Fraser Ecological Consulting



abn 797 637 40114 665 Scenic Road Macmasters Beach NSW 2257 telephone 042323 8193 email alohafraser@gmail.com

Vegetation Management Plan

1020 MELIA COURT, CASTLE HILL

(Lot 1020 DP 876671, Lot 1021 DP 876671, Lot 2 DP 576773 Lot 1020 Melia Court and Lots 2 and 1021 Glen Road, Castle Hill)



6th February 2024

SUMMARY

Fraser Ecological Consulting has been contracted by Castle Hill Glen Pty Ltd to prepare a Vegetation Management Plan (VMP) to comply with the conditions of consent for the enhancement and protection of Blue Gum High Forest (BGHF) Critically Endangered Ecological Community listed under the NSW *Biodiversity Conservation Act 2016* as part of the proposed development at 1020 Melia Court, Castle Hill.

This VMP directs the management of Lot 1 and forms the positive covenant for the Restricted Development Area as part of the previously approved 22 lot residential subdivision. This update includes recent information on the site based upon the Biodiversity Assessment Report (BDAR) for the proposed development application. The VMP is designed to address the Hills Shire Council's statutory obligations to protect and enhance BGHF on private property in accordance with the *Biodiversity Conservation Act 2016* and S.5A of the *Environmental Planning and Assessment Act 1979*.

The VMP includes restoration and weed management techniques, environmental protection measures and recommendations for revegetation to achieve biodiversity conservation outcomes during the 5 year maintenance period to be managed by the Community Association.

Like most remaining BGHF remnants, the health of this vegetation community is poor with weed invasion high with the predominant weed species being Morning Glory (*Ipomoea indica*) vines among existing remnant Sydney Blue Gum (*Eucalyptus saligna*) trees. Introduced environmental and noxious weeds are inhibiting juvenile recruitment of the BGHF species. The resilience (presence of native soil seed bank) appears to be highly suppressed by weed growth, however, the site displays potential for natural regeneration and is worthy of conservation efforts due to the presence of a hectare area of Critically Endangered Ecological Community.

Revegetation works are likely to be required during the second year of the VMP works once there is a better understanding of the regeneration progress of the native soil seedbank after primary and secondary weed clearing works are completed. Natural regeneration from the soil seedbank is preferred over revegetation. However, it is highly likely supplementary revegetation works are required to provide additional canopy cover and hopefully it will inhibit weeds whilst still allowing natural regeneration for most of the site.

Weed control from areas of high resilience to low resilience, upper slope to lower slope in accordance with the *'Bradley Method'* (Buchanan 1989) shall be undertaken in 3 stages described as primary, secondary and maintenance weeding. Weed control techniques including mechanical and hand removal and herbicide application have been described in detail and have been recommend for particular species of concern including woody weeds, small hand pull-able plants and those with underground reproductive structures. Methods, densities and maintenance procedures for revegetation with locally sourced BGHF species were provided to supplement existing native vegetation.

Recommended environmental protection measures to be implemented to protect BGHF on site included protection fencing, erosion and sediment control, stormwater management, and preventing spread of weed and soil pathogens via machinery.

A schedule of works is provided to implement the plan for a period of 5 years under the supervision of a suitably qualified and experienced bush regeneration contractor to be engaged to undertake any revegetation planting, restoration and maintenance weed control. The major goal of the establishment phase (required prior to the release of the Subdivision Certificate) is the bulk primary clearing of Morning Glory (*Ipomoea indica*) vines, creation of informal maintenance tracks, monitoring quadrat points and installation of fencing and signage.

It is envisaged the agreement between Hills Shire Council and the applicant to implement this plan will produce a positive outcome for the retention and improvement of BGHF within the Restricted Development Area.

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Alex Fraser also hold an Animal Research Authority under the Animal Research Act (1995), as administered by NSW Agriculture. Surveys are approved and supervised by an Animal Care and Ethics Committee, applying the standards as detailed in the Australian Code of Practice for the Care and Use of Animals for Scientific Purposes (NHMRC 1997).

1. Introduction

Fraser Ecological Consulting has been contracted by Castle Hill Glen Pty Ltd to prepare a Vegetation Management Plan (VMP) for the enhancement and protection of Blue Gum High Forest (BGHF) Critically Endangered Ecological Community listed under the NSW *Biodiversity Conservation Act 2016* for the proposed development application.

The VMP is designed to address Hills Shire Council's statutory obligations to protect and enhance BGHF on private property in accordance with the *Biodiversity Conservation Act 2016* and S.5A of the Environmental Planning and Assessment Act 1979. The VMP includes restoration and weed management techniques, environmental protection measures and recommendations for revegetation to achieve biodiversity conservation outcomes during the 5 year maintenance period to be managed by the Community Association.

The BGHF proposed for retention is approximately 0.8 ha (outside the APZs) and is a Critically Endangered Ecological Community listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the NSW *Threatened Species Conservation Act 1995*. Less than 5% of the original extent of this vegetation community remains. Appendix 1 lists features of this community.

This report provides recommendations including:

- The removal and suppression of weeds from remnant Blue Gum High Forest over a 5 year period
- The re-vegetation of areas
- Silt, erosion, soil and water management strategies
- Monitoring and reporting requirements for plan implementation
- Timeframes and scheduling of proposed works

As part of the previous subdivision approval, the consent authority, the Hills Shire Council, has stipulated that the remnant BGHF, naturally occurring on the site, are to be incorporated into this development and regenerated within the Restricted Development Area known as Lot 1 (Figure 1-3).

The following page shows the previous Council conditions relevant to the preparation of this VMP.

16H. Bushland Protection Fencing

Prior to any works commencing on site temporary Bushland Protection Fencing must be in place at the following locations:

At the boundary of the works area required for construction of Shoring Wall RT4 and the remnant native bushland within Lot 1.

The temporary fence is to be a minimum chain-wire fence or similar and be suitable to restricted unauthorised entry.

The temporary fence is to stop the following occurring:

- Stockpiling of materials within significant bushland.
- Placement of fill within significant bushland.
- Parking of vehicles within significant bushland.
- Compaction of soil within significant bushland.
- Cement washout and other chemical or fuel contaminants within significant bushland.
- Damage to threatened plants and their habitat.

45. Vegetation Management Plan

A Vegetation Management Plan must be prepared in accordance with Council's Guidelines for preparing a Vegetation Management Plan (available on Council's website http://www.thehills.nsw.gov.au). The Plan must be prepared by a suitably qualified bush regenerator or restoration ecologist with a minimum Certificate IV in Conservation Land Management. The Plan must be submitted to Council's Manager – Environment and Health for approval.

The Vegetation Management Plan must include details relating to:

- The rehabilitation and management of native vegetation within the Community Association Lot/ Restricted Development Area.
- The production of an information fact sheet (maximum 1 page double sided) prepared in accordance with Council's *Guidelines for preparing Information Fact Sheet* (available on Council's website).
- The wording and erection of signage at key locations.
- The location and type of fencing required.

46. Vegetation Management Plan (VMP) Implementation

All performance criteria for the establishment phase of the VMP (5 years) must be complied with prior to the issue of a Subdivision Certificate.

