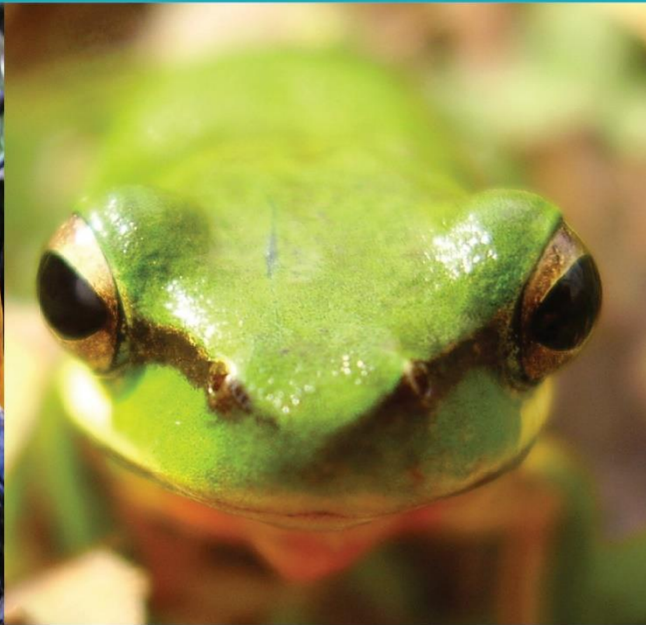




TRIVERS BUSHFIRE & ECOLOGY

A TBE ENVIRONMENTAL COMPANY



CONSERVATION MEASURES IMPLEMENTATION PLAN

Proposed Development
Lots 3 and 4 DP26902
10 and 12 Boondah Road
Warriewood

6 May 2022
(REF: 18HEN03.2)

CONSERVATION MEASURES IMPLEMENTATION PLAN

Lots 3 and 4 DP26902, 10 and 12 Boondah Road, Warriewood

Report authors:	George Plunkett B. Sc. (Hons.), PhD – Botanist – Accredited Assessor no. BAAS19010 Michael Sheather-Reid B. Nat. Res. (Hons.) – Managing Director Accredited Assessor no. BAAS17085
Flora survey:	Lindsay Holmes B. Sc. – Senior Botanist – Accredited Assessor no. BAAS17032 George Plunkett B. Sc. (Hons.), PhD – Botanist – Accredited Assessor no. BAAS19010
Fauna survey:	Nathan Stewart B. Env. Sc. Mgmt. – Fauna Ecologist
Plans prepared:	Sandy Cardow B. Sc.
Approved by:	Michael Sheather-Reid (Accredited Assessor no. BAAS17085)
Date:	6/05/22
File:	18HEN03.2



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The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features is to be confirmed by a registered surveyor.

1. INTRODUCTION

It is a requirement of a standard Biodiversity Certification application that a conservation measures implementation plan be provided which details as to how the conservation measures will be implemented within the site for the purposes of the Biodiversity certification application.

1.1 Mechanism for delivery of conservation measures

The delivery of the conservation measures will be through the retirement of biodiversity credits as determined by the prepared BCAR and the establishment of a conservation area covering proposed C2-zoned lands. This conservation implementation plan is prepared in accordance with the requirements of the Biodiversity Certification application and is intended to form part of the conditions of the certification.

Restricted Development Area (RDA) protected under an 88B instrument for conservation purposes as a DA condition of consent.

The on-ground conservation measures are detailed in a Vegetation Management Plan (VMP) which specifies the conservation and management requirements of the conservation area.

We have attached a Master VMP Layout which will be the basis of the VMP to be approved.

1.2 The responsibility for delivery, including details of biodiversity certification agreements entered or proposed to be entered into.

The responsible party for the delivery and details of biodiversity certification agreements entered into or proposed to be entered into is the proponent for the planning proposal. The proponent acts on behalf of the landowners.

Current landowners

Henry Fraser Pty Ltd
Suite 604, Eastpoint Tower,
Level 6, 180 Ocean Street,
Edgecliff NSW 2027

Cassius Investments Pty Ltd
Suite 604, Eastpoint Tower,
Level 6, 180 Ocean Street,
Edgecliff NSW 2027

Proponent

Henroth Investments P/L
C/- Daniel Maurcici

Suite 604, Eastpoint Tower,
Level 6, 180 Ocean Street,
Edgecliff NSW 2027
Phone: (02) 9302 5333
Mobile: 0409 395 589
Email: dan@henroth.com.au

It is proposed that parts of the current Lots 3 and 4 DP26902, at 10 and 12 Boondah Road, Warriewood within the Northern Beaches local government area (LGA) will be entered into a standard biodiversity certification agreement. The proposed biodiversity certification area is shown below in Figure 1.



Figure 1 – Subject lot (red) and proposed biodiversity certification area (yellow)

1.3 Timing of implementation of conservation measures

Concurrent with the finalisation of the planning proposal (rezoning / amendment of the LEP) will be the granting of the biodiversity certification.

The timing of the implementation of the conservation measures are expected to occur in the following manner:

Concurrent with the preparation and submission of the planning proposal:

- Submission of VMP to Northern Beaches Council for comment, and to BCD for approval

Prior to or concurrent with the granting of the planning proposal consent:

- Finalisation of the VMP subject to consent of planning proposal from BCD

Upon granting of the Development Application consent and prior to the issue of the construction certificate:

- Commencement of the pre-construction VMP works (*Note - no construction certificate required*) and creation of separate conservation lot
- Conservation lot established and protected with fencing
- Continuation of primary restoration works in accordance with the VMP and as listed in section 1.5 below

Note: The 5 year maintenance period commences upon practical completion of primary restoration work as set out within the VMP (approximately 1 year from commencement of pre-construction VMP works)

Following approval of construction certificate:

- Complete project initiation, site preparation, seed propagation, and primary and secondary weed control of VMP

Ongoing

- Monitoring and auditing of conservation measures as set out in VMP

The specific restoration works within the conservation area and the timing of each action is listed within the approved VMP.

1.4 Funding sources for delivery of conservation measures

Funding for the implementation of all onsite works and retirement of the required biodiversity credits this project will be provided by the proponent:

Henroth Group
C/- Daniel Maurcici
Suite 604, Eastpoint Tower,
Level 6, 180 Ocean Street,
Edgecliff NSW 2027
Phone: (02) 9302 5333
Mobile: 0409 395 589
Email: dan@henroth.com.au

Evidence of the ability of Henroth Group to sufficiently fund the conservation outcomes will be controlled by development consent conditions to be imposed by the Northern Beaches Council. The development application will include the following components:

- Provision of one privately held conservation parcel, fully rehabilitated and restored, consisting of the southern-most conservation land.

The proponent proposes to proceed with the imposition of an 88B instrument within the conservation parcel to protect and manage the conservation area.

The proponent is agreeable to appropriate title restrictions being imposed at time of creation of the conservation lot outlining the conservation implementation measures defined within the VMP to be approved by Council as a consent condition at the DA stage.

- Provision of habitat conservation measures within the development including construction of terrestrial movement facilities such as glider poles and under road movement culverts for native fauna. Such measures to be reflected within appropriate development consent conditions.

1.5 Framework for monitoring, reporting or auditing of the implementation of proposed conservation measures

The framework for monitoring and implementation of the conservation measures will be undertaken under the direction of an approved project ecologist to ensure completion of all works as per the approved VMP.

The key components include:

- Appointment of an Project Ecologist to audit the implementation of all biodiversity conservation Implementation measures
- Monitoring as listed below and contained within the attached VMP (*Travers bushfire & ecology 2022*)
- Preparation and submission of an annual audit to Northern Beaches Council for all approved consent requirements and site monitoring and audits. Auditing is to be undertaken for 10 years or a specified in the Biodiversity Certification Approval.

Subject to the approved VMP the following inspection, monitoring and auditing will be undertaken.

