November 2024

Botanist, Nicholas Skelton, GIS Environmental Consultants

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Table 4.1a. Ecological Status (legal, conservation) Species Summary

Number of Plant Species in each Plot, summariseed by legal status and conservation importance

	BC Act Threatened	Native to NSW (non Threatened)	Planted Non Native	Weed Other	Weed Regional Syd Priority	Weed State Priority	Total
VZ1 Plot 1		46	1	8			55
Additonal Outside Plots		6	0	1	1		8
Total	0	52	1	9	1	0	63

Table 4.1b. Native Plant Species Composition (Species Richness, Floristics) Summary

Native Species Richness in each Vegetation Zone, inside and outside plots, summarised by Growth Form

	Fern (EG)	Grass & Grass Like (GG)	Forb (FG)	Shrub (SG)	Tree (TG)	Other (OG)	Total
VZ1 Plot 1	2	4	17	2	11	10	46
Additonal Outside Plots	2	0	2	0	2	2	8
Total	4	4	19	2	13	12	54

Table 4.1c. Native Vegetation Structure Summary (Projected Foliage Cover)

Projected Native Foliage Cover % in each Vegetation Zone, in plots, summarised by Growth Form

	Fern (EG)	Grass & Grass Like (GG)	Forb (FG)	Shrub (SG)	Tree (TG)	Other (OG)
VZ1 Plot 1	0.15	3.9	4.6	0.5	90.2	1.5

Table 4.1d. Non-Native (Weeds, Exotics) Composition (Species Richness, Floristics) Summary

Weed Species Richness in each Vegetation Zone, inside and outside plots, summarised by Growth Form

	Fern (EG)	Grass & Grass Like (GG)	Forb (FG)	Shrub (SG)	Tree (TG)	Other (OG)	Total
VZ1 Plot 1		2	3	3			8
Additonal Outside Plots			1		1		2
Total	0	2	4	3	1	0	10

4.3 Vegetative Structure

The tree canopy is a forest dominated by *Syncarpia glomulifera (*Turpentine Tree), followed by *Eucalyptus piperita* (Sydney Peppermint). The shrub canopy is currently very sparse and reflects the history of thinning for bushfire protection of the existing house. The ground cover is sparse and is dominated by herbs.

4.3.1 Structure in Vegetation Zone A – Central Coast Escarpment Moist Forest

The tree canopy in VZ1 is all native and has a cover of 90.2%. The shrub canopy is almost non-existent with only 0.5% native cover, and the ground cover is 8.65% native, with mostly herbs and some grasses.

4.4 Existing Weeds

A total of 11 weed species were recorded on the site, including *Bidens pilosa*, *Briza maxima*, *Conzya bonariensis*, *Lilium formosanum*, *Ochan serrulata*, *Setaria palmifolia*, *Salanum mauritianum*, *Taraxacum officinale*, *Senna pendula* and *Argentina adenophora*.

A list of the weeds on the survey plots and in the vicinity of the site is provided in Table 4.1e within Appendix A.

5 Fauna Habitat

The site contains good quality habitat for many species. Below is a table summarising fauna that have been previously recorded on the site.

Table 5.5 Summary of Fauna that have been Recorded on the site

Common Name	Scientific Name	Evidence
Birds		
Australian Brush-turkey	*Alectura lathami*	O,C
Australian Magpie	*Cracticus tibicen*	O
Laughing Kookaburra	*Dacelo novaeguineae*	O
Noisy Miner	*Manorina melanocephala*	O
Pied Currawong	*Strepera graculina*	O
Rainbow Lorikeet	*Trichoglossus moluccanus*	O
Sulphur-crested Cockatoo	*Cacatua galerita*	O
Mammals		
Common Brushtail Possum	*Trichosurus vulpecula*	A
Common Ringtail Possum	*Pseudocheirus peregrinus*	A
Dog	*Canis lupus familiaris*	O
European Rabbit	*Oryctolagus cuniculus*	P, T
Swamp Wallaby	*Wallabia bicolor*	O
Sugar Glider	*Petaurus breviceps*	O, S, Q
Reptiles		
Diamond Python	*Morelia spilota*	A
Water Dragon	*Intellagama lesueurii*	A

Fauna in **bold** indicates a Threatened Species.

Key

*Introduced species, +Listed as Threatened Species under the NSW Biodiversity Conservation Act 2016, ?Species presence uncertain

Observation Types: Observed (O), Heard call (W), Scat (P), Nest/roost (E), Tracks or scratchings (T), Burrow (B), Crushed Cones (G), Hair (H), Feathers or skin (F), Dead (K), Camera (Q), In scat (X), Bone or teeth or shell (Y), In raptor/owl pellet (Z), Ultrasonic bat detector (U), Anecdotal (A)

6 Map 2, Habitat Removal and Protection

7 Photo Page 2

8 Ecological Works

The ecological works required for this Biodiversity Management Plan (BMP) are divided into 3 stages and the Biodiversity Management Area (BMA) is divided into 3 zones.

The 3 Zones are:

- **Zone A – Environment Protection and Management, of good quality bushland using Assisted Regeneration**
  Green area on Maps 1 and 3 – 4,116 sqm. Zone A contains undisturbed Central Coast Escarpment Moist Forest (PCT 3230) and Coastal Enriched Sandstone Forest (PCT 3592). This zone is to have:
    - protection fencing during construction,
    - installation of nest boxes,
    - installation of Environment Protection Fencing during construction,
    - installation of bollards and signage to mark the outer boundary of the APZ, and
    - weeds managed every 6 months for a minimum of 5 years.

- **Zone B – APZ and EMA Managed Habitat, Weed Control**
  Blue Area on Maps 1 and 3 – 1,317 sqm. Zone B is Central Coast Escarpment Moist Forest (PCT 3230). This zone is to have:
    - protection fencing during construction,
    - fauna rescue during tree removal,
    - tree thinning in to establish to meet APZ standards,
    - planting native plants within the EMA that are tolerant of high nutrient conditions,
    - installation of Environment Protection Fencing during construction, and
    - weeds managed every 6 months for a minimum of 5 years.

- **Zone C – Earthworks and Construction Area (rest of the site)**
    - fauna rescue during tree removal,
    - installation of Environment Protection Fencing during construction,
    - installation and planting of bioswales, and
    - weed control every 6 months.