A statement certifying such compliance must be provided by the author of the VMP or an equally qualified and experienced person.

Consideration may be given to early release of a Subdivision Certificate in lieu of this by agreement with Council's Manager – Subdivision and Development Certification, based on alternative arrangements to secure the completion of works.

Such agreement must comply with s109J(2) of the EP&A Act and will be conditional upon there being no circumstances prohibiting the issuing of a Subdivision Certificate contained within s109J(1) of the EP&A Act at the time of any such agreement.



Figure 1: The VMP works areas (Lot 1 – Restricted Development Area) comprising 1.16 hectares (shown in red polygon)



Figure 2: The VMP works areas in relation to surrounding catchment



Figure 3: The VMP works areas (Lot 1 – Restricted Development Area) shown in red polygon in relation to the previously approved subdivision residential lots (shown in red polygon)



Figure 4: The VMP works areas (Lot 1 – Restricted Development Area) shown in red polygon in relation to the approved subdivision residential lots (shown in red polygon)



Figure 1 Southern intact BGHF remnant proposed for retention (red diagonal shaded area) equating to approximately 1.5ha as part of the currently proposed development application

1.1 Aims:

The aim of the VMP is to:

1) Conserve, rehabilitate, enhance and protect the remnant vegetation of high conservation value and to maintain and improve the faunal habitat of the site

2) Manage the site in accordance with best practice environmental and biodiversity conservation guidelines

3) Implement measures directed at minimising impacts on the environment

1.2 Objectives

The purpose of the VMP is to:

- implement actions of any recovery plan for BGHF
- provide an inventory of native and exotic plant species present on site
- provide details on the conservation of the plant gene pool on site
- provide details of site preparation for rehabilitation e.g. weed control
- provide a list of recommended BGHF species to be incorporated into revegetation works
- describe the monitoring and revision process
- to prepare a schedule of works for the plan's implementation

1.3 Outcomes

The following outcomes summarise what the aims and objectives of this VMP will achieve in practise.

- Conservation of and improvement of existing BGHF on the site within increased species diversity of the community
- Reduction in the abundance of and diversity of weed species using best management techniques which will minimise disturbance to the environment
- Providing future landowners of the site an appreciation of conserved BGHF as result of on ground restoration works and shall be managed by the Community Association over the 5 year period

2. Methods

2.1 Desktop survey

A desktop survey is performed to ensure all relevant documentation is considered when preparing the plan. Documents surveyed include:

- Aerial photographs
- Native Vegetation of the Cumberland Plain Maps (Tozer 2003)
- Sydney Metropolitan Catchment Management Area (SMCMA) draft vegetation mapping of the surrounding landscapes including Blue Gum High Forest vegetation communities (DECCW 2009)
- Department of Environment Climate Change (DECC) vegetation community definition of the Blue Gum High Forest in the Sydney Basin Bioregion Critically Endangered Ecological Community (NSW Scientific Committee 2009)
- *Guidelines for the preparation of Vegetation Management Plans* (Department Infrastructure Planning and Natural Resources 2007).
- *Best practice guidelines for Blue Gum High Forest* (Department of Environment and Climate Change 2008).
- Sydney Soil Landscape Series Sheet 9130 (Chapman and Murphy 1998)
- Development Consent issued

2.3 Field Surveys

A visual inspection was undertaken on the 3rd October 2023 to identify and evaluate the current vegetation community occurring on the subject site, identify any threatened flora and fauna species and assess the current nature and extent of fauna habitats. Features of the vegetation including floristics, structure, extent, type and projective foliage cover, presence of weed species and other significant features were noted and recorded). All flora recorded were predominantly identified to family, genus and species level with confirmation according to *Field Guide to the Native Plants of Sydney* (Robinson, 2003), *Weeds of the south-east: an identification guide for Australia* (Richardson, 2006) and the Botanic Gardens Trust (2009) *PlantNET* flora database. The DECCW definition of the vegetation composition for the Blue Gum High Forest was used as a guide to identify species that are characteristic of the BGHF community (NSW Scientific Committee, 2009).

Activities specifically related to the preparation of this VMP included:

• Identification of weed species recorded from the subject site

- Determination of appropriate revegetation and rehabilitation techniques
- Determination of appropriate weed control techniques
- Outlining the applicant's responsibilities including environmental safeguards, performance criteria and preparation of a schedule of works for the plan's implementation.

3. Site description and ecological values

3.1. Site characteristics

The Fraser Ecological was commissioned by EinV on behalf of Castle Hill Glen Pty Ltd (Property Owner) to provide an Arboricultural Impact Assessment (AIA) report for trees at 1020 Melia Court, Castle Hill (subject site). The subject site is located within The Hills Shire Council Local Government Area (LGA) (Figure 1).

The project involves the re-development of 1020 Melia Court in Castle Hill for Planning Proposal Application to the Hills Shire Council. The site is to be developed for a mix of low and medium density residential buildings including a new public park, series of open spaces and public domain upgrades.

The project includes:

- A Publicly Accessible Park "Rogans Hill Park" that is designed to provide a natural play area and outdoor fitness opportunities.
- Six (6) residential flat buildings, with heights ranging from three to six storeys, containing 147 apartment units.
- 38 terraces, each spanning between two and three stories.
- A series of connected biodiversity corridors connecting the existing Blue Gum High Forest and WSUD infrastructure that provide new opportunities for habitat for local flora and fauna.
- A central loop road to enhance accessibility and circulation to each public and communal space.

Term	Definition
Subject Land	Lot 1020 DP 876671 Melia Court CASTLE HILL NSW 2154
	Lot 1021 DP 876671 Glen Road CASTLE HILL
	Lot 2 DP 576773 Glen Road CASTLE HILL NSW 2154
Subject Land Area	4.5 hectares (ha) – all 3 lots mentioned above combined
Development Footprint	The footprint of the works proposed as part of the subdivision (ie roads and services) and the likely footprint of future residential development (ie building envelopes, landscaped areas, driveways, OSD basins and other engineered structures). This would be equivalent to the " <i>operational</i> <i>footprint</i> ".
APZ Impact	Areas subject to future IPA requirements
Canopy Impact	Areas of native canopy outside mapped native vegetation
Impact Area	A combination of the Development Footprint, APZ Impact and Canopy Impact. This would be equivalent to the " <i>construction footprint</i> ".
The Forest	An area of bushland in the south of the subject land which will be set aside for conservation
Local Government Area	The Hills Shire Council
Land Zoning	C4 ENVIRONMENTAL LIVING
Biodiversity	The site is not mapped as Biodiversity on the Hills Shire LEP (2019) terrestrial biodiversity map

Table 1 Site Particulars, Terminology and Definitions



Figure 2: The site in relation to The Hills Shire Council LGA extent map (Source: SIX Maps.com)



Figure 3: Locality aerial map (Source: SIX Maps.com)



Figure 4: Aerial map showing property boundaries (Source: Nearmap.com)



Figure 5 1943 aerial imagery of the subject site



Figure 6: Sensitive biodiversity values map (Source: NSW DPE accessed 25/9/23)



Figure 7 Glenorie and West Pennant Hills Soil landscapes mapped for the site – red arrow (Source: www.espade.com)

3.2 Vegetation and flora

3.2.1 Plant species and vegetation community

Like most remnants of Blue Gum High Forest, the vegetation was considered to be in poor to moderate condition due to past landform modification works occurring immediately upslope of the site which has altered nutrient and drainage patterns that have promoted the spread of introduced understorey species.