A. Conservation Area site inspections

Inspection of the Conservation Area undertaken by a suitably qualified person at the times, and having regard to the purpose, set out below (undertaken in perpetuity):

A. Purpose	B. Interval (starting from the Agreement Date)
To determine the physical condition of fencing and gates and whether they are maintained to a standard that can: <ul style="list-style-type: none"> – reduce and control human and domestic dog access and disturbance – reduce vehicle strike 	Every 12 months
To determine extent of any human disturbance on the Conservation Area	Every 6 months
The proponent must also document any evidence of erosion within other areas of the Conservation Area.	Every 6 months
To determine the presence of rubbish on the Conservation Area	Every 6 months
Baseline biodiversity monitoring as summarised below	Every 5 years
To assess the effectiveness of threatened species habitat management actions	Every 12 months

B. Baseline biodiversity integrity survey plots

Vegetation integrity survey plots must be established with the purpose of providing a baseline for assessing biodiversity outcomes in the future. The numbers and locations of baseline integrity plots are yet to be determined. To be undertaken for 10 years or a specified in the Biodiversity Certification Approval.

These plots will be used to monitor:

- (a) native vegetation management
- (b) threatened species habitat management
- (c) integrated feral pests management, and
- (d) integrated weed management

Each of the above monitoring strategies will be subject to the parameters as follows:

Performance indicator	Species or task	Method of monitoring	Timing
Native vegetation biodiversity	Species count	Monitoring surveys	6 monthly
Threatened species habitat management	Quality and size	Monitoring surveys	12 monthly
Feral Pests	Rabbits	Monitoring surveys	3 months
	Foxes/Dogs/Cats	Monitoring surveys	3 months

C. Photographs

Photographs will be taken at points where the numbers and locations are yet to be determined. These photo points will consist of:

- (a) Photographs are taken from each point within 12 months of the agreement date and then at least every 12 months thereafter.
- (b) The proponent must take photographs according to the specifications below:

The photographs must:

- (i) Be taken in all directions (360°) from the photo point.
- (ii) Be taken at the same location, with the same starting direction for the commencement and direction of the sweep, with the camera held at the same location, height and angle;
- (iii) Show exactly the same field of view each monitoring event, to enable comparison across years;
- (iv) Be clear and of suitable resolution to show detail, and taken at appropriate light conditions to display optimal contrast.
- (v) Be dated, and labelled with the corresponding photo point reference number.
- (vi) Retained by the proponent for the duration of the deed.

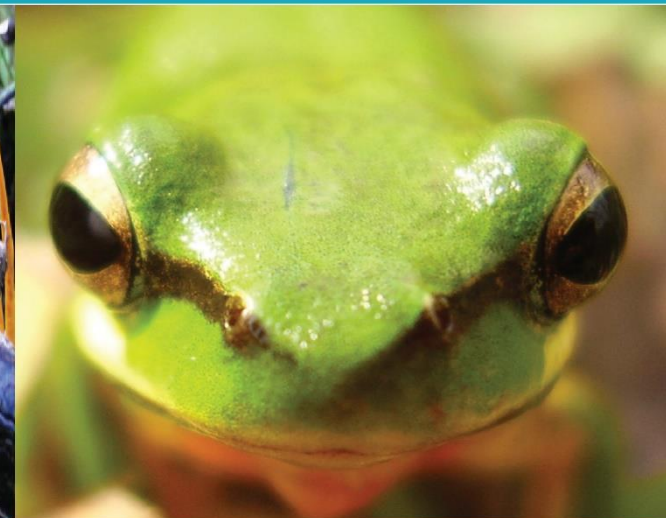
1.6 **Attachments**

Concept Master VMP (*Travers bushfire & ecology 2022*).



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VEGETATION MANAGEMENT PLAN

Proposed Development

Lots 3 and 4, DP 26902, 10-12 Boondah Road
WARRIEWOOD

4 May 2022

(REF: 18HEN03.2V)

VEGETATION MANAGEMENT PLAN (DRAFT)

Lot 4 DP26902, 10-12 Boondah Road, WARRIEWOOD

Prepared for: Henroth Investments P/L
 Prepared by: Travers bushfire & ecology
 Michael Sheather-Reid (B. Nat. Res. Hons.) – Managing Director – BAM accredited
 assessor
 Authors: Robert Sansom (B. Sc. Hons.) – Botanist / Ecologist
 Date: 4 May 2022

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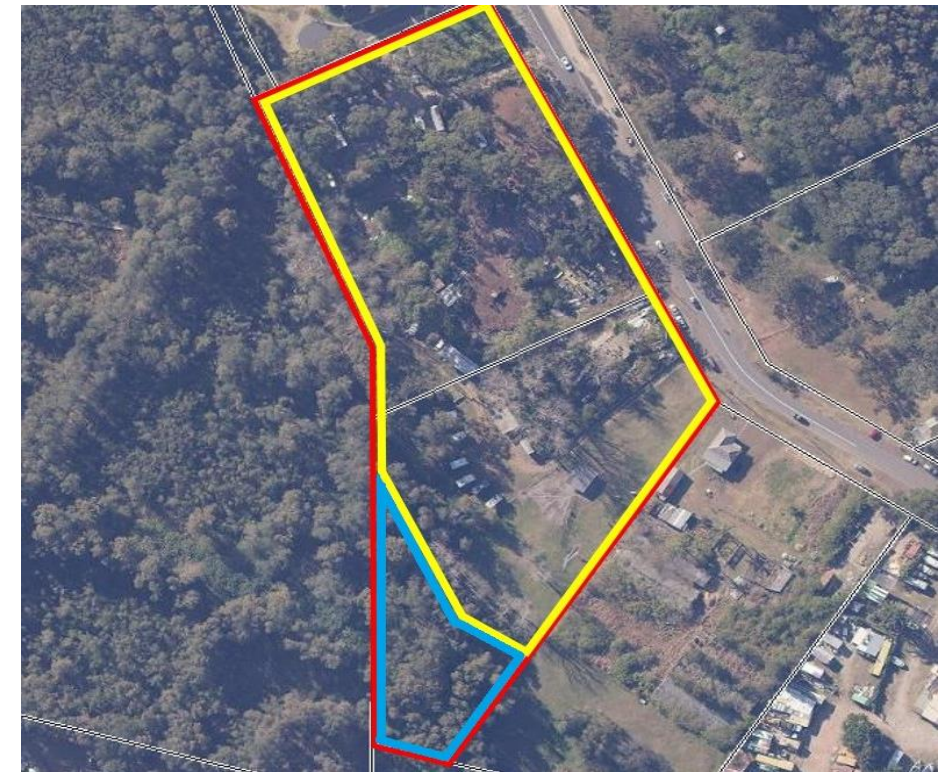


Figure 1 – VMP Restoration Area
 Lots (red), Development Area (yellow), Restoration Zone (blue)



Figure 2 – Concept Masterplan (Source: Buchan, March 2022)



VEGETATION MANAGEMENT SPECIFICATIONS

The purpose of this Vegetation Management Plan, is to document management actions to restore 0.26 ha of Plant Community Type (PCT) 1232 – Swamp Oak floodplain swamp forest, Sydney Basin Bioregion and South East Corner Bioregion within Lot 4 DP 26902. PCT 1232 is commensurate with *Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* which is listed as an endangered ecological community (EEC) under the NSW *BC Act 2016*. This community is also commensurate with *Coastal Swamp Oak Forest* which is listed under the *EPBC Act* as an EEC.

The aims of this VMP include:

- Installation of permanent protection fencing and erosion control fencing
- Engagement of a Project Ecologist to undertake ongoing monitoring, compliance inspections and certifications
- Engagement of a suitably qualified bushland regeneration team
- Weed control and maintenance of replanted areas for a period of not less than 5 years
- Restoration of 0.26 ha PCT 1232 – Swamp Oak Floodplain Swamp Forest, as a fully structured and diverse vegetation community
- Management of the restored vegetation, protective fencing and 9x installed nest boxes for a period of 5 years, with regular inspections by the Project Ecologist and compliance certificates sent to Council

SITE PREPARATION & PROTECTION OF NATIVE VEGETATION

The following site preparation must be undertaken:

- Install permanent protection fencing with two (2) locked access gates and four (4) nest boxes as shown on Schedule 1 - Vegetation Management Plan. This fencing needs to be maintained in perpetuity
- Sediment fencing is to be installed immediately adjacent or in conjunction with the permanent protection fencing along the north-eastern side of the VMP management area for the duration of the maintenance period
- Commence weed control within the whole of the VMP management area prior to commencing planting / enrichment works

FENCING

Permanent fencing is to be installed on the north-eastern aspect boundary of the regeneration area consisting of a 1.8 m high chain link fence as shown in Schedule 1 - Vegetation Management Plan. This fencing shall contain two locked gates, one of which will provide direct access to the area managed under this VMP. The fencing shall remain in place for at least the 5-year maintenance period. Fencing consisting of steel pickets and 4 strands of plain wire will delineate the eastern, southern and south-western boundaries.