The 3 stages are:

- **Stage 1 – At issue of the Construction Certificate** and after payment of offsets. Baseline monitoring, installation of nest boxes, fauna rescue, tree thinning, and tree removal in construction area.

- **Stage 2 – During Construction and Prior to Occupation Certificate**, including prior to Construction Certificate and during construction. This stage includes all tasks and details that would otherwise be detailed in a Construction Environment Management Plan (CEMP) and can be used for the same purpose.

- **Stage 3 - Ongoing maintenance** for the remaining part of the 5 years.

This document addresses each of the stages in turn and the management actions for each zone are described within each stage. A GANNT chart is provided in Appendix C which outlines the timing of each management action. Estimated costs for each management action are provided in Appendix D.

9 Quantifiable Goals and Key Performance Indicators

The following Key Performance Indicators (KPI's) are to be met at each annual monitoring period over the 5-year duration of this Biodiversity Management Plan. If these levels are not achieved, then more effort is required until these quantifiable goals are achieved.

KPI's, where possible, should use the SMART criteria, i.e. they should be Specific, Measurable, Achievable, Relevant and Time-bound.

- There is to be no harm to native vegetation to be retained.
- There are to be no weeds in the tree or shrub vegetation layers.
- Weed removal is to achieve <5% weed projected foliage cover at all times within Zone A.
- Weed removal is to achieve <10% weed projected foliage cover within Zone B at all times.
- Weed removal is to achieve <20% weed projected foliage cover in Zone C during all weed removal sessions during construction to prevent the spread of weeds to Zones A and B.
- Bushfire fuel hazard reduction requirements are to be met within the APZ.
- The soil surface is not to be left bare.
- No fertiliser, pesticides or insecticide are to be used.
- Only works consistent within this BMP are permitted within Zone A.
- No environmental weeds are to be planted in the property.
- Installation of temporary during-construction fencing and signage as shown on Map 2, with maintenance ensuring that no damage occurs. The fencing is to keep out machinery, domestic animals and people other than those performing ecological works described in this BMP or for the construction of the paddocks.
- Installation of metal bollards and signage at the end of construction as shown on Map 3.
- No rubbish to be left behind.
- Annual monitoring reports are to be completed and provided to Council on request.

10 Restoration Management Actions

10.1 Monitoring

The monitoring of European Rabbits, weed control, fences, erosion, pests, disease, ecological works, Key Performance Indicators/Quantifiable Goals and Benchmarks are to be carried out by the Project Ecologist, who is to be **independent** of the Bush Regeneration Contractor.
The Project Ecologist is to assist the owner/developer in managing the Bush Regeneration contractor and to monitor the site to provide proof of meeting the DA conditions and to certify where necessary. Whether the quantifiable goals, Performance Criteria and Benchmarks are being met will need to be assessed by an appropriately qualified Project Ecologist (Environmental Scientist, B. Sc.) with at least 5 years of experience in the ecology of the area. Monitoring of the site must be undertaken:

- Baseline survey before issue of Construction Certificate;
- Every 6 months during construction;
- Before Issue of Occupation Certificates; as well as
- Every 12 months for the 5-year life of this BMP.

Monitoring photos for each of the seven (7) monitoring points must be taken at standing height from each compass directions (N, E, S, W). The location of photo monitoring points is shown using a camera symbol on Map 3. The table on Map 3 contains the co-ordinates of each photo monitoring point.

There will be ongoing monitoring by a qualified Project Ecologist, who will be independent of the bush regeneration contractor, to ensure the ongoing quantifiable goals and key performance indicators are being met. The Project Ecologist will be responsible for monitoring in relation to:

- Ongoing quantifiable goals and performance targets;
- Indicators that assess change in threatened species abundance, occupancy, or habitat;
- Photo points, see Map 3;
- Review of this Biodiversity Management Plan and activities;
- Condition and abundance of logs, hollows, and nest boxes;
- Evidence of disease;
- Changes in vegetation integrity;
- Potential threats to the ecological community;
- Recommended remedial actions; and
- Documentation of the findings in a report.

10.2 Maintenance Weed Management

Follow-up weeding will involve hand weeding and selective application of herbicide to weeds that emerge after the primary weed removal. Recognised bush regeneration methods should be used that are appropriate for each weed species.
Weeds on all parts of the property are to be prevented from flowering. It is important that weeds and weed propagules do not spread to nearby bushland, causing a fire hazard, health issues and aesthetic problems.

10.3 Vegetation Remediation Techniques to be used on this Site

Due to the high level of native species richness and cover on this site, the ecosystem has a high resilience and capacity to self-repair. Accordingly, assisting the natural regeneration of bushland with minimal intervention is the recommended technique on this site. Natural regeneration involves improving ecological conditions and promoting opportunities for recruitment of native species. The

specific tools that are most applicable to this site have been selected and in some cased adapted for unique conditions on this site. It is recommended that planting does not occur on this site.

10.4 Weed Removal

Weeds are to be controlled by using bush regeneration techniques.

Hand Removal
Areas with native species in the groundcover layer should be weeded by hand to avoid killing any of the existing native plants.
Cut and Paint, Scrape and Paint
Cut and paint or Scrape and Paint is the preferred method for shrub weeds on this site.
Spraying
The preferred type of weed removal is by hand. The site currently contains a very low number of weeds, and it is unlikely that spraying will be necessary.
In the event that a large plume of weeds establishes on the site and herbicide is proposed to be used, it is to be applied to weeds with a hand spray bottle or wipe.
Slashing, Mowing and Broad scale use of Herbicide
Due to the high level of native species richness and cover on this site, slashing, mowing, and broad scale use of herbicide is not to be used on the site.
General
The use of any herbicide on the site is to be recorded. It is important that dye is added to herbicide if any herbicide is used on this site as it is a residential site.
All weeds are to be removed by suitably qualified bush regenerators using the most appropriate technique for each species.
All weed material is to be completely removed off-site, as piles of weeded material can be a target for arson, can prevent germination of native species underneath and in some cases cause re-seeding or re-infestation.

A detailed description of various bush regeneration methods is provided in Appendix E.