The understorey is dominated noxious and other environmental weeds including:

- Morning Glory (Ipomoea indica) HIGHLY DOMINANT
- Crofton Weed (Ageratina adenophora)
- Lantana (Lantana camara)
- Small-leaved Privet (*Ligustrum sinense*)
- Broad-leaved Privet (Ligustrum lucidum)
- Giant Reed (Arundo donax)
- Kikuyu (Pennisetum clandestinum)
- Arum Lily (Zantedeschia aethiopica)
- Indian Shot (*Canna indica*)
- Paddy's Lucerne (Sida rhombifolia)
- Panic Veldt Grass (Ehrarta erecta)
- Chickweed (Stellaria flaccida)
- Blackberry (Rubus fruticosus)

In addition to the dominant canopy of *Eucalyptus saligna* (Sydney Blue Gum) trees, a small abundance of the following native species were recorded:

- Acacia implexa (Hickory)
- Acacia longifolia
- Acacia floribunda (White sallow Wattle)
- Glochidion ferdinandi (Cheese Tree)
- Dichondra repens (Kidney Weed)
- Oplismenus aemulus (Basket Grass)

While the condition of the vegetation is poor, it is still considered worthy of maximum protection to restore and protect the remaining elements of this community. While the presence of a small amount of native species indicates the site does have some native resilience, it requires some intensive and consistent bush regeneration work to ensure regeneration is successful.

Some *Eucalyptus saligna* trees were considered to be exhibiting dieback of the crown, however, a majority were considered to be of good vigour. Their heights averaged from 20-32m with a canopy spread of 16-50 square metres.

Benson and Howell (1990) comment that "the Sydney Blue Gum, Eucalyptus saligna, Blackbutt, Eucalyptus pilularis and Grey Ironbark, Eucalyptus paniculata of the Blue Gum High Forest probably grew to 30-40m, and provided valuable timber. At Pennant Hills, for instance, the trees were described as:'....in general of an uncommonly large size, perhaps more so than in any other part of Cumberland, and therefore very advantageously situated so near a rapidly increasing town'.

The big trees were cut and the land cleared for farms and orchards, suburbs followed the development of the northern railway and today, no sizeable example of the impressive High Forest is left in Hornsby". The site within the Hills Shire at Castle Hill is within the same locality at Pennant Hills.

DECC (2008) lists reasons for the need to conserve Blue Gum High Forest, including:

- This vegetation type is a unique assembly of plants, from giant trees to tiny ground orchids and grasses providing habitat and shelter for a range of native animals, and is part of the distinctive landscape of the Sydney region;
- This vegetation type is not found anywhere else in Australia and provides a living link to ancient Australia;
- Over-mature Blue Gums form hollows large enough to shelter animals, including threatened bird, bats and marsupials; and
- Less than 1% of the total area of this forest type is protected in national parks.
- OEH (2013) comments that "Threats are high. Small-scale clearing associated with residential subdivision, road upgrading, extension and maintenance of service easements etc. pose a threat of ongoing decline in the extent of the community".
- Despite the absence of associated mid-storey and groundcover species, the patches of overmature, mature and early-mature native trees in the subject site comply with the description of the TEC Blue Gum High Forest.

3.2.2 Threatened flora

No threatened flora were recorded on site. The likelihood of them occurring is very low. A BIONET search undertaken by Fraser Ecological, 15th May 2018 has identified 44 state-listed threatened flora species or populations records within 10 kilometres of the site. Of these, 28 species are listed as threatened at the Commonwealth level under the EPBC Act (1999). Threatened flora records are listed in the table below.

Scientific Name	Common Name	NSW status	Comm. status	Records
Acacia bynoeana	Bynoe's Wattle	E1,P	v	27
Acacia clunies-rossiae	Kanangra Wattle	V,P		1
Acacia gordonii		E1,P	E	3
Acacia pubescens	Downy Wattle	V,P	v	17
Allocasuarina glareicola			E	
Ancistrachne maidenii		V,P		2
Asterolasia elegans			E	
Caladenia tessellata	Thick Lip Spider Orchid	E1,P,2	v	1
Callistemon linearifolius	Netted Bottle Brush	V,P,3		11
Cryptostylis hunteriana			v	
Cynanchum elegans			E	
Darwinia biflora		V,P	v	585
Darwinia peduncularis		V,P		25
Dillwynia tenuifolia	Dillwynia tenuifolia Sieber ex D.C. in the Baulkham Hills local government area	E2,V,P		5
Dillwynia tenuifolia		V,P		6
Epacris purpurascens var. purpurascens		V,P		300
Eucalyptus camfieldii	Camfield's Stringybark	V,P	v	36
Eucalyptus nicholii	Narrow-leaved Black Peppermint	V,P	v	8
Eucalyptus scoparia	Wallangarra White Gum	E1,P	v	3
Eucalyptus sp. Cattai		E4A,P		40
Galium australe	Tangled Bedstraw	E1,P		7
Genoplesium baueri	Bauer's Midge Orchid	E1,P,2	E	20
Genoplesium plumosum	Tallong Midge Orchid	E4A,P,2	E	2

Scientific Name	Common Name	NSW status	Comm. status	Records
Grammitis stenophylla	Narrow-leaf Finger Fern	E1,P,3		7
Grevillea caleyi	Caley's Grevillea	E4A,P,3	E	1
Haloragis exalata subsp. exalata			v	
Haloragodendron lucasii		E1,P	E	3
Hibbertia spanantha			CE	
Hibbertia superans		E1,P		197
Hypsela sessiliflora		P,3	х	1
Kunzea rupestris		V,P	v	1
Lasiopetalum joyceae		V,P	v	39
Leptospermum deanei		V,P	v	20
Leucopogon fletcheri subsp. fletcheri		E1,P		25
Melaleuca biconvexa	Biconvex Paperbark	V,P	v	2
Melaleuca deanei	Deane's Paperbark	V,P	v	88
Persoonia hirsuta	Hairy Geebung	E1,P,3	E	30
Persoonia mollis subsp. maxima		E1,P	E	216
Persoonia nutans	Nodding Geebung	E1,P	E	2
Pimelea curviflora var. curviflora		V,P	v	73
Pimelea spicata	Spiked Rice-flower	E1,P	E	1
Pomaderris brunnea	Brown Pomaderris	E1,P	v	1
Pomaderris prunifolia	P. prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	E2		4
Prostanthera marifolia	Seaforth Mintbush	E4A,P,3	CE	2
Pterostylis gibbosa			E	
Pterostylis nigricans	Dark Greenhood	V,P,2		1
Pterostylis saxicola	Sydney Plains Greenhood	E1,P,2	E	1
Pultenaea parviflora			v	
Syzygium paniculatum	Magenta Lilly Pilly	E1,P	v	18
Tetratheca glandulosa		V,P		234
Thesium australe			v	
Triplarina imbricata	Creek Triplarina	E1,P	E	4
Wilsonia backhousei	Narrow-leafed Wilsonia	V,P		4

3.3 Fauna and fauna habitats

No significant hollow-bearing trees occur in the subject site. One tree does contain a hollow but it occurs within the area for the approved retaining wall. The removal of this shall be undertaken under supervision of the Project Ecologist in similar manner to the previous relevant condition of consent (Condition 21(h)) as per below:

21H. Tree Removal and Fauna Protection

Trees with hollows shall be lopped in such a way that the risk of injury or mortality to fauna is minimised, such as top-down lopping, with lopped sections gently lowered to the ground, or by lowering whole trees to the ground with the "grab" attachment of a machine.