HERBICIDE USE

The use of low residue and low toxicity herbicides is recommended in accordance with the manufacturer's labels. Only operators with *Chemcert* or equivalent training must undertake the spraying of weeds. The operator must evaluate the success of each treatment after a set period of time according to the labelled effective method of treatment of each species for each herbicide. Care must be taken when applying herbicides near water bodies due to the sensitivity of waterways and resident flora and fauna. All herbicides must be applied according to the herbicide usage label and provisions of the Protection of the Environmental Operations Act (NSW). Weeding within the permanently fenced restoration area is to be undertaken by hand or via spot spraying and without the use of heavy machinery.

REVEGETATION SPECIFICATIONS

Table 1 provides a recommended revegetation species list. Only plant species typically occurring within PCT 1232 are to be utilised for revegetation purposes, any variation from Table 1 must be approved by the project ecologist. All plants utilised for restoration are to be sourced from the local area, preferably within the Northern Beaches Local Council area. A minimum of 25 native species shall be used as part of the revegetation works. Revegetation planting is to be undertaken preferably in March / April or September / October to avoid mid-summer heat and potential frosts. Revegetation works shall include the planting of native tree, shrub and groundcover species commensurate with PCT 1232 as indicated in Table 1. The planting and regeneration of the VMP management area must achieve the following densities within the fully structured revegetation zone:

- Trees – 1 tree per 50 m² (26)
- Sub-Canopy – 1 per 30 m² (43)
- Shrubs – 1 Shrub per 10 m² (130)
- Groundcovers – 3 groundcovers per 1 m² (3,900) and

- Climbers – 1 climber per 40 m² (33)

NOTE: the above densities are for full restoration planting areas of 2,600 m² in size. It is considered that only enrichment planting at 50% density will be required. Estimated numbers of plants required are calculated within Table 1. As a minimum, holes for tree planting are to be twice the depth and twice the width of the pot size of the plant.

Maintenance

All installed plantings are to be protected with a 2L cardboard box or corflute guards with small supporting stakes to protect from frost and grazing animals such as rabbits. If required, Pindone rabbit baiting is to be undertaken 4 weeks prior to revegetation and throughout the entire maintenance period, (subject to Local Government guidelines)

Weed control works, bush regeneration and restoration are to be undertaken over a minimum maintenance period of five (5) years which begins at the end of the construction phase. Weed control and restoration works are to be monitored and audited by an appointed Project Ecologist to achieve the restoration performance targets.

It is expected that at least 95% of plantings will survive and will be progressively replaced if any plants are observed to die or be destroyed. If the success rate is less than this, contingency planting is to be undertaken to re-establish the performance targets required. Revegetation maintenance including weed control and replacement planting is to be undertaken over a 5-year minimum period. Watering of all revegetated areas is to be undertaken a minimum of once a week for the first six to eight weeks post planting, or as required in the event of a dry spell. A 15% contingency allocation is to be set aside with an estimated additional planting of 3 trees, 7 sub-canopy, 20 shrubs, 607 groundcovers and 5 climbers.

PROJECT MANAGEMENT, REPORTING AND AUDITING

The following project management tasks are to be undertaken:

1. Engagement of qualified and experienced bushland regeneration contractors to undertake all restoration works
2. All plant stock is to be certified as local provenance from the supplier, with preference for seeds collected from similar community types within the locality
3. Engagement of a project ecologist to undertake auditing, reporting and compliance certification
4. Photo points and monitoring quadrats are to be set up at the beginning of contract work to be monitored at least annually for 5 years and
5. A compliance statement is to be submitted to Council upon completion of the revegetation works (practical completion) and at the end of each year for the 5-year maintenance period assessing compliance with the stipulated restoration performance targets

RESTORATION PERFORMANCE TARGETS

The following restoration performance targets are to be audited and compliance certificate issued by the project ecologist demonstrating satisfactory completion of the works in the Vegetation Management Plan and as shown on Schedule 1.

1. A 1.8 m high permanent chain link protective fence with steel posts is to be installed between the proposed development and the restoration area as shown in Schedule 1 – Vegetation Management Plan.
2. Two (2) locked access gates are to be installed within the chain link fence as shown in Schedule 1 – Vegetation Management Plan.
3. Final weed coverage will not exceed more than 5% coverage at the end of Year 1 and less than 3% at the end of Year 5 and is to be free of invasive environmental weed species listed for the Greater Sydney Region within the NSW *Biosecurity Act* (2015).
4. Native vegetation plant density within the restoration zone is to comply with the minimum of:
 - 1 Tree every 50m²
 - 1 Sub-canopy every 30m²
 - 1 Shrub per 10m²
 - 3 Groundcovers per 1m², and
 - 1 Vine per 40m²

5. A minimum of 20 locally-occurring native species commensurate with PCT-1232 as specified in Table 1 are to be utilised in the revegetation works within the restoration area.
6. There is to be no evidence of bare patches or areas of potential soil erosion.
7. A minimum of 95% plant survival is to be achieved, and natural growth rates and plant cover is to be typical of the PCT-1232 vegetation type after 5 years.
8. Twelve (12) nest boxes of similar size to removed hollows will be installed within the restoration area prior to the felling of any hollow bearing trees. These nest boxes are to be inspected and maintained for the whole of the maintenance period of 5 years.

RESTORATION SPECIES LIST

Table 1 – Species List for Planting PCT 1232 – Swamp Oak Floodplain Swamp Forest (Note 1)

Scientific Name	Common Name	No.	Sub Total	Total
Canopy species Enrichment Planting 50% density (0.26ha = 2,600m ²) - 1 per 100m ²			26	
<i>Casuarina glauca</i>	Swamp Oak	12		
<i>Eucalyptus botryoides</i>	Bangalay	5		
<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark	9		
Sub-canopy species 50% Enrichment (2,600m ²) - 1 per 60m ²			43	
<i>Melaleuca linariifolia</i>	Snow in Summer	13		
<i>Glochidion ferdinandi</i>	Cheese Tree	5		
<i>Pittosporum undulatum</i>	Sweet Pittosporum	10		
<i>Livistona australis</i>	Cabbage-tree Palm	5		
<i>Melaleuca styphelioides</i>	Prickly-leaved Tea Tree	10		
Shrubs 50% Enrichment Planting (2,600m ²) - 1 per 20m ²			130	
<i>Myoporum</i> sp.	Boobialla	60		
<i>Melaleuca ericifolia</i>	Swamp Paperbark	70		
Groundcovers 50% Enrichment Planting (2,600m ²) - 3 per 2m ²			3900	
<i>Gahnia clarkei</i>	Tall Saw-sedge	600		
<i>Hypolepis muelleri</i>	Harsh Ground Fern	300		
<i>Centella asiatica</i>	Swamp Pennywort	200		
<i>Calochlaena dubia</i>	Rainbow Fern	300		
<i>Persicaria hydropiper</i>	Knotweed	500		
<i>Blechnum cartilagineum</i>	Gristle Fern	325		
<i>Oplismenus</i> spp.	Basket Grass	600		
<i>Alternanthera denticulata</i>	Lesser Joyweed	150		
<i>Carex appressa</i>	Tall Sedge	400		
<i>Centella asiatica</i>	Indian Pennywort	400		
<i>Commelina cyanea</i>	Scurvy Weed	100		
<i>Phragmites australis</i>	Common Reed	25		
Climbers 50% Enrichment Planting (2,600m ²) - 1 per 80m ²			33	
<i>Parsonia straminea</i>	Common Silkpod	33		
Total No. of plants			4,132	

Note 1: Substitute species - n instances where species are unavailable, different species from the same family may be substituted upon approval from the project ecologist subject to know occurrence within PCT 1232 – Swamp Oak Floodplain Swamp Forest



Lot 4, DP 26902, 10-12 Boondah Rd, WARRIEWOOD

4 May 2022
Ref: 18HEN03.2V

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Vegetation Management Plan

WEED CONTROL

Primary (initial) weed control is to be undertaken prior to any site works to remove highly invasive weed propagules and the bulk of exotic ground layer grasses. All ground and shrub layer weed control works are to be undertaken by qualified personnel from an experienced bushland regeneration company utilising low impact and best practice weed control, restoration, revegetation and bush regeneration methods.