10.5 Adaptive Management for Uncertain Biodiversity Impacts

The climate on this site is dominated by the seasons and droughts. During cold or dry times, the ground cover vegetation on the site is sparse and many species are resting as dormant seeds, bulbs or other structures. At times when the weather is not cold and there has been good rain, the ground cover is dense, and grasses are abundant.

To allow for these changes, an adaptive approach is needed to be taken for the weed control where more effort is used in the wetter and warmer times. It is recommended that the contract for the bush regenerators be over a long period to allow some flexibility with the timing of site visits. To control this flexibility, it is essential that there is a Project Ecologist that is regularly liaising with the bush regeneration contractor and plant supply nursery. There is no flexibility with the quantifiable goals, the duration, the number or type of plants to be planted or the fencing.
Other unpredictable circumstances may also occur such as Rabbits, dumping and fire that may need adaptation of Risks Associated with this Biodiversity Management Plan.

10.6 Risk assessment

- Spreading of weeds by machinery and clothing
- Native plants being harmed due to poorly educated workers
- Planted plants dying due to lack of water
- Plants being eaten by Rabbits
- Infection by *Phytophthora cinnamomi* or Myrtle Rust

The recommended actions required to reduce risks are discussed in this BMP.

10.7 Required Qualifications for Bush Regenerators

The ecological works are only to be undertaken by qualified bush regeneration persons with a minimum TAFE Certificate III in Conservation and Ecosystem Management (CEM) qualification and supervised by a worker with minimum TAFE Certificate III in CEM, at least 2 years of full-time equivalent experience in the Sydney region and be accredited by the Australian Association of Bush Regenerators (AABR).
The Project Ecologist can assist with the management of the Bush Regeneration Contract as they will be monitoring the site. The Bush Regenerator must be totally independent of the Project Ecologist.

For more information on bush regeneration contract management see 'Bush Regeneration, a practical guide to contract management' by Peter Davies and Peter Dixon (2003). Additional resources in relation to managing contracts can also be found at: https://www.aabr.org.au/learn/professional-practice/managing-contracts/
For a list of bush regeneration companies, see the Australian Association of Bush Regenerators (AABR) website: https://www.aabr.org.au/do/business-directory/wpbdm-category/aabr-accredited-bush-regenerators/
A list of suitable local Bush Regenerators is provided in Appendix F.

10.8 Required Qualifications for the Project Ecologist

The Project Ecologist is responsible for assisting the owner and the builder with protecting the biodiversity values on the site during construction, assisting the builder avoiding fines, monitoring the ecological improvement of the site, providing advice and certifying at the end of construction that the works have been carried out in accordance with the ecological conditions of consent.

A Project Ecologist is to be appointed for the duration of the 5 years prior to the issue of the Construction Certificate. The Project Ecologist is responsible for the supervision of the remediation works and during construction ecological works, ecological monitoring, reporting and certification. The Project Ecologist must have the minimum qualifications of a relevant bachelor's degree or a TAFE Diploma in Conservation and Ecosystem Management (CEM) and 5 years professional work experience in ecology within the Sydney region and must be familiar with Bushland Regeneration practices. The Project Ecologist must be independent of the Bush Regeneration contractor.

The Project Ecologist is to provide advice on:

- Protection of biodiversity values
- Pre-clearance fauna rescue
- The bush regeneration contractor
- The procuring of suitable plant material from a bush regeneration nursery, if applicable
- Weed control
- Mulching in appropriate locations if applicable
- Interactions between residence and wildlife. e.g., brush turkeys, ticks and snakes
- Licencing to do with Threatened species if applicable
- Tree removal/trimming
- Feral animals e.g. Foxes, Cats, Ducks, Common Mynas and Rats
- Installation of nest boxes
- Timing of the works
- Identifying adaptive management triggers and measures to allow for modification for: unusual weather, bushfire, and other unexpected changes

10.9 Licences that may be Required

- An AQF3 Chemical Accreditation is required for anyone who will be using herbicide.
- Chainsaw Licence for anyone operating a chainsaw.

10.10 General Restrictions

- There is to be no damage to any native trees or native vegetation or disturbance to the natural soil surface within the Environment Protection Area (Zone A).
- There is to be no vehicles or machinery entering the Environment Protection Area (Zone A).
- There is to be no depositing of fill, spoil or stockpiling of materials in the Environment Protection Area (Zone A).
- Only works consistent with this BMP are permitted within the Environment Protection Area (Zone A).
- No access is allowed into the Environment Protection Area (Zone A) during construction, unless for the purpose of carrying out works permitted by this BMP.
- This BMP must be included in any tender documents for construction including a clear description of the responsibilities of the builder and the project manager/owner.
- No sediment or waste produced during construction is to enter the Environment Protection Area (Zone A).
- All equipment and clothing are to be cleaned or sterilised with bleach before entering the site to prevent the spread of weeds and Phytophthora.
- There is to be no bushfire hazard reduction within the Environment Protection Area (Zone A).
- Dogs, Cats, Horses and other companion or domestic animals are not to enter the Environment Protection Area (Zone A).
- No removal of logs or firewood within the Environment Protection Area (Zone A).
- No fertiliser, pesticides or insecticides are to be used.
- The site ecologist must be present during any tree removal.

11 Map 3, Ongoing Maintenance Protection and Monitoring

12 Stage 1 – At Issue of Construction Certificate

This stage will involve the installation and maintenance of temporary Environment Protection Fencing and Tree Protection Fencing, creation of Clean Water Diversion Mounds and installation of permanent metal bollards. The management techniques are of 3 kinds; general techniques across the entire site, general techniques across all the zones and techniques specific to only 1 or 2 of the zones.

12.1 Engagement of Bushland Regenerator and Project Ecologist

Evidence of the engagement of a Bushland Regeneration Contractor and Project Ecologist must be provided to Council. Details about engaging a Bushland Regeneration Contractor and Project Ecologist are described in sections 10.8 and 10.9 of this report.

12.2 Baseline Monitoring Prior to Any Works – Zones A and B

Baseline monitoring, including baseline Photo Points, is to be done by the Project Ecologist prior to any works on the site and a report will be submitted to Council. Monitoring details are provided in section 10.1 of this report.