Any injured fauna is to be placed into the hands of a wildlife carer (please note only appropriately vaccinated personnel are to handle bats).

No nests were observed in any of the trees and no scats or other evidence of long-term use of any of the trees in the subject site were recorded.

Fauna habitats present on site are limited to:

- leaf litter and groundcover
- seed and fruit resources form eucalypts, acacia and exotic privet species
- upper canopy connectivity and roosting sites within remnant canopy trees
- potential nesting sites for possums within introduced vegetation

Native fauna recorded on site during the relatively short fauna observation period on site included locally common species such as Australian Brush Turkey (*Alectura lathamii*), Dark-flecked Sun Skink (*Lamproholis delicata*), Noisy Miner (*Manorina melanocephala*), Rainbow Lorikeet (*Trichoglossus haematodus*), Laughing Kookaburra (*Dacelo novaehollandiae*) and Pied Currawong (*Strepera graculina*).

The southern forested areas of the site may contain hollow-bearing trees that could not be visible as there were engulfed in environmental weedy vines (*Ipomoea indica* – Morning Glory). As a precautionary measure it has been assumed that habitat for these species maybe present.

3.3.1 Threatened species

As part of the BDAR, targeted surveys were undertaken for Dural Land Snail (*Pommerhelix duralensis*) as the author has previously recorded this species in the locality. This species was no detected in the immediate development impact area, however, this species is highly cryptic and some areas of the southern forest were not accessible due to weedy overgrowth. Therefore, we have assumed presence as a precautionary measure and created a species polygon for credit retirement in case it is indirectly impacted by the proposal (refer to the Biodiversity Assessment Report prepared by Fraser Ecological).

Other mobile threatened fauna species, Grey-headed Flying-fox and a variety of microchiropteran bat species are likely to forage over the subject site, important maternity sites were not observed during surveys.

Two threatened species of fauna, the Powerful Owl and Grey-headed Flying-fox, were detected (vocalisations) during surveys of the subject land. The Powerful Owl was heard from the southern portion of the property boundary during targeted nocturnal surveys possibly on neighbouring lands. No potential nest trees of the Powerful Owl were identified but due to the large amount of overgrown vine impeding access, we have assume presence of this species.

A list of threatened fauna previously recorded in the locality (BIONET database searches) are provided on the following page.

Scientific Name	Common Name	NSW status	Comm. status	Recor ds
Heleioporus australiacus	Giant Burrowing Frog	V,P	v	19
Pseudophryne australis	Red-crowned Toadlet	V,P		157
Litoria aurea	Green and Golden Bell Frog	E1,P	v	9
Varanus rosenbergi	Rosenberg's Goanna	V,P		2
Ptilinopus superbus	Superb Fruit-Dove	V,P		5
lxobrychus flavicollis	Black Bittern	V,P		3
Haliaeetus leucogaster	White-bellied Sea-Eagle	V,P	c	8
Hieraaetus morphnoides	Little Eagle	V,P		11
Lophoictinia isura	Square-tailed Kite	V,P,3		14
Pandion cristatus	Eastern Osprey	V,P,3		1
^^Falco hypoleucos	Grey Falcon	E1,P,2		1
Falco subniger	Black Falcon	V,P		1
Callocephalon fimbriatum	Gang-gang Cockatoo	V,P,3		62
Callocephalon fimbriatum	Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas	E2,V,P,3		57
^^Calyptorhynchus lathami	Glossy Black-Cockatoo	V,P,2		33
Glossopsitta pusilla	Little Lorikeet	V,P		17
Lathamus discolor	Swift Parrot	E1,P,3	CE	22
Neophema pulchella	Turquoise Parrot	V,P,3		2
Polytelis swainsonii	Superb Parrot	V,P,3	V	2
Ninox connivens	Barking Owl	V,P,3		12
Ninox strenua	Powerful Owl	V,P,3		451
Tyto novaehollandiae	Masked Owl	V,P,3		13
Tyto tenebricosa	Sooty Owl	V,P,3		2
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	V,P		1
Anthochaera phrygia	Regent Honeyeater	E4A,P	CE	9
Melithreptus gularis gularis	Black-chinned Honeyeater (eastern subspecies)	V,P		1
Daphoenositta chrysoptera	Varied Sittella	V,P		9
Artamus cyanopterus cyanopterus	Dusky Woodswallow	V,P		26
Melanodryas cucullata cucullata	Hooded Robin (south- eastern form)	V,P		1
Petroica boodang	Scarlet Robin	V,P		8
Petroica phoenicea	Flame Robin	V,P		2
Petroica rodinogaster	Pink Robin	V,P		1
Stagonopleura guttata	Diamond Firetail	V,P		1
Dasyurus maculatus	Spotted-tailed Quoll	V,P	E	11
Phascolarctos cinereus	Koala	V,P	V	12

Scientific Name	Common Name	NSW status	Comm. status	Recor ds
Cercartetus nanus	Eastern Pygmy-possum	V,P		6
Petaurus australis	Yellow-bellied Glider	V,P		8
Petauroides volans	Greater Glider	Р	v	2
Pteropus poliocephalus	Grey-headed Flying-fox	V,P	v	191
Saccolaimus flaviventris	Yellow-bellied Sheathtail- bat	V,P		26
Mormopterus norfolkensis	Eastern Freetail-bat	V,P		52
Chalinolobus dwyeri	Large-eared Pied Bat	V,P	V	2
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V,P		34
Miniopterus australis	Little Bentwing-bat	V,P		22
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	V,P		135
Myotis macropus	Southern Myotis	V,P		34
Scoteanax rueppellii	Greater Broad-nosed Bat	V,P		29
Vespadelus troughtoni	Eastern Cave Bat	V,P		1
Pseudomys gracilicaudatus	Eastern Chestnut Mouse	V,P		2
Meridolum corneovirens	Cumberland Plain Land Snail	E1		23
Pommerhelix duralensis	Dural Woodland Snail	E1	E	33

4. <u>Description of regeneration strategy and on-</u> ground works

4.1 Weed Control

4.1.1 Initial stage of works – prior to release of Construction Certificate/ establishment phase

The immediate weed control issue to be addressed is the extensive invasion of a vine - Morning Glory (*Ipomoea indica*). This weed occurs for a majority of the understorey and mid-storey and is inhibiting the regeneration of native BGHF species (Photograph 1).