Table 2 – Species List for Planting PCT 1232

Scientific name	Common name	Weed Control Priority
TREES		
<i>Archontophoenix alexandrae</i>	Alexandra Palm	HIGH
<i>Cinnamomum camphora</i>	Camphor Laurel	HIGH
<i>Erythrina sykesii</i>	Coral Tree	HIGH
<i>Morus alba</i>	Mulberry	HIGH
<i>Olea europaea</i> subsp. <i>cuspidata</i>	African Olive	HIGH
<i>Phoenix canariensis</i>	Canary Island Date Palm	HIGH
<i>Populus nigra</i>	Black Poplar	HIGH
<i>Salix babylonica</i>	Weeping Willow	HIGH
<i>Syagrus romanzoffiana</i>	Cocos Palm	HIGH
SHRUBS		
<i>Cestrum parqui</i>	Chilean Cestrum	VERY HIGH
<i>Gomphocarpus fruticosus</i>	Narrow Leaf Cotton Bush	HIGH
<i>Lantana camara</i>	Lantana	HIGH
<i>Ligustrum lucidum</i>	Large-leaved Privet	HIGH
<i>Ligustrum sinense</i>	Small-leaved Privet	HIGH
<i>Ochna serrulata</i>	Mickey Mouse Plant	MEDIUM
<i>Osteospermum fruticosum</i>	Shrubby Daisy-bush	MEDIUM
<i>Ricinus communis</i>	Castor Oil Plant	VERY HIGH
<i>Rubus fruticosus</i> sp. agg.	Blackberry Complex	VERY HIGH
<i>Senna pendula</i> var. <i>glabrata</i>	-	HIGH
<i>Solanum mauritianum</i>	Wild Tobacco	MEDIUM
GROUNDCOVERS		
<i>Acetosa sagittata</i>	Turkey Rhubarb	VERY HIGH
<i>Ageratina adenophorum</i>	Crofton Weed	HIGH
<i>Anagallis arvensis</i>	Scarlet Pimpernel	LOW
<i>Andropogon virginicus</i>	Whisky Grass	HIGH
<i>Arundo donax</i>	Giant Reed	VERY HIGH
<i>Asparagus aethiopicus</i>	Asparagus Fern	HIGH
<i>Axonopus fissifolius</i>	Narrow-leaf Carpet Grass	HIGH
<i>Capsella bursa-pastoris</i>	Shepherds purse	LOW
<i>Cenchrus clandestinum</i>	Kikuyu	HIGH
<i>Cerastium glomeratum</i>	Mouse-ear Chickweed	LOW
<i>Chenopodium album</i>	Fat Hen	LOW
<i>Chlorophytum comosum</i>	Spider Plant	MEDIUM
<i>Cirsium vulgare</i>	Spear Thistle	MEDIUM
<i>Coryza sumatrensis</i>	Fleabane	MEDIUM
<i>Cortaderia selloana</i>	Pampas Grass	VERY HIGH
<i>Cyclosporum leptophyllum</i>	Slender Celery	MEDIUM
<i>Cyperus brevifolius</i>	Mullumbimby Couch	HIGH
<i>Cyperus eragrostis</i>	-	LOW
<i>Cyperus rotundatus</i>	-	LOW
<i>Ehrharta erecta</i>	Panic Veldtgrass	HIGH
<i>Eichhornia crassipes</i>	Water Hyacinth	VERY HIGH
<i>Erechtites valerianifolia</i>	Brazilian Fireweed	VERY HIGH
<i>Euphorbia peplus</i>	Spurge	LOW
<i>Foeniculum vulgare</i>	Fennel	VERY HIGH
<i>Gladiolus</i> sp.	-	MEDIUM
<i>Hedychium gardnerianum</i>	Ginger Lily	HIGH
<i>Hydrocotyle bonariensis</i>	Kumell Curse / Pennywort	LOW
<i>Hypericum perforatum</i>	St John's Wort	LOW

<i>Hypochaeris glabra</i>	Smooth Catsear	LOW
<i>Hypochaeris radicata</i>	Flatweed	LOW
<i>Lilium formosanum</i>	Formosan Lily	HIGH
<i>Ludwigia peruviana</i>	Water Primrose	VERY HIGH
<i>Mentha</i> sp.	Mint	LOW
<i>Modiola caroliniana</i>	Red-flowered Mallow	LOW
<i>Oxalis corniculata</i>	Yellow Wood Sorrel	LOW
<i>Parietaria judaica</i>	Wall pellitory	LOW
<i>Paspalum dilatatum</i>	Paspalum	HIGH
<i>Paspalum urvillei</i>	Vasey Grass	HIGH
<i>Phytolacca octandra</i>	Inkweed	MEDIUM
<i>Plantago lanceolata</i>	Ribwort	MEDIUM
<i>Poa annua</i>	Winter Grass	HIGH
<i>Ranunculus repens</i>	Creeping Buttercup	MEDIUM
<i>Rumex crispus</i>	Curled Dock	LOW
<i>Senecio madagascariensis</i>	Fireweed	LOW
<i>Setaria parviflora</i>	-	HIGH
<i>Sida rhombifolia</i>	Paddy's Lucerne	LOW
<i>Solanum chenopodioides</i>	Whitewort Nightshade	MEDIUM
<i>Solanum nigrum</i>	Black Nightshade	MEDIUM
<i>Soliva sessilis</i>	Jojo	LOW
<i>Sonchus asper</i> subsp. <i>asper</i>	Prickly Sowthistle	LOW
<i>Sonchus oleraceus</i>	Common Sow-thistle	LOW
<i>Sporobolus africanus</i>	Parramatta Grass	HIGH
<i>Stenotaphrum secundatum</i>	Buffalo Grass	HIGH
<i>Strelitzia reginae</i>	Bird of Paradise	MEDIUM
<i>Tagetes minuta</i>	Stinking Roger	LOW
<i>Taraxacum officinale</i>	Dandelion	LOW
<i>Tradescantia albiflora</i>	Wandering Jew	HIGH
<i>Trifolium repens</i>	White Clover	LOW
<i>Verbascum virgatum</i>	Twiggy Mullein	LOW
<i>Verbena bonariensis</i>	Purpletop	LOW
<i>Verbena litoralis</i>	Coastal Verbena	LOW
<i>Viola odorata</i>	Sweet Violet	LOW
<i>Watsonia meriana</i>	Wild Watsonia	HIGH
<i>Zantedeschia aethiopica</i>	White Arum Lily	MEDIUM
VINES		
<i>Monstera deliciosa</i>	Fruit-salad Plant	MEDIUM
<i>Anredera cordifolia</i>	Madiera Vine	VERY HIGH
<i>Araujia sericifolia</i>	Mothvine	VERY HIGH
<i>Cardiospermum grandiflorum</i>	Balloon Vine, Love in a Puff	VERY HIGH
<i>Ipomoea indica</i>	Coastal Morning Glory	VERY HIGH
<i>Lonicera japonica</i>	Japanese Honeysuckle	VERY HIGH
<i>Passiflora edulis</i>	Common Passionfruit	HIGH
<i>Stephania japonica</i> var. <i>discolor</i>	Snake Vine	HIGH
<i>Vicia sativa</i> subsp. <i>sativa</i>	Common Vetch	MEDIUM



Lot 4, DP 26902, 10-12 Boondah Rd, WARRIEWOOD

4 May 2022
Ref: 18HEN03.2V

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Vegetation Management Plan

HOLLOW-BEARING TREES

A total of nine (9) trees containing twelve (12) hollows are located within the proposed development area and APZ for the subject site (*Travers bushfire & ecology*, Biodiversity Certification Assessment Report, April 2022) (Table 3). These trees will be removed by the proposed development.