12.3 Nest Boxes Prior to Tree Removal – Zone A

Tree of Hollow Removed	Height off the Ground (m)	Dimensions (mm diameter)	Evidence of Occupation	Suitability for Threatened Species	Location of Replacement Next Boxes
T65	4	70 x 70	No	Small birds and gliders	Zone A

The proposal involves the removal of at least one hollow-bearing trees, T65, which contains one hollow suitable for small birds and gliders. A minimum of 1 microbat and 1 small mammal nest box are to be installed on the site. The next boxes must be installed in Zone A and the Project Ecologist is to choose which trees they are installed to. The trees should be large, of a good size and rough-barked for ease of climbing. The two new artificial nest boxes should be similar size to the hollow being removed (70mm x 70mm).

The nest boxes are to be installed prior to the removal of any trees or habitat to ensure that this habitat is available for fauna before they are displaced. It is recommended that the nest boxes are ordered 3 weeks prior to installation to allow for time for them to be shipped and assembled.

The nest boxes are to be installed in Zone A by a qualified Ecologist, bush regenerator or tree climber who is experienced in nest box installation.

Nest boxes are to be monitored for use by feral bees or pest bird species during monitoring surveys.

If any trees removed contain hollows, each hollow removed is to be replaced by 2 next boxes or artificial hollows which are to be placed in Zone A. Section 13.2.3 of this report addresses this in detail.

A general guideline for nest boxes and artificial hollows by the Biodiversity Conservation Trust (August 2020) is attached in Appendix G.

12.4 Ecological Site Induction Prior to Any Works

An Ecological Site Induction by the Project Ecologist must be included as part of the induction of all workers and visitors to the site. A confirmation of induction is to be signed by every worker and visitor. The Ecological Site Induction is to include:

- A summary of this Biodiversity Management Plan;
- Information on the important ecological features on the site, e.g. hollows and Swift Parrot feed trees;
- What to do if native fauna is found on the site;

- Hygiene protocols to prevent the introduction of weeds and pathogens; and
- Vegetation and tree clearance protocols.

12.5 Tree Protection Measures Prior to Any Works

Tree Protection Fencing and other tree protection measures will be installed as per the details described in the Arborist report, including installation of temporary Tree Protection Fencing. This is the responsibility of the builder and arborist. The Project Ecologist is to be present during all tree removal works.

12.6 Retention of Logs

Logs from trees to be removed in the development area are to be cut into lengths that are manageable by hand and are to be translocated to provide fauna habitat around the property and in Zone A. The quantity and locations are to be determined by the Site Ecologist. Logs are not flash fuel and can be retained in the APZ. The large, hollowed log shown in Photo 4 of Photo Page 1 is important habitat and must be retained. The log is located in the central part of the site. The log is to be moved to Zone A under the supervision of the Project Ecologist using a lightweight mini loader designed for arborists with a specialised log grab attachment suited to the size of the log. Some examples of suitable machines are shown in the image below:

LOG GRAB HEAVY DUTY

12.7 Temporary Environment Protection Fence Prior to Any Works – All Zones

The proposal requires that during construction, there is to be a temporary 1.8m panel Environment Protection Fence in the location shown on Map 2 to prevent accidental damage to Zones A and B, and the trees that are to be retained. The felling of trees within this fenced is to be done using chainsaws and the site ecologist must be present during tree removal. No machinery is to enter this area as the steep slope of the land is not suitable for machinery due to high erosion potential. The fence must have A4 size water-proof signage every 10 metres describing the prohibition of access (except for surveying, APZ management, construction of paddocks, ecological conservation and monitoring works). The signage is to have the following text written on it:

NO ACCESS
Biodiversity Management Area
This area is to be managed in accordance with the Bushland Management Plan (BMP) by GIS Environmental Consultants (February 2025).
The Arborist may enter this area only for the trimming and removal of trees to establish the APZ and those required to be removed for the paddocks. Other than this, only Bushland Regenerators, the Project Ecologist and any personnel constructing the paddocks may enter this area.
Fertiliser, insecticides or pesticides are NOT to be used in this area.
NO vehicles or machinery are to enter this area.
NO sediment or waste can enter this area.
NO stockpiling.
NO dumping.
NO rubbish or litter.
NO dogs, cats, horse or other domestic animals are to enter this area.
REMEMBER to sterilise ALL equipment and footwear prior to entering.

The fencing and signage should be installed by the bushland regenerator and assisted by the builder. The fencing and signage must be installed prior to any earth works and immediately after the issue of the Construction Certificate. The fencing and signage must be maintained during construction.

12.8 Clean Water Diversion Mounds Prior to Any Works

The clean water diversion mounds shown on Maps 2 and 3 are to be dug by hand by the bush regeneration contractor in the locations. These will be shallow swale and hump deep drainage lines that will divert the clean surface water around the earthworks, horse paddocks, stables and the on-site sewage disposal area. The goal of the of these diversion mounds is to prevent clean water entering these areas and adding to the dirty water volume which would lead to nutrients and sediment leaving the site. Nutrients and sediment from the horse manure and sediment from the construction site going into the downstream protected and ecologically important Warriewood Wetlands. The clean water diversion mounds are to be 20cm deep and 20cm wide. They are to be built prior to the issue of the Construction Certificate and are to be maintained throughout the life of this plan. They are to be made by the Bushland Regenerator.

12.9 Sediment Control Prior and During Construction

- Planning for Bushfire Protection 2019 discourages the removal of vegetation including trees on slopes greater than 18 degrees may not be removed, except in accordance with conditions identified in a Geotechnical Engineer Assessment Report undertaken for that purpose.
- Landowners have a duty of care in the appropriate management of soil erosion and landslip risks when clearing trees and vegetation. Landowners who clear trees and vegetation under a DA approval or for bushfire protection are not exempt from liability. It is the responsibility of landowners to seek expert advice in relation to these matters. The requirements below have been recommended to assist landowners in the management of vegetation on their land operating in accordance with these conditions does not absolve the landowner from their responsibility for landslip and erosion issues. To manage soil erosion and landslip risks on land with a slope greater than 18°:
    - there is to be no disturbance of the soil,
    - vegetation must not be removed below the soil surface

  - all topsoil must remain on the soil surface,
  - retain a protective ground cover on the soil surface, and
  - the use of graders, ploughs, bulldozers (or other types of heavy machinery that are designed to break the soil surface such as excavators) to establish or maintain an APZ is not permitted.
- The Blue Book (Landcom) standards for sediment control are to be used to prevent sedimentation of the stormwater flowing from the construction site into the downslope Warriewood Wetlands.
- No sediment is to enter the stormwater system.