Other weed species to be targeted are Broad-leaved Privet and Small-leaved Privet that occur as small trees. Due to the bulk extent of this weed (1.16 ha) it is recommended that this be undertaken via a Tritter machine under the supervision of a bush regeneration consultant (Photograph 2). Alternatively, after consultation with Council (after their approval of this plan) the base of the vines can be 'skirted' and treated in accordance with the recommendations provided in Appendix 1 which included:

Control

Climbing stems can be cut and left in situ to wither and die.

Rooted stems and ground-running stems can be treated with translocatable herbicide such as glyphosate, with some degree of success using the following method:

1. Roll up long ground-running stems, to within 1 m of their first firmly rooted point of contact with the ground.

2. Cut the rolled stems, and either take them off-site for disposal, or leave them to dry out ensuring they do not remain in contact with the soil.

3. Stem-scrape a long section of of the remaining rooted stem (at least 20 cm) and apply the herbicide immediately (within 10 seconds of making the scrape).

The bulk removal of the vines is considered to be the establishment phase which is to be completed prior to the release of the Subdivision Certificate (as per the development consent cited in Section 1 of this plan). This will allow proper ground visibility and establishing of monitoring points for reporting over the 5 year life of the VMP, and therefore, is considered a suitable initial milestone. It will also allow the establishment of an informal maintenance track (over the approximate 1.16 ha area) so the site can be successfully managed over the 5 year maintenance period.

The infestation of introduced weeds Giant Reed (*Arundo donax*) and Canna Lily (*Canna indica*) that occurs upslope of the VMP works area (within the development site) shall be removed as part of the Civil Works bulk civil earth moving contract and taken off-site to a dedicated green waste facility (Photograph 3). These highly invasive weeds should be controlled properly to ensure that they do not spread into the VMP works area further down slope.



Photograph 1: A tritter machine used successfully broad scale primary weed removal works for another VMP management project in the Hills Shire Council



Photograph 1: Bulk weed invasion of 'Morning Glory' in Lot 1

4.2 General strategy

Over the 5 year period it is expected that the regeneration must achieve a minimum of 80% with a weed cover of maximum 5% (DIPNR 2003).

Weed control from areas of high resilience to low resilience, upper slope to lower slope in accordance with the Bradley Method (Buchanan 1989) is to be undertaken in 3 stages described below:

<u>1) Primary weed control:</u> The first step. Targets primary weeds but does not remove all weeds as the soil will be eroded (DEC 2005). Areas identified with the greatest resilience (e.g. around the base of remnant trees) should be cleared first to encourage regeneration from the soil seed bank. Involves getting rid of larger debris and raking up areas of invasive creepers. All non-exotic woody material is to be retained within the BGHF zone as fauna habitat.

<u>2) Secondary weed control:</u> Intensive follow up weeding straight after primary weeding and treating weed seedlings as they germinate (Buchanan 1989). The weeds progress is monitored and some are allowed a month or two of annual weed growth before they are treated. Sites in good condition require little follow-up while others in worse condition require more effort.

<u>3) Maintenance weeding:</u> Maintain and controlling low weed levels ensuring new weeds that have moved into the area or have had the chance to germinate are eliminated. Maintenance weeding

After primary and secondary weeding and natural regeneration of the bushland, the area should be able to resist most weeds. However, weeds will re-establish on the site from bird, wind, water transport and other seed or propagule dispersal mechanisms within the site.

Maintenance weeding should be undertaken 3-6 times a year until such time as the resistance of the bushland to weeds increases, then only requiring hand weeding on a needs basis. Maintenance weeding is to be conducted for a minimum period of five (5) years.

4.3 Weed Management Techniques

Weeds are to be progressively removed in accordance with the following techniques recommended by the National Trust, NSW National Parks and Wildlife Service and Australian Association of Bush Regenerators.

Bush regeneration techniques are described as a guide to infer their intended performance. These techniques are to be implemented by a qualified and experienced bush regeneration company. The use of trained personnel will ensure correct plant identification, work methods and compliance with required Occupational Health and Safety standards.

Woody Weeds Removal Techniques

1) Cut and Paint

This technique involves cutting the weed (using chainsaw, bush/ pruning saw, secatuers or loppers) at the base of the stem an immediately painting them.

- Make a horizontal cut close to the ground using secateurs, loppers or a bush saw; and
- Immediately apply herbicide to the exposed flat stump surface.

Considerations:

- Cuts should be horizontal to prevent herbicide from running off the stump, sharp
- angle cuts are hazardous;
- Herbicide must be applied immediately before the plant cells close (within 30
- seconds) and translocation of herbicide ceases;
- If plants re-sprout, cut and paint the shoots after sufficient regrowth has occurred; and
- Stem scraping can be more effective on some woody weeds.

2) Stem Injection

- At the base of the tree drill 10mm diameter holes at a 45 degree angle into the
- sapwood;
- Fill each hole with herbicide immediately; and
- Repeat the process at 5 cm intervals around the tree.

3) Frilling

- At the base of the tree make a cut into the sapwood with a chisel or axe;
- Fill each cut with herbicide immediately; and
- Repeat the process at 5 cm intervals around the tree.

Considerations:

- Plants should be actively growing and in good health;
- Deciduous plants should be treated in spring and autumn when leaves are fully formed;
- For multi-stemmed plants, inject or chip below the lowest branch or treat each
- stem individually; and

- Herbicides must be injected immediately before plant cells close (within 30
- seconds) and translocation of herbicide ceases.

Small Hand-Pullable Plants Removal Techniques

1) Hand Removal

- Remove any seeds or fruits and carefully place into a bag;
- Grasp stem at ground level, rock plant backwards and forwards to loosen roots
- and pull out; and
- Tap the roots to dislodge any soil, replace disturbed soil and pat down.

Considerations:

- Leave weeds so roots are not in contact with the soil e.g. Rafted in a dedicated area, composted in dedicated bin or removed from the site via green waste bin.

Vines and Scramblers Removal Techniques:

1) Hand Removal

- Take hold of one runner and pull towards yourself;
- Check points of resistance where fibrous roots grow from the nodes;
- Cut roots with a knife or dig out with a trowel and continue to follow the runner;
- The major root systems need to be removed manually or scrape/cut and painted with herbicide; and
- Any reproductive parts need to be bagged.

2) Stem Scraping

- Scrape 15 to 30 cm of the stem with a knife to reach the layer below the
- bark/outer layer; and
- Immediately apply herbicide along the length of the scrape.

Considerations:

- A maximum of half the stem diameter should be scraped. Do not ringbark;
- Larger stems should have two scrapes opposite each other; and
- Vines can be left hanging in trees after treatment.

Weeds with Underground Reproductive Structures Removal Techniques

1) Hand Removal of Plants with a Taproot

- Remove and bag seeds or fruits;
- Push a narrow trowel or knife into the ground beside the tap root, carefully loosen
- the soil and repeat this step around the taproot;
- Grasp the stem at ground level, rock plant backwards and forwards and gently pull removing the plant; and
- Tap the roots to dislodge soil, replace disturbed soil and pat down.