Table 5 – Data for Hollow-bearing trees to be removed

Tree No.	Common Name	DBH (cm)	Spread (m)	Height (m)	Vigour (%)	Hollows recorded
HT2	<i>Populus nigra</i>	34	28	11	75	1x 0-5cm trunk, 1x 5-10cm trunk
HT3	<i>Populus nigra</i>	56	20	11	75	1x 10-15cm broken trunk (Common Brushtail Possum)
HT4	<i>Populus nigra</i>	90	29	17	75	1x 5-10cm trunk, 1x 5-10cm broken trunk
HT5	<i>Populus nigra</i>	40	21	8	75	1x 0-5cm trunk split
HT6	<i>Populus nigra</i>	30	20	8	75	1x 5-10cm trunk
HT7	<i>Populus nigra</i>	41	35	10	75	1x 0-5cm trunk, 1x 0-5cm trunk split
HT8	<i>Populus nigra</i>	40	26	11	75	1x 5-10cm broken trunk
HT9	<i>Populus nigra</i>	37	38	10	75	1x 5-10cm trunk split
HT10	<i>Populus nigra</i>	54	45	20	75	1x 0-5cm trunk

TREE REMOVAL & HOLLOW RELOCATION STRATEGY

The aim of the hollow relocation strategy is to protect and provide habitat for hollow-dependent threatened fauna species with most potential to occur. Where the felling of hollow-bearing trees is required, this is to be conducted under the supervision of a fauna ecologist to ensure appropriate animal welfare procedures are taken, particularly for threatened species.

Pre-clearing

At least one (1) weeks' notice will be needed prior to the planned date for clearing of any hollow bearing trees. This is required to allow time for inspections of trees for use by fauna and to plan for the safe felling of the tree, and removal of fauna if present. After notice is given of the planned removal of trees a fauna ecologist will inspect the trees for use by fauna. This may include inspection of trees at sunset (stag watching) that allows for the detection of diurnal fauna returning to hollows or nocturnal fauna leaving for the night. Inspections may also require camera probe inspection. All hollow-bearing trees proposed for removal shall be clearly marked with an 'H' Symbol to indicate removal under supervision by a fauna ecologist. A fauna ecologist is to be present at the removal of each habitat tree.

Hollows of high quality or with fauna recorded residing within are to be sectionally dismantled for relocation and all hollows are to be inspected for occupation, signs of previous activity and potential for reuse.

Subsequent to felling, hollows suitable for re-use are to be relocated within remaining bushland areas within the study area. After modification for reinstallation the hollow section is to be reattached to a recipient tree within the nearby conservation areas as selected and directed by the fauna ecologist. The welfare and temporary holding of the residing animal(s) is at the discretion of the fauna ecologist. The hollow section should be well secured in the recipient tree in a manner that will not compromise the current or future health of that tree.

Where retained hollows are placed as on ground habitat and are not reattached to a new recipient tree then they are to be replaced with appropriately sized, high quality, long-life nest boxes.

During clearing

Where fauna is identified within a hollow and the risk of death or injury as a result of machine felling of the tree is high, the tree may need to be felled in sections. This will involve the removal of hollow limbs or sections by chainsaw with the hollow limb lowered to the ground for removal/relocation of fauna. These works are to be carried out by a suitably qualified arborist under the direction of the fauna ecologist.

All hollow limbs will be inspected after felling for occupation by fauna. Any fauna will be removed and relocated to adjoining bushland.

Where young fauna are identified within a hollow whose survival will be at risk as a result of the removal of the hollow or the felling of the tree, then clearing will not be carried out until those young are old enough to leave the hollow and the care of the parents. It is suggested therefore that clearing is not carried out during breeding times when young are likely to be present within hollows (spring-early summer).

Where possible, hollow limbs removed from trees will be collected by the fauna ecologist for re-erection in retained bushland on site. Any fauna injured during clearing will be handed to WIRES or a veterinarian for care and rehabilitation.

Hollow modification for relocation

Hollows that have been selected for relocation are to be modified to provide a dry, enclosed nest. Modifications may include:

- Attaching a ≥17 mm thick marine ply/structural ply at the base which has been cut to provide a good seal and fixing with construction glue and galvanised screws
- Attaching metal brackets or hardwood timber support batten to allow hollows to be screwed into a suitable branch or trunk
- Entrance hollows to be positioned on installation to minimise water entry, located as per the 'nest box specifications'
- Hollow to be painted externally with a non-toxic wood preservative or external paint

NEST BOX INSTALLATION

Twelve (12) nest boxes will be installed within the retained and managed vegetation under the guidance of a fauna ecologist. These nest boxes will replace hollows removed at a ratio of 1 installed for every 1 removed. Nest boxes should be designed as follows:

- Four (4) nest boxes with 1-2 cm sized entry, suitable for microchiropteran bats;
- Four (4) nest boxes with 5-10 cm entries suitable for small birds and mammals;
- Four (4) nest box with 10-15 cm sized entry, suitable for Brush-tailed Possum.

Nest box design

The following specifications apply to the construction of the nest boxes. I also refer to the generic diagrams in Figures 4, 5, 6 & 7.

- Timber is to be of high-grade ply 17+ mm thick (MDF, particle board and low-grade ply are not acceptable).
- The lid is to be hinged at the rear side of the box that is affixed to the tree to allow internal inspections from the front side. Lids are to be well sloped to the front to allow runoff by rain. Hinges are to be robust (not small) and made of brass, stainless steel or galvanised. Lids are to be larger than the overall cross-sectional size of the box and placed so that a small eave exists on all sides to prevent entry of rain.
- Two vertical timber supports (approximately 30x30 mm timber strips 150 mm apart) are to be attached down the rear face of the box so that there are two points of attachment to the trunk on a curved surface and the box does not rock in the wind. This will also provide easy attachment points to the trees without having to screw through the inside of the box. These are to be made of treated pine and any screws into this (for hinges etc.) should be manufactured for use in treated pine or stainless. Holes at both ends of both supports are to be predrilled for easy attachment to trees. Timber supports should not be placed directly onto the box but with small timber spacers so that an eave is permissible along this side of the roof.
- Joints are to be glued and screwed for strength. Glue should be labelled as non-toxic wood glue.
- All fasteners used are to be weather resistant stainless steel, galvanised or other. Screws into the treated pine supports are to be stainless steel or screws manufactured for use in treated pine.
- All fasteners for tree attachment are to be supplied (stainless steel or treated pine coach screws). These are to be a suitable gauge depending on the size of box and suitable length to pass through the vertical timber supports, through the bark and cambium, and into a sufficient extent of heartwood. Heartwood penetration will depend on the size of the box. Screws for small boxes should extend a minimum of 20 mm into the heartwood of hardwood eucalypts and medium boxes ~40 mm. All boxes are to be screwed so that a small distance for growth exists between the timber supports and the trunk. This can be achieved with a small stainless sleeve over the screw.
- 5 mm drainage holes are to be drilled in each corner at the base of each nest box.
- Exterior of the boxes (including treated pine supports) are to be painted with a primer and then a minimum of two coats of external non-alcohol based acrylic paint. The colour selected should be consistent with the colour of the recipient trunk and therefore recipient trees should ideally be prior selected.