12.10 Primary Weed Removal Prior to Any Works – All Zones

Primary weed removal is to occur prior to the issue of the Construction Certificate on the entire site, achieving <5% weed cover in Zone A, <10% weed cover in Zone B and <20% weed cover in the rest of the site (Zone C) to prevent the spread of weeds during construction. Details about general weed control for this site are described in section 10.4 of this report.

12.11 Monitoring During Construction – All Zones

Monitoring is to occur every 6 months during construction and is the responsibility of the Project Ecologist. Monitoring details are provided in section 10.1 of this report.

12.12 Establishment of the Asset Protection Zone (APZ)

The Asset Protection Zone (2,796 sqm) is to be established only in the area in red outline shown on Map 1. The APZ is to be established by the Bush Regenerator and the Project Ecologist and Arborist must be present.
The APZ/IPA may be able to be achieved by the following actions adapted from Standards for Asset Protection Zones (NSW Rural Fire Service) for establishing and maintaining an APZ:

- The conservation management and establishment of the fuel reduced bushland habitat in Zone B involves both selective fuel reduction (tree and shrub removal, thinning and pruning) and the retention of vegetation, soil and some leaf litter.
- All weeds and exotics are to be removed first, then there can be removal of dead material, and then thinning of native vegetation if necessary to meet the fuel load requirements.
- Ground fuels such as fallen leaves, twigs (less than 6 mm in diameter) and bark should be reduced on a regular basis. This flash fuel burns quickly and increases the intensity of a fire.
- Fine fuels can be removed by hand.
- Logs or hollows are not flash fuel and are to be retained.
- The leaf litter fuel reduction is not carried out to an extent that exposes bare earth which would lead to soil erosion and/or weed invasion.
- An effective way to permanently reduce fuel loads is to use a 20% cover of large 0.5 – 1m diameter flat shaped rocks placed on the ground surface in the APZ. Rocks provide permanent fuel reduction, are low maintenance and are good habitat. Some of the rocks can be retained from the construction. Rocks and quantities must be supervised by the Project Ecologist. There is to be no fine material deposited. If a weathered look is desired then the application of a mixture of ochre, yogurt and topsoil will rapidly accelerate aging.
- Trees to be removed within the APZ are to be marked onsite by the Arborist in consultation with the Project Ecologist and the Bushfire consultant. All other trees within the APZ will be retained.
- Tree trunks to be retained are to be selected by the Arborist in consultation with the Project Ecologist and the Bushfire consultant prior to tree removal.
- Native shrubs can be retained as clumps or islands up to 20% of the area.
- Flammable shrubs are not to be located under trees or within 10m of any exposed windows or

doors.

There is to be no storage of flammable materials or planting of plants under the building.
The removal of fine fuels, weeds and thinning of shrubs is to be undertaken by a qualified Bush Regeneration Contractor.

12.12.1 Tree Removal in the APZ

The APZ requires the removal of trees in addition to those required for the development, as an APZ cannot have more than 15% foliage cover in the tree canopy. GIS Environmental Consultants chose the trees to be removed for the establishment of the APZ. These can be found on Map 2. The trees to be removed were chosen in the following order until 15% projected foliage cover was met:

1. Trees with canopy overhanging the proposed dwelling.
2. Trees with overlapping canopies.
3. Smooth-barked trees.

Known hollow-bearing trees were avoided when choosing the trees for removal.
If necessary, when choosing trees for removal to establish the APZ, trees with high habitat value should be avoided where possible, including:

- Avoid removal of **hollow-bearing trees** identified on Map 2. This includes trees T24, T41, T60, T65 and T113. Additionally, trees that are likely to contain hollows (trees described in the Arborist Report as containing cavities) include trees T6, T19, T22, T23, T25, T39, T49, T61, T62, T65, T69, T87, T95, T96, T101, T116, T150 and T156. If any hollows are removed, these are to replaced with 2 artificial hollows or nest boxes.
- This site is mapped on the Swift Parrot Important Habitat map. The Swift Parrot profile can be found in Appendix B. The Swift Parrot is a Threatened bird that is also at risk of potential Serious and Irreversible Impacts. It breeds in Tasmania and migrates to mainland Australia during the winter months to forage for food. One of the key threats contributing to the Swift Parrot's rapid decline is the reduction of food resources available in mainland Australia due to development. Important feed trees for the Threatened Swift Parrot found on this site include ***Eucalyptus robusta*** **(Swamp Mahogany) and** ***Corymbia gummifera*** **(Red Bloodwood)**. It is important that these species are NOT removed unless necessary.
- Large Eucalypt trees provide high habitat value and are not flash fuel, and should therefore be retained where possible.

Tree numbering is consistent with the Tree Location Plan below extracted from the Arboricultural Impact Assessment and Tree Protection Specification by Laurence and Co Consultancy, Arboriculture and Plant Pathology.

12.13 Fauna Rescue during Tree and Vegetation Removal – Entire Site

A qualified ecologist should be present on-site prior to and during vegetation removal activities to ensure works are in line with industry best-practice techniques and to ensure steps are taken to minimise harm to protected and threated fauna. These steps include:

- The vegetation to be cleared should be surveyed by the ecologist immediately prior to clearing works to identify the presence of any fauna.
- The ecologist should have a cage ready to hold and transport any injured wildlife to WIRES or a local veterinary practice, blankets or hessian sacks to assist in capture, heavy-duty gloves to prevent scratches and bites, and a warm water bottle to provide warmth to any captured fauna if need be.
- Each tree containing fauna or hollows should be carefully shaken by suitable construction machinery prior to felling or sectionally dismantled by chainsaw (depending on method of felling). If fauna appear at this point, it should be allowed to relocate of its own accord or captured in the case of injury. Hollow-bearing trees on this site are identified on Map 2. This

includes trees T24, T41, T60, T65 and T113. Of these, tree T41, T60 and T65 will be removed due to the development. Refer to section 12.13 below for further details regarding hollow-bearing tree management.