2) Crowning

This technique is useful when the weed may regenerate from root material left in the soil.

- Remove and bag stems with seed or fruit;
- Grasp the leaves or stems together so the base of the plant is visible;
- Insert the knife or lever at an angle close to the crown;
- Cut through all the roots around the crown; and
- Remove and bag the crown.

Herbicide Treatment – Stem Swiping

- Remove any seed or fruit and bag; and
- Using a herbicide applicator, swipe the stems/leaves.

Considerations:

- Further digging may be required for plants with more than one tuber;
- Some bulbs may have small bulbils attached or present in the soil around them
- which need to be removed;
- It may be quicker and more effective to dig out the weed;
- Protect native plants and seedlings; and
- For bulb and corm species the most effective time to apply herbicide is after
- flowering and before fruit is set.

- Exotic vegetation should be removed and stockpiled in a clear area away from adjoining bushland. This stockpile should be removed from the site at a convenient time. As part of the regular maintenance of the restored area any regrowth of the exotic plant species should be removed and disposed of appropriately.

Use of Herbicides

Herbicides are required for use with the cut and paint technique to control woody weeds and spraying exotic herbs and grasses.

Herbicides should not be applied 0 to 12 hours prior to rain occurring. This reduces the herbicides effectiveness as well as being transported in runoff to creek lines and waterways. An advantage of herbicide use is the low time taken to spray weeds as compared to physically removing them, particularly for large infestations of weeds.

The use of herbicides should be considered when:

- There are small areas of dense weeds with few or no native plants to protect;
- There are large areas of weeds;
- The weeds are growing too rapidly for physical removal; and
- The weeds are located in areas with a high potential for erosion if vegetation is removed.
- The spraying of weeds must only be undertaken by persons with Chem-Cert or equivalent qualifications. All staff using herbicide will have appropriate training and appropriate records will be kept in accordance with the *Pesticides Regulation 1995.*
- The success of each treatment must be evaluated by the operator after a set period of time according to the labelled effectiveness for each herbicide.

The use of herbicides is needed where hand removal of weeds is impractical. The use of Glyphosate based herbicides is recommended in accordance with the manufacturers labels. Within 5m of a drainage line only Roundup Bi-active [®] or equivalent formulations can be used. Travers bushfire and ecology recommend the use of Roundup Bi-active [®] within this site due to its proximity to a watercourse.

Other regularly used herbicides include Garlon [®], Brushoff [®], Brush Killer [®] and Starane 200 [®]. These non-Glyphosate based herbicides are not to be used adjacent to water bodies.

Grazon DS is not considered a safe chemical to use within high soil moisture zones and that significant off target kill of woody species and aquatic fauna has been tentatively linked to Grazon DS. It is recommended that this herbicide is not to be used on site.

An advantage of herbicide use is the low time taken to spray weeds as compared to physically removing them, particularly for large infestations of weeds. The disadvantage is that no single herbicide is effective on all weed species, thus the herbicide used needs to achieve an effective kill.
In general, Fraser Ecological supports the use of herbicides if:

- There are small areas of dense weeds with few or no native plants to protect;
- There are large areas of predominantly weed coverage;
- Application can be undertaken without the risk of spray drift or off target kills, and
- Weeds are growing too rapidly for physical removal.

The potential for destabilising soils and causing erosion on steep slopes as a result of spraying vegetation with herbicide needs to be considered prior to commencement of weed control works.

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 treatment of each species for each herbicide. Care must be taken when applying herbicides near water bodies due to the sensitivity of the waterways and resident flora and fauna to runoff containing these herbicides.

All herbicides must be applied according to the herbicide usage label and provisions of the Protection of the Environmental Operations Act (NSW POEO Act).

All noxious and environmental weeds need to be eradicated and controlled across the entire site. Garden waste and weed propagules (seeds, tubers etc.) need to be periodically collected and disposed of at an approved waste transfer facility and shall not be dumped on adjacent bushland or allowed to be washed downstream.

4.4. Mulching

Mulching is an efficient method to impede the establishment of weed species, soil erosion, compaction and desiccation. However, it can also supress the native soil seedbank so should be used only in certain areas deemed suitable by the project ecologist and bush regeneration contractor.

Mulch containing Privet, African Olive, Wandering Jew, Radiata Pine, Willow, Montpellier Broom, Lantana, Oleander, Blackberry, Senna, Wild Tobacco, Giant Reed, Asparagus Fern, Panic Veldtgrass, African Lovegrass, Fishbone Fern, Onion Weed, Ludwigia, Camphor Laurel, Coral Tree, Poplar and aquatic or declared noxious weeds is not to be used.

The Contractor shall ensure the provenance of the mulch is assured, and that any mulch used is properly composted before use. The receipts of all mulch brought into the site should be included in the monitoring reports submitted to Council.

5. <u>Revegetation works and methods</u>

Revegetation works are required during the second year of the VMP works once there is a better understanding of the regeneration progress of the soil seedbank after primary and secondary weed clearing works, and major site establishment work have been completed. Natural regeneration from the soil seedbank is preferred over revegetation.

However, it is highly likely supplementary revegetation works are required to provide additional canopy cover and hopefully inhibits weeds whilst still allowing natural regeneration.

Successful regeneration works have occurred from prescribed burns undertaken by Ku-ring-gai Council and TAFE NSW (NAM Teacher Mark Walters) within BGHF reserves (e.g. Bannockburn Oval and Dalrymple Hay NR) purely for bush regeneration purposes, however, it is unlikely such a burn can be undertaken at this site due to he difficulty in meeting the required timeframes and losgitsics associated with the RFS. However, the possibility of a burn should be considered as a future management tool, and Fraser Ecological would relish the opportunity to be involved in this project if successful in being involved with the 5 year management period of the site.

Supplementary revegetation can be undertaken within the following areas:-

- Open areas where dead trees have been felled and where soil stockpiles have been
- Stormwater Drainage outlets (refer to Section 8.6),
- Bushland interface to rectify any soil disturbance and vegetation removal,
- Any soil disturbance areas such as swales, spreaders or soil contouring.

5.1 Plant Material

All plants will be installed as tube stock or equivalent sizes. All planted stock should be watered-in to settle any air pockets. Further water will occur when deemed necessary by the appointed Contractor depending on rainfall events after planting and season of planting. Planting will only take place where there is no evidence of natural regeneration following secondary weed removal.

Plant material used for revegetation within the project area shall be sourced only from local bushland areas. Plants shall be sourced from provenance specific seed/material collected from within a 5km locality of the site. Non-provenance specific material is prohibited. A list of recognised native nurseries that stock local provenance BGHF material is provided in Appendix 3.

All plants are to be provided in a healthy condition. They must have good root development and a sturdy shoot system. Plant with an elongated or yellowed shoot system shall not be accepted.

Planting shall be undertaken immediately after delivery. If this is not possible, the appointed Contractor shall be required to provide appropriate storage to keep the plants in good condition on the site, adequately protected from frost, wind, sun and vermin. Ideally tubestock and other plants would be planted in autumn (Refer to Section 10 – Schedule of Works).