Nest box placement

- Nest boxes are to be erected by a qualified arborist under the supervision of the project ecologist or fauna ecologist. A fauna ecologist is to locate appropriate trees and locations for installing the nest boxes. The specific locations of nest boxes within the site are to be determined by the Project Ecologist.
- All replacement nest boxes are to be secured to trees at a minimum height of four metres above ground level facing the east to northeast direction. Place nest boxes as high as physically possible within a tree preferably using a cherry picker or tree climber/arborist - generally the higher the better for consideration to most species.
- Nest boxes and re-erected limbs are not to be placed near locations where public access is planned.
- The larger and more mature tree are to be selected to be nest box recipients where available. This will comparatively reduce the weighted stress on the tree, make the box less visible and result in less change in growth ratio affecting the selected attachment method. Boxes are preferably to be placed on the trunk for structural stability and protection from falling branches.
- Place nest boxes away from continual direct mid-day summer sun.
- Place nest boxes with large entry holes away from any prevailing winds when close to open water-bodies. E.g. protect from strong southerly winds close to the ocean and contrastingly cool-hot westerly winds in different seasons
- Attach nest boxes securely so that they do not shift or shake in response to strong winds or being knocked by the movements of heavier animals, e.g. Possums and goannas.
- To ensure nest boxes are inaccessible to cats and rats or to also assist native species by exclusion of possums, the base of the trunk or branches may also require the installation of tree guards or exclusion collars.
- Nest boxes should ideally be placed in such a way that they are accessible for management but concealed from interference.
- These artificial nest boxes / structures must be accessible for maintenance purposes with an expected life span of 20 years.

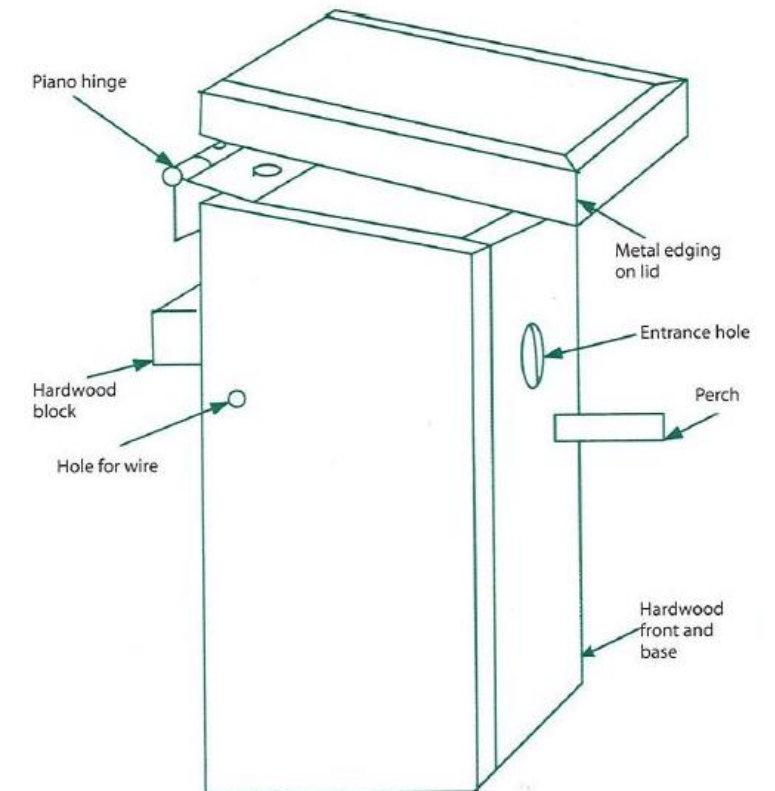


Figure 4 – A generic nest box design
(Source - From Alan and Stacey Franks, 2003)

Nest box attachment

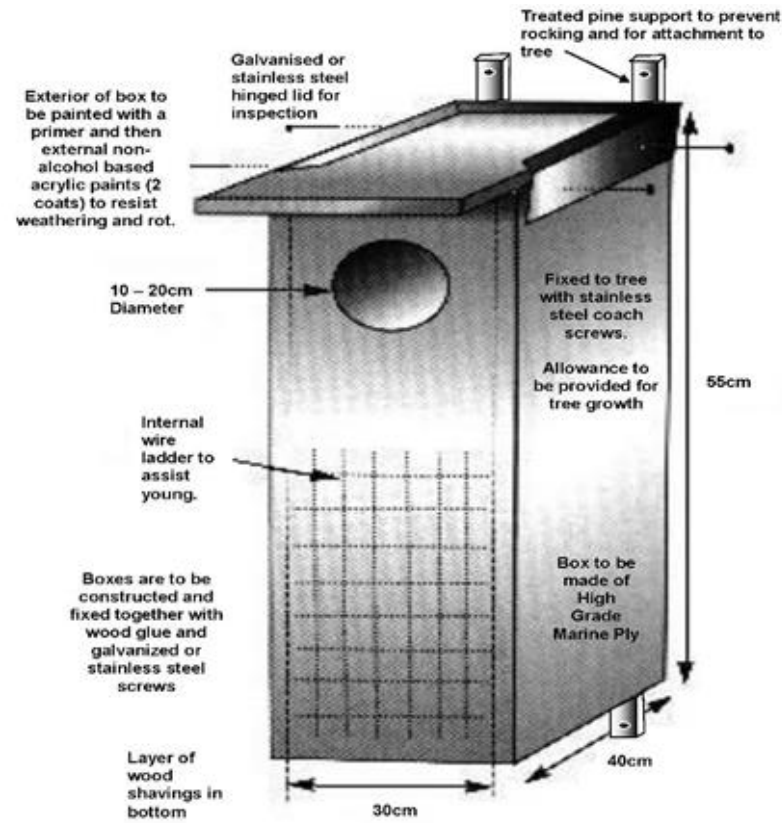
Nest boxes are to be appropriately affixed to a recipient tree under the guidance of a fauna ecologist. Different methods of attachment to the tree are available. *Travers bushfire & ecology* generally recommends that the boxes should be fixed with robust stainless steel or treated pine coach screws that penetrate through the cambium and into the heartwood of the tree to ensure a very secure attachment. Provided that any cambium damage to a tree is not left as an open wound then the chance of fungal infection or insect attack is significantly reduced and the tree will grow around the screw. Any other method of attachment selected should also ensure the box is secured to prevent movement or fall and allows for the future growth of the tree without any cambium constriction over the entire life of the nest box.

Nest box maintenance

- All nest boxes and re-erected limbs will be inspected annually for a minimum of five (5) years and any damaged, or in danger of falling, are to be repaired or replaced.
- Deterring Mynas and Starlings from re-nesting is not easy; these pests are very persistent, and constant vigilance is necessary. This also means that you must have convenient regular access to the nest-box, and that you must be aware of what creatures are using it for what purposes.
- Nest boxes found to be utilised by threatened or otherwise significant fauna may be prioritised for ongoing management to ensure their longevity and replicate their design/placement characteristics.

Table 6 – Recommended dimensions for nest boxes

SPECIES	INTERNAL SIZES	DEPTH/ LENGTH	ENTRY DIAMETER	VERT/ HOR	HEIGHT	REF
Bat sp.	70-100 x 150-240 mm	200-250 mm	15-20 mm slit	v	-	BFNC (n.d.)
Bat, Chocolate Wattled	-	-	10 mm slit	v	-	Trainor (1995)
Bat, Gould's Wattled	-	-	10 mm slit	v	-	Trainor (1995)
Bat, Lesser Long-eared	-	-	10 mm slit	v	-	Trainor (1995)
Little Lorikeet	120 mm	600 mm	60 mm	h	5 m	
Squirrel Glider	200 mm	650 mm	60 mm	v	6 m	



Example 1 - DIMENTIONS APPLIED FOR A LARGE PARROT ROOSTING / NESTING BOX

Note: Small parrot nest boxes will require a reduced entry hole size of 5 – 10cm in diameter

Figure 6 – Typical Dimensions for large Parrot Box



Photo 1 – PCT 1232 – Swamp Oak floodplain swamp forest in the southern portion of the subject land