- Each tree felled should be inspected for hollows. Any hollows identified will be thoroughly checked for residing fauna. Trees that are likely to contain hollows (trees described in the Arborist Report as containing cavities) include trees T6, T19, T22, T23, T25, T39, T49, T61, T62, T65, T69, T87, T95, T96, T101, T116, T150 and T156. Refer to section 12.13 below for further details regarding hollow-bearing tree management.
- After a tree is felled, if fauna appear, attempt to capture with a blanket or sack and place in cage. Otherwise retreat and allow fauna to relocate on its own accord.
- Assess condition of captured fauna and relocate if healthy. If fauna is injured or appear distressed, cover cage with a blanket, inform WIRES and/or local veterinary practice and transport as soon as practicable. Keep injured wildlife warm and in a quiet environment to lower stress levels.
- If any fauna species, or a nest or roost are located during clearing, then works should cease until safe relocation can be advised.
- If Microbats appear, capture and place in hessian sack to be relocated in dark environment safe from predators and release after dusk that evening.
- Should fauna approach the work site, cease clearing works until fauna are relocated. Avoid making loud noises to encourage relocation.
- Landowners have a duty of care to avoid cruelty and harm to native, introduced or domestic animals when clearing trees and vegetation. Landowners who clear trees and vegetation are not exempt from prosecution under the *National Parks and Wildlife Act 1974* for harm to protected fauna, or for deliberate cruelty to animals under the *Prevention of Cruelty to Animals Act 1979*. A DA approval does not absolve the landowner from their responsibility for avoiding harm to protected fauna or deliberate cruelty to animals. Note: 'protected fauna' is as defined in the *National Parks and Wildlife Act 1974*. If you witness any displaced, orphaned or injured wildlife you should contact the Office of Environment and Heritage, or licensed fauna rehabilitation group for assistance. Visit the Office of Environment and Heritage for further advice and the full list of licensed providers.

12.14 Hollow-bearing Tree Removal and Hollow Management

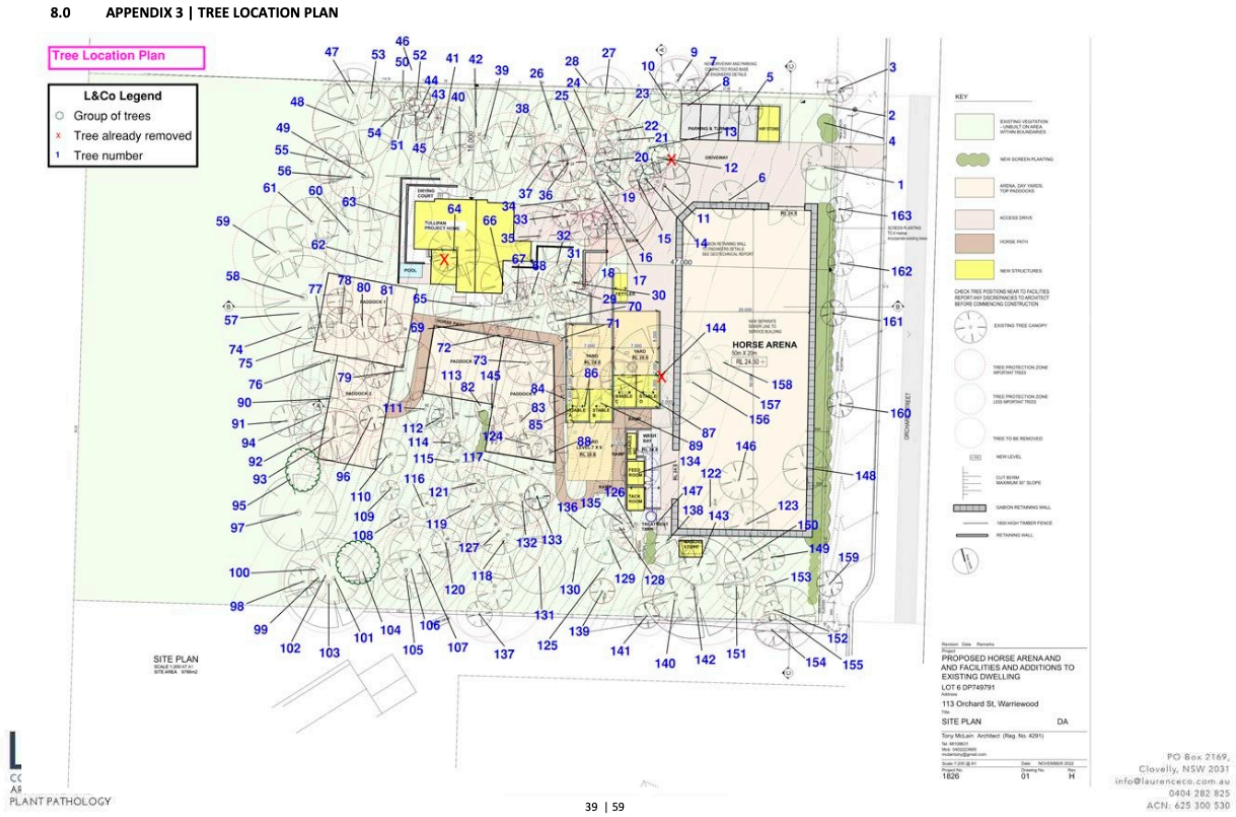
Any removal of a hollow-bearing tree from the site should be done in accordance with the following best practice guidelines:

- Removal of hollow-bearing trees must be supervised by the Project Ecologist.
- Artificial tree hollows are to be installed prior to any clearing commencing under the supervision of a suitably experienced ecologist as per Section 12.3 of this BMP.
- Hollow-bearing trees on this site are identified on Map 2. This includes trees T24, T41, T60, T65 and T113. Of these, tree T65 will be removed due to the development. Additionally, trees that are likely to contain hollows (trees described in the Arborist Report as containing cavities) include trees T6, T19, T22, T23, T25, T39, T49, T61, T62, T65, T69, T87, T95, T96, T101, T116, T150 and T156. Of these, trees T6, T19, T22, T23, T49, T65, T69, T87, T95, T96 and T156 will be removed due to the development.
- Hollow bearing trees (tree T65) to be removed should be sectionally dismantled and soft felled.
- Where tree hollows cannot be retained due to the proposed works, artificial hollows are to be provided using existing tree limbs, supplemented by other materials as necessary. These artificial hollows should be located away from construction activity in areas likely to provide habitat for arboreal mammals and installed prior to any works commencing.
- Additional artificial hollows or nest boxes should be provided in compensation at a rate of two artificial hollows for every natural tree hollow removed. On this site, that would require the

installation of two artificial hollows of similar size to the one being removed. Additional artificial hollows or nest boxes are to be installed in Zone A.