5.2 Plant species selection

Only locally occurring Blue Gum High Forest species selected from the Scientific Determination for Blue Gum High Forest (Appendix 1) or those identified naturally occurring within the site are to be planted within the BGHF zone.

In general, tubestock are normally planted in a mixed species order and positioned randomly. Groundcovers should be planted in ways that reflect the natural distribution of those groundcover species, such as planting certain species in a group rather than as scattered individuals. It is also recommended that smaller groundcovers be planted within the same planting hole as a tree or shrub. Large specimens may also be planted in groups of three to seven, but should be sufficiently close together to enable a dense cover to form (where this is appropriate, and will not suppress light-demanding groundcovers).

Planting arrangement should also be grouped to allow or spaced to allow access for routine maintenance.

Acmena smithii	Adiantum aethiopicum
Allocasuarina torulosa	Alphitonia excelsa
Angophora costata	Angophora floribunda
Asplenium flabellifolium	Backhousia myrtifolia
Blechnum cartilagineum	Breynia oblongifolia
Calochlaena dubia	Carex maculate
Cissus hypoglauca	Clematis aristata
Clerodendrum tomentosum	Dianella caerulea
Doodia aspera	Elaeocarpus reticulatus
Entolasia marginate	Entolasia stricta
Eucalyptus globoidea	Eucalyptus paniculata
Eucalyptus pilularis	Eucalyptus saligna
Eustrephus latifolius	Ficus coronate
Glochidion ferdinandi var. Ferdinandi	Glycine clandestina
Hydrocotyle laxiflora	Leucopogon juniperinus

Recommended species planting

Lomandra longifolia	Marsdenia rostrata
Maytenus silvestris	Morinda jasminoides
Notelaea longifolia forma longifolia	Oplismenus aemulus
Oplismenus imbecillis	Oxalis perennans
Pandorea pandorana	Persoonia linearis
Pittosporum revolutum	Pittosporum undulatum
Platylobium formosum	Poa affinis
Polyscias sambucifolia subsp. A	Pratia purpurascens
Pseuderanthemum variabile	Pteridium esculentum
Rapanea variabilis	Smilax australis
Smilax glyciphylla	Tylophora barbata
Viola hederacea	

5.3 Planting Methods

Planting holes shall be excavated to a depth of 150 mm and a diameter of 200 mm. Slow release native plant fertiliser (low phosphorous formulated native plant fertiliser tablet/granules) shall be placed into the planting hole. In poorly structured soils, approximately 200 cubic centimetres of native plant soil mix is to be placed and incorporated into the planting hole with fertiliser and water storing granules.

Plants must be placed into moistened soil preferably by soaking 1-2 litres of water into each hole. After planting the soil shall be replaced and carefully firmed, leaving a slight depression around each plant to allow for water collection. Soil is to be replaced in the hole so that the base of the stem is level with the soil surface, not set below the soil, or sitting above.

All plants are to be thoroughly watered before planting and again after planting. If the weather is hot, a third watering shall be carried out within two (2) days or a t-tape or drip irrigation system set up to water plants on a weekly basis.

5.4 Plant Protection

The Contractor shall be responsible for adequately protecting plant material from frost, wind, sun, vermin and animals. Two (2) Litre cardboard guards (including 2 stakes) shall be around each plant and maintained throughout the maintenance period of 12 months. The use of jute mats (mulch mats) is recommended where annual or grass re-growth is expected. Weed free mulch can be used to minimise weeds and retain moisture around plantings.

Plant Maintenance and Weed Control

Tube stock must be suitably maintained (watering and weeding) are to be maintained over a 24 month period on the following basis:-

- 1-3 months post planting weekly watering and maintenance
- 4-12 months post planting monthly watering and maintenance
- 12-24 months watering only during times of extreme heat and maintenance

Site maintenance shall consist of the following tasks:

- Weeding throughout the planting area;
- Watering tubestock;
- Replacing lost plants (as required); and
- Removing wind-blown or other rubbish from the planting area

The Contractor shall provide a preliminary maintenance schedule which incorporates a timetable of works for each of the activities listed above.

6. <u>Permanent fencing</u>

Permanent protection fencing shall be constructed essentially along the edge of the conservation zone area as a 1.8m high cyclone mesh fencing to restrict access into conserved bushland areas of Lot 1.

With the exception of the installation of support posts, no native ground layer vegetation is to be disturbed during the installation of this fence. Gates will be provided at strategic points for access into Lot 1 for weed control works, bushland regeneration works and monitoring.

The fencing shall comply with the previous subdivision approval Council condition as follows:

Condition 16H. Bushland Protection Fencing

Prior to any works commencing on site temporary Bushland Protection Fencing must be in place at the following locations:

At the boundary of the works area required for construction of Shoring Wall RT4 and the remnant native bushland within Lot 1 (no longer relevant to current development application)

The temporary fence is to be a minimum chain-wire fence or similar and be suitable to restricted unauthorised entry.

The temporary fence is to stop the following occurring:

- Stockpiling of materials within significant bushland.
- Placement of fill within significant bushland.
- Parking of vehicles within significant bushland.
- Compaction of soil within significant bushland.
- Cement washout and other chemical or fuel contaminants within significant bushland.
- Damage to threatened plants and their habitat.

7. <u>Signage</u>

Four (4) signs will be erected to raise community awareness in regards to the role of the protected area outside the development site and asset protection zone. Locations are shown in Figure 8.

Unauthorised actions such as native tree removal, native understorey slashing or mowing within BGHF vegetation community would likely impact upon this endangered ecological community. Such unauthorised actions can qualify as illegally picking or disturbing the habitat and could render any person who carried out such action as liable for prosecution under the *Threatened Species Conservation Act 1995* and *National Parks and Wildlife Act 1974*.

An example of signage is given below.





Figure 8 Location of Environmental Protection Area Signage

8. <u>Environmental Protection Measures</u>

The current proposal is to be carried out in accordance with all policies, operational procedures and guidelines in place as part of consent conditions issued by Council relating to environmental management or impact minimisation for construction projects.

All exotic and non-locally occurring native species are to be removed from the BGHF zone.

The following environmental safeguard measures have been recommended for all phases of the proposed development and the implementation of this plan:

8.1 Tree removal and protection

Any native remnant trees proposed for removal due to poor health should be done during the construction stage so that compensatory tree planting can be undertaken immediately. Removed trees should be mulched and re-used on site or logs retained on ground as habitat. All tree removal hall be undertaken in consultation with the Project Ecologist and Council.

All works (including driveways and retaining walls) within 3 metres of any trees required to be retained (whether or not on the land the subject of this consent), must be carried out under the supervision of an 'AQF Level 5 Arborist' or equivalent and a certificate submitted to the principal certifying authority detailing the method(s) used to preserve the tree(s). No excavation, filling or stockpiling of building materials is to occur within 4 metres of any tree to be retained.

8.2 Erosion and Sediment Control

A sediment fence is to be installed on the development side of the permanent protection fence line and is to be firmly trenched into the soil.