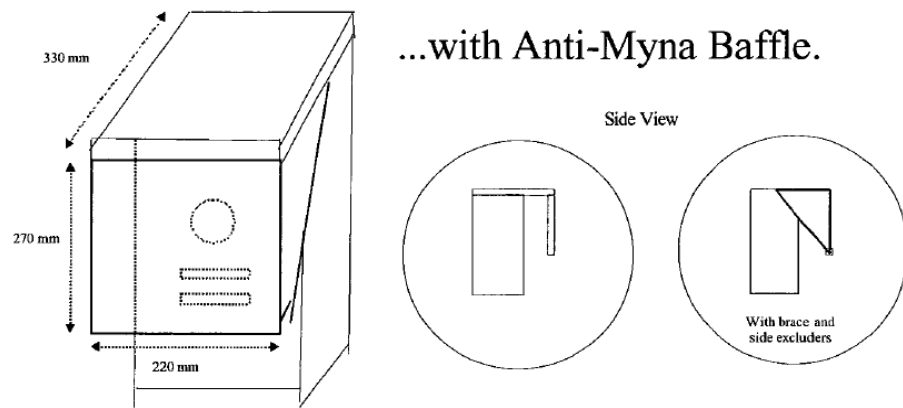
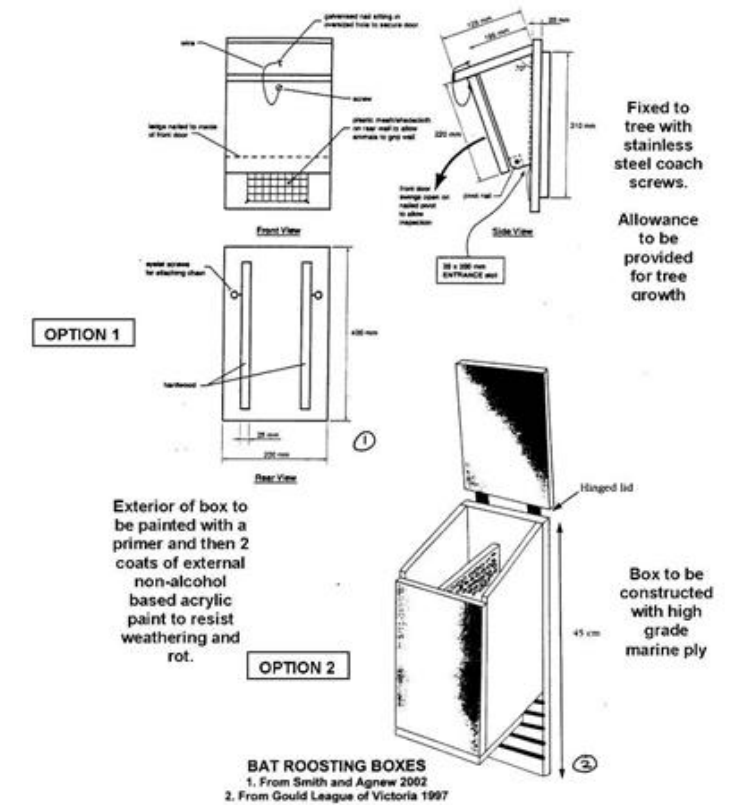


Figure 5 – Anti-Myna Baffle

(Source : From Birds Australia Information Sheet No.5 – 30 July 2001)

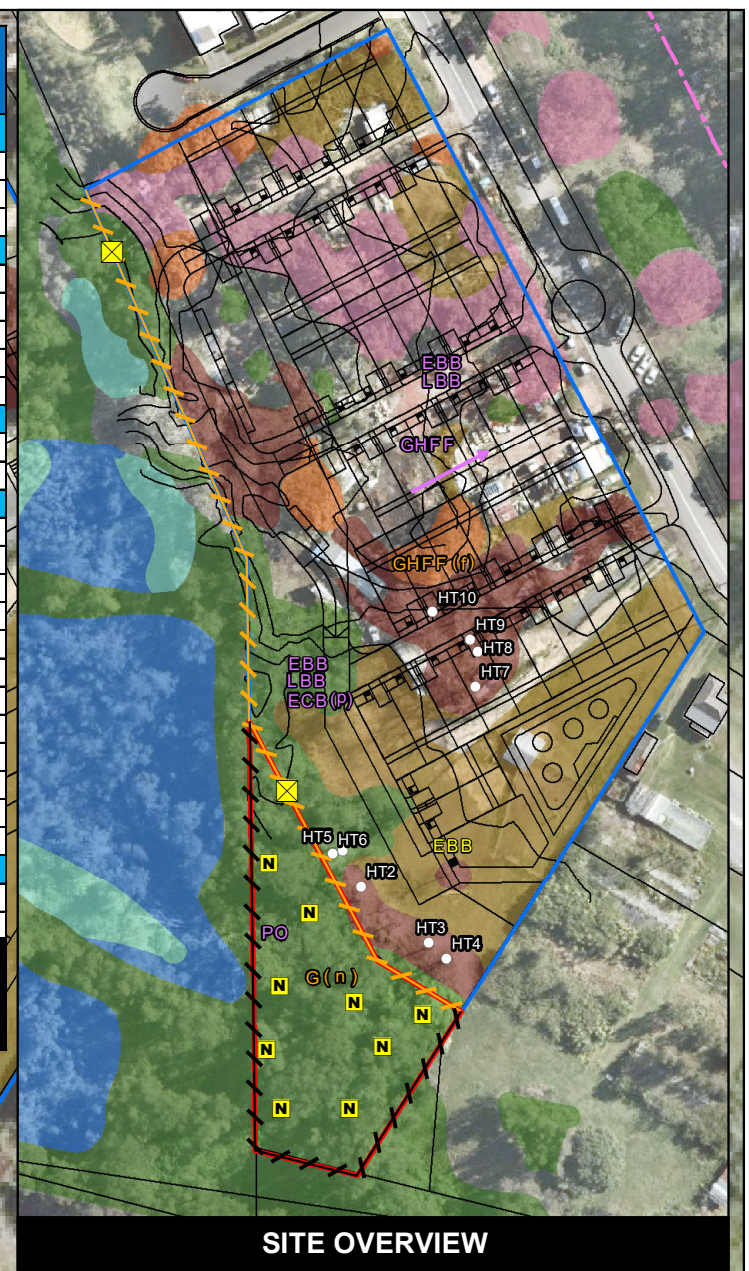


DESIGN 3 - MICROBAT NEST BOX DETAIL (Option 1 & 2)
Note: Alternative designs available for alternative mounts