- The design, construction, and installation of artificial hollows should be carried out in accordance with best practice protocols.

Tree numbering is consistent with the Tree Location Plan below extracted from the Arboricultural Impact Assessment and Tree Protection Specification by Laurence and Co Consultancy, Arboriculture and Plant Pathology:



Please note: The above Tree Location Plan does not contain the current design.
A general guideline for nest boxes and artificial hollows by the Biodiversity Conservation Trust (August 2020) is attached in Appendix G.

12.15 Secondary Weed Control – All Zones

Secondary weed control will occur 6 months after primary weed control on the entire site, achieving <5% weed cover in Zone A, <10% weed cover in Zone B and <20% weed cover in the rest of the site (Zone C) to prevent the spread of weeds during construction..

12.16 Maintenance Weed Control During Construction- All Zones

Maintenance weed control will occur every 6 months throughout construction with the first session 6 months after secondary weed control. Maintenance Weed Control is to achieve <5% weed cover in Zone A, <10% weed cover in Zone B and <20% weed cover in the rest of the site (Zone C) to prevent the spread of weeds during construction.

12.17 Bioswales After Construction

The Stormwater Plans by Tony McClain Architect issued on 6th January 2025 include the installation of 3 bioswales as shown on Map 3. The bioswale on the eastern (front) boundary of the site can be

installed using machinery. However, the bioswales in the middle of the site are to be dug by hand. The Bioswales are to be planted with the plants in Appendix H.

12.18 Permanent Bollards After Construction – Zone A

Once all construction works have been completed, 45mm galvanised metal bollards with a minimum height of 500mm, with an endcap, are to be installed every 5m as shown on Map 3. The bollards will protect the good quality native vegetation within this site from encroachment and prevent removal of logs and trampling of habitat. The bollards are to have 2 litres of concrete at the base or if in rock, there is to be a hole drilled and a reinforcing rod cemented into the rock and pole. Every second bollard is to have an A5 size metal sign with the following text:

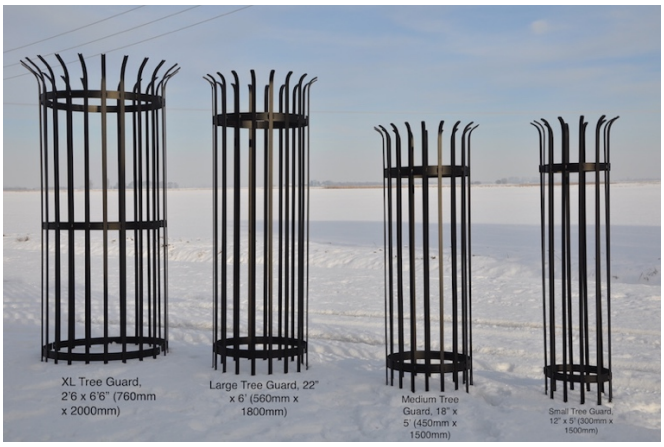
Environment Protection Area
This area is to be managed in accordance with the Bushland Management Plan (BMP) by GIS Environmental Consultants (February 2025).
Fertiliser, insecticides and pesticides are NOT to be used in this area.
Native vegetation in this area must NOT be harmed in any way.
NO vehicles or machinery are to enter this area.
NO Bushfire Hazard Reduction.
NO removal of rocks, logs or firewood.
NO rubbish or litter.
NO dogs, cats, horse or other domestic animals are to enter this area.

Figure 1 Example of a Bollard delineating a Conservation Area

The bollards must be installed prior to the issue of the Occupation Certificate.

12.19 Permanent Tree Trunk Protection After Construction

Permanent tree trunk protection is to be installed around the trees that be retained within the paddocks as shown on Map 3 and in accordance with the Arborist report. Examples of trunk protection that can be used to prevent damage from horses is shown in the images below:



There is a Sugar Glider family present within the hollow in tree T113, a *Eucalyptus resinifera*, as shown in Photo 5 and 6 of Photo Page 1. The trunk protection must be placed around this tree in a way that does not block the hollow and allows movement in and out of the tree. The two types of tree guards above do not obstruct movement in and out of the tree. If the tree is wrapped with material/plastic, access for the Sugar Gliders can be accomplished by leaving a small gap.
The tree protection must be installed prior to the issue of the Occupation Certificate.

12.20 Planting within the Effluent Management Area (EMA) After Construction – Zone B

The Effluent Management Area (EMA) is to be planted with the plants in Appendix H by a qualified Bush Regenerator. These species have been chosen due to their tolerance of high nutrient environments.

12.21 Monitoring After Construction – All Zones

Monitoring is to occur after construction and after the installation of permanent bollards. Monitoring is the responsibility of the Project Ecologist who will submit a report to Council prior to the issue of the Occupation Certificate. Monitoring details are provided in section 10.1 of this report.

13 Stage 2 - Ecological Maintenance for the remaining part of the 5 years

This section is for the ongoing ecological maintenance for a period of at least 5 years after the issue of the construction certificate.

The measures for post construction impact to threatened species mitigation include:

- Weed control.
- Monitoring.
- Adaptive management triggers and measures to allow for modification for, unusual weather, bushfire, and other unexpected changes - See Section 10.6 of this report.

13.1 Continuation of Maintenance Weed Control – Zones A and B

Maintenance weed control is to continue every 6 months after construction has ceased until 5 years from the issue of the Construction Certificate. Maintenance weed control after construction is to achieve <5% weed cover in Zone A and <10% weed cover in Zone B.

13.2 Annual Monitoring – All Zones

Once construction has finished, monitoring by the Project Ecologist is to continue on an annual basis. Monitoring details are provided in section 10.1 of this report.

13.3 Maintenance of the Asset Protection Zone (Zone B)

The Asset Protection Zone (2,796 sqm) shown on Map 3 is to be managed as a bushfire fuel reduced area in perpetuity of the development. The Asset Protection Zone is to be managed at least annually (in September).
The APZ/IPA may be able to be achieved by the following actions adapted from Standards for Asset Protection Zones (NSW Rural Fire Service) for establishing and maintaining an APZ:

- The conservation management and establishment of the fuel reduced bushland habitat in Zone B involves both selective fuel reduction (tree and shrub removal, thinning and pruning) and the retention of vegetation, soil and some leaf litter.
- All weeds and exotics are to be removed first then there can be removal of dead material, followed by thinning of native vegetation if necessary to meet the fuel load requirements.
- Ground fuels such as fallen leaves, twigs (less than 6 mm in diameter) and bark should be reduced on a regular basis. This flash fuel burns quickly and increases the intensity of a fire.
- Fine fuels can be removed by hand.
- Logs or hollows are not flash fuel and are to be retained.
- The leaf litter fuel reduction is not to be carried out to an extent that exposes bare earth, which would lead to soil erosion and/or weed invasion.
- Native shrubs can be retained as clumps or islands up to 20% of the area.
- Flammable shrubs are not to be located under trees or within 10m of any exposed windows or doors.
- Zone A around the dwelling is to be fuel free by using a pebble mulch with timber edging to prevent the pebbles from spilling into the adjacent bushland.

There is to be no storage of flammable materials or planting of plants under the building.
The removal of fine fuels, weeds and thinning of shrubs is to be undertaken by a qualified Bush Regeneration Contractor.

13.4 Description of Exclusion Areas for Domestic Animals

There are no exclusion areas on this property for domestic animals. Pet cats or dogs on the property are to be kept indoors at night. It is recommended that any domestic cats or dogs are kept indoors most of the time, as they pose a predatory threat to the native fauna that may occur on the site.

15 Appendix A – Plant Species List

APPENDIX A PG 2

16 Appendix B – Swift Parrot Profile

APPENDIX B SWIFT PARROT PG 2

APPENDIX B SWIFT PARROT PG 3

APPENDIX B SWIFT PARROT PG 4

APPENDIX B SWIFT PARROT PG 5

17 Appendix C – Gannt Timeline

PG 2 GANNT TIMELINE APPENDIX C

18 Appendix D – Estimated Costs

19 Appendix E - Weed Control Methods

Personal Protection Equipment: hat, gloves, long sleeves/pants, boots, sunscreen and insect repellent and additional when using herbicide safety glasses, respirator. Always wash hands after use.

Modified from Garden Escapees & Other Weeds of Bushland & Reserves
3rd Edition 2015 mid North Coast Weeds Co-ordinating Committee.

1. Hand pull/dig **(using knife/trowel)**

- rake back leaf litter.
- cut down alongside plant.
- grasp stem or leaves at ground level and pull firmly while loosening soil from roots with knife/trowel.
- shake excess soil from roots and bag for removal or place plant on rock/log to die.
- replace leaf litter. e.g. Inkweed, Thistle.

2. Crown cut **(using knife)**

- only the underground growing heart of the plant needs to be removed.
- rake back leaf litter.
- grasp plant at ground level, gathering stems together, insert knife and cut in a circular motion to remove crown.
- replace disturbed soil/leaf litter and gently pat down. e.g. Ground Asparagus.

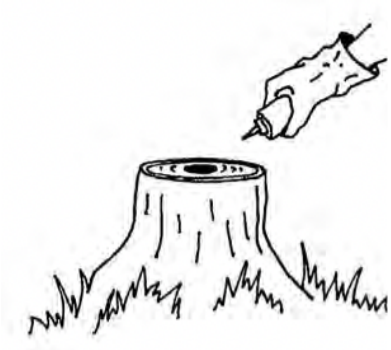
3. Skirting **(using secateurs and herbicide)**

- as low as possible, depending on access, gather and cut all vines around tree.
- apply herbicide IMMEDIATELY (within 10 seconds of cutting) to ground cut stems first, then aerial stems.
- check for reshooting within 6 weeks, retreating where necessary.
  e.g. Morning Glory, Moth Vine, Ivy.
  Note: NOT suitable for vines with aerial tubers e.g. Madiera Vine.

4. Stem scrape **(using knife and herbicide)**

- working close to ground, scrape along the stem of the plant for about 15-30 cm to expose vascular tissue.
- apply herbicide to exposed vascular tissue IMMEDIATELY (within 10 seconds of scraping).
- take care not to ringbark entire stem.
- leave plant insitu until completely dead, and re-treat if necessary.
  e.g. Madiera Vine, Ochna, Senna, Morning Glory.

5. Cut and Paint **(using saw and herbicide)**



- the plant should not have aerial tubers.
- appropriate on woody weeds up to 10cm basal stem diameter.
- cut stem horizontally close to ground, below any branching stems or side shoots.
- apply herbicide to cambium layer IMMEDIATELY within 10 seconds of making cut.
  e.g. Bitou Bush, Lantana, Privet.

PPE: hat, gloves, safety glasses, long sleeves/ pants, boots sunscreen and insect repellent.

6. Foliar spraying **(Knapsacks and pressure sprayers)**

- the use of herbicide diluted with water at a specific rate.
- most suited for use on certain shrubs, grasses and dense vines.
- foliage should be sprayed to the point of runoff (until every leaf is wet but not dripping).
- do not make up more dilute than required for the job and do not store diluted herbicide as it may breakdown and become inactive.
- always use fresh clean water for mixing not ground or dam water as herbicide may breakdown and become inactive.

Illustration: Taken from Noxious and Environmental Weed Control Handbook - NSWDPI

Various spraying/control regimes and herbicide information is available for use on particular weeds. The NSW Department of Primary Industries has developed a Management guide application for smart devices entitled “NSW Weed Wise” that is available online free of charge. Contact the Noxious Weeds Officer at your local Council or visit http://weeds.dpi.nsw.gov.au/ for further details.

20 Appendix F – Local Bush Regeneration Companies

21 Appendix G – Nest Box and Artificial Hollow Guidelines

22 Appendix H – Planting List