All erosion and sediment controls (i.e. geotextile sediment fence and straw bales) shall be in place before any works begin so as to protect the BGHF zone and native fauna habitat. Techniques used for erosion and sediment control on building sites are to be adequately maintained at all times and must be installed in accordance with Council and EPA/DECCW guidelines. All techniques shall remain in proper operation until all development activities have been completed and the site fully stabilised. This condition must be complied with during building work.

Kick-backs are to be installed along all sections of sediment fencing that run downslope to slow down any waters being directed down the fence line. The sediment fence is to be supported by fixed hay bales on low sections of the fence where concentrated runoff is directed through the fence.

Sediment and erosion controls throughout the construction area must be installed in accordance with Landcom's 'Managing Urban Stormwater: Soils and Construction' (2004) (see Figure 9). Techniques used for erosion and sediment control on site are to be adequately maintained and monitored at all

times, particularly after periods of rain, and shall remain in proper operation until all development activities have been completed and the site is sufficiently stabilised with vegetation.



Figure 9 Generic installation detail geotextile sediment fence

Drainage line restoration and outlet scour protection is to be undertaken as per the requirements outlined in Section 3.2. Additional plants are to be installed to assist in stabilisation of moist soils surrounding these works and are to be locally sourced and consistent with native species typically present within a Blue Gum High Forest vegetation community (see Appendix 1).

8.3 Guidelines for hollow bearing tree removal

In addition to the previous requirements of Council Condition 21H:

21H. Tree Removal and Fauna Protection

Trees with hollows shall be lopped in such a way that the risk of injury or mortality to fauna is minimised, such as top-down lopping, with lopped sections gently lowered to the ground, or by lowering whole trees to the ground with the "grab" attachment of a machine.

Any injured fauna is to be placed into the hands of a wildlife carer (please note only appropriately vaccinated personnel are to handle bats).

If required, guidelines for ameliorating the loss of nesting hollows are as follows:

I) Where possible and practical, hollow bearing limbs identified for removal should have the hollow sections collected and re-erected. Where this is not feasible, due to unstable decaying timber, artificial nest boxes providing accommodation of similar size to the removed hollows are to be erected in suitable locations. II) 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. Nest boxes and reerected limbs are not to be placed near locations where public access is planned along reserve areas. All nest boxes and re-erected limbs will be inspected annually and any damaged, or in danger of falling, are to be repaired or replaced.

A fauna ecologist is to locate appropriate trees and locations for installing the nest boxes.

On-ground refugia should be retained where possible consisting of rocks, logs, and wherever appropriate dense under-storey native vegetation.

The following guidelines are provided in the event of a hollow bearing tree that requires removal within the proposed development area.

Pre-clearing

At least one (1) weeks' notice will be needed prior to the planned date for clearing of any trees. This is required so as to allow for suitable time for inspections of trees for use by fauna and to plan for the safe felling of the tree/removal of fauna if present.

All hollow-bearing trees proposed for removal shall be clearly marked with a 'H' Symbol to indicate removal under supervision by a fauna ecologist. The contractor is to be managed such that all due care is taken to prevent damage to trees to be retained and is not to remove the trees without first receiving instruction from the fauna ecologist. A fauna ecologist is to be present at the removal of each habitat tree.

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.

In some cases physical inspections of hollows by climbing trees may be required. This will be carried out by suitably qualified arborists under the direction and supervision of the fauna ecologist.

8.4 BGHF access maintenance path

Due to the large size of the VMP works area being over 1ha, a minimum width vehicle access path is required to ensure effective long-term management of the site.

The access path for site maintenance of the BGHF zone shall be an informal path constructed of mulch or indigenous groundcover re-using logs from primary weed removal (e.g. Privet) for path edging, steps and retaining some areas of loose soil where weed removal as been recently undertaken.

The location of the path cannot be appropriately determined until initial bulk clearing of the vines occur. This may require the removal of dumped fill to re-establish the original site contours and facilitate access and appropriate drainage.

8.5 Fauna habitat protection and creation

All non-exotic woody material is to be retained within the BGHF zone as fauna habitat. The two trees stags are to be retained. Any bush rock encountered within the BGHF zone is to be treated sensitively and retained as habitat.

8.6 Stormwater management

All stormwater discharges from the development shall be dissipated as sheet flow to minimise soil, nutrient runoff, erosion, sedimentation and vegetation disturbance within the BGHF zone on site and neighbouring properties.

Any construction for essential stormwater/ sewerage infrastructure shall be undertaken under the supervision of an 'AQF Level 5 Arborist' or equivalent to minimise damage of critical root zones of remnant BGHF canopy trees.

The separate Soil and Water Management and engineering Plans will dictate the specific location of these outlets.

To comply with NoW requirements, the outlet structures must:-

- Define the route and identification of the specific point of discharge;
- Select a stable section of the stream for the discharge point, preferably mid-way between bends or alternatively, incorporating outlet discharge points into disturbed/eroded areas which are to be stabilised or rehabilitated;
- Minimisation of construction footprint and proposed extent of disturbance to soil and vegetation within and adjacent to the watercourse;
- Demonstration that changes to the hydrology of the receiving watercourse have been assessed and there is no detrimental impact on discharge volumes and channel velocities;
- Ensure discharge from an outlet should not cause bed or bank instability;
- Protection of the bed of the watercourse below the outlet if not bedrock, and or if bed scour is likely and scour protection installed on the opposite streambank;
- Aligning the outlet with the adjoining bank alignment;
- Rock rip-rap, as the preferred outlet material should extend for the full extent of the design scour apron and adjoining flanks/streambank and must be appropriately keyed in to withstand the maximum velocities of runoff or discharge from the site and cut-off trenches should be provided where necessary;
- Rip-rap should consist of durable, angular run-of-quarry rock placed over a bedding layer of angular cobbles over geotextile. Where possible, incorporate vegetation such as sedges and rushes into scour management for further stability;
- Grade scour apron to bed level of the watercourse or just below any permanent water created by any stable feature such as a rock bar within the watercourse; and
- Stabilise and rehabilitate all disturbed areas including topsoiling, revegetation and regeneration, mulching, weed control and maintenance.

8.7 Prevent Spread of Weed and Pathogens

To prevent the spread of weeds and fungal pathogens such as Cinnamon Fungus (*Phytophthora cinnamomi*) and Chytrid Fungus (*Batrachochytrium dendrobatidis*), all machinery shall be cleaned of soil and debris before entering the subject site.

8.8 Tree Pruning and Removal

All tree removal and tree pruning shall be undertaken in accordance with *Australian Standard AS4373-1996 (Pruning of Amenity Trees)* and shall be carried out in a manner that does not adversely affect retained indigenous trees.

9. <u>Monitoring, Reporting and Performance Criteria</u>

9.1 Monitoring and reporting

Progress is to be monitored to evaluate the success of the plan and to make necessary adjustments.

Restoration areas are to be maintained for a minimum of five (5) years.

Monitoring of the progress of weed removal, plant growth and natural regeneration is to be undertaken at regular intervals by the appointed project ecologist who will submit compliance statements to Council at the completion of each major item undertaken within the VMP.

At the beginning of the contract, the project ecologist shall set up monitoring points a that include a photographic record prior to works being undertaken