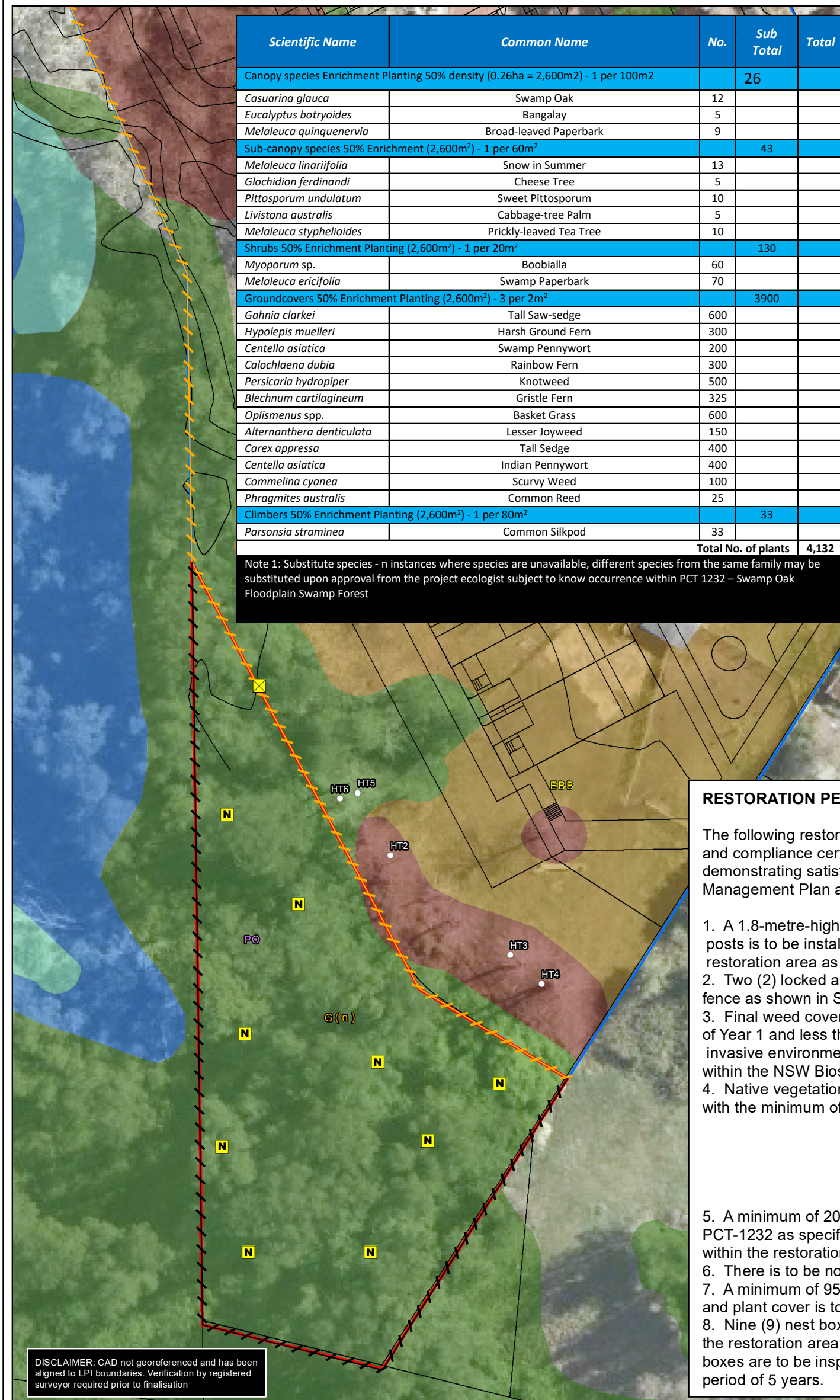
Figure 7 – Microbat Roost Box detail

Scientific Name	Common Name	No.	Sub Total	Total
Canopy species Enrichment Planting 50% density (0.26ha = 2,600m ²) - 1 per 100m ²			26	
<i>Casuarina glauca</i>	Swamp Oak	12		
<i>Eucalyptus botryoides</i>	Bangalay	5		
<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark	9		
Sub-canopy species 50% Enrichment (2,600m ²) - 1 per 60m ²			43	
<i>Melaleuca linariifolia</i>	Snow in Summer	13		
<i>Glochidion ferdinandi</i>	Cheese Tree	5		
<i>Pittosporum undulatum</i>	Sweet Pittosporum	10		
<i>Livistona australis</i>	Cabbage-tree Palm	5		
<i>Melaleuca styphelioides</i>	Prickly-leaved Tea Tree	10		
Shrubs 50% Enrichment Planting (2,600m ²) - 1 per 20m ²			130	
<i>Myoporum</i> sp.	Boobiolla	60		
<i>Melaleuca ericifolia</i>	Swamp Paperbark	70		
Groundcovers 50% Enrichment Planting (2,600m ²) - 3 per 2m ²			3900	
<i>Gahnia clarkei</i>	Tall Saw-sedge	600		
<i>Hypolepis muelleri</i>	Harsh Ground Fern	300		
<i>Centella asiatica</i>	Swamp Pennywort	200		
<i>Calochlaena dubia</i>	Rainbow Fern	300		
<i>Persicaria hydropiper</i>	Knotweed	500		
<i>Blechnum cartilagineum</i>	Gristle Fern	325		
<i>Oplismenus</i> spp.	Basket Grass	600		
<i>Alternanthera denticulata</i>	Lesser Joyweed	150		
<i>Carex appressa</i>	Tall Sedge	400		
<i>Centella asiatica</i>	Indian Pennywort	400		
<i>Commelina cyanea</i>	Scurvy Weed	100		
<i>Phragmites australis</i>	Common Reed	25		
Climbers 50% Enrichment Planting (2,600m ²) - 1 per 80m ²			33	
<i>Parsonia straminea</i>	Common Silkpod	33		
		Total No. of plants	4,132	

Note 1: Substitute species - n instances where species are unavailable, different species from the same family may be substituted upon approval from the project ecologist subject to know occurrence within PCT 1232 – Swamp Oak Floodplain Swamp Forest



SITE OVERVIEW



DISCLAIMER: CAD not georeferenced and has been aligned to LPI boundaries. Verification by registered surveyor required prior to finalisation

RESTORATION PERFORMANCE TARGETS

The following restoration performance targets are to be audited and compliance certificate issued by the project ecologist demonstrating satisfactory completion of the works in the Vegetation Management Plan and as shown on Schedule 1.

1. A 1.8-metre-high permanent chain link protective fence with steel posts is to be installed between the proposed development and the restoration area as shown in Schedule 1 – Vegetation Management Plan.
2. Two (2) locked access gates are to be installed within the chain link fence as shown in Schedule 1 – Vegetation Management Plan.
3. Final weed coverage will not exceed more than 5% coverage at the end of Year 1 and less than 3% at the end of Year 5 and is to be free of invasive environmental weed species listed for the Greater Sydney Region within the NSW Biosecurity Act (2015).
4. Native vegetation plant density within the restoration zone is to comply with the minimum of:

- 1 Tree every 50m²
- 1 Sub-canopy every 30m²
- 1 Shrub per 10m²
- 3 Groundcovers per 1m²
- 1 Vine per 40m²

5. A minimum of 20 locally occurring native species commensurate with PCT-1232 as specified in Table 1 are to be utilised in the revegetation works within the restoration area.
6. There is to be no evidence of bare patches or areas of potential soil erosion.
7. A minimum of 95% plant survival is to be achieved, and natural growth rates and plant cover is to be typical of the PCT-1232 vegetation type after 5 years.
8. Nine (9) nest boxes of similar size to removed hollows will be installed within the restoration area prior to the felling of two hollow bearing trees. These nest boxes are to be inspected and maintained for the whole of the maintenance period of 5 years.

- Legend**
- Site boundary (2.04ha)
 - VMP boundary (0.27ha)
 - Open water
 - Top of Bank "Top of Bank"

- Watercourse (by Category)**
- Category 1 Category 1
 - Category 2 Category 2
 - Category 3 Category 3
 - Riparian Protection Zone
 - Habitat Tree

- Fauna Survey Results 2013**
- EBB Large Bent-winged bat
 - G(n) Goshawk Nest
 - GHFF(f) Grey-headed Flying-fox (foraging)

- Fauna Survey Results 2016**
- SM Southern Myotis (possible)
- Fauna Survey Results (2019)**
- EBB Large Bent-winged bat
 - LBB Little Bent-winged bat
 - SM Southern Myotis
 - SM(r) Southern Myotis (culvert roost)
- Fauna Survey Results (2021)**
- ECB(p) Eastern Cave Bat (possible)
 - LBB Little Bent-winged bat
 - EBB Large Bent-winged bat
 - PO Powerful Owl
 - GHFF Grey-headed Flying-fox

- X Access gate (2)
- N Nest box or augmented hollows (9)
- 1.2m high 4 strand plain wire fence & steel post fence (174m)
- 1.8 m high chainlink fence (223m)

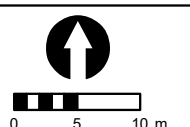
- Vegetation Communities**
- Threatened Ecological Community (TEC)**
- PCT 781 - Coastal Freshwater Lagoons
 - PCT 1232 - Swamp Oak Floodplain Swamp Forest (poor) (0.44ha) (Impacted 0.18ha)
 - PCT 1236 - Swamp Paperbark - Swamp Oak Tall Shrubland
 - PCT 1793 - Smooth-barked Apple - Bangalay / Tuckeroo - Cheese Tree Open Forest (poor) (Impacted 0.23ha)
- (non TEC)**
- Planted and derived exotic vegetation (Impacted 0.27ha)
 - Planted native vegetation (*E. microcorys*) (Impacted 0.10ha)
 - Pasture and weeds (impacted 0.48ha)



PROJECT & MXD REFERENCE
10 & 12 Boondah Road, Warriewood
18HEN03.2_VMP001

DATE & ISSUE NUMBER
29/04/2022
Issue 1

SCALE & COORDINATE SYSTEM
1:600 @ A3
GDA 1994 MGA Zone 56



TITLE
Schedule 1 - Vegetation Management Plan

Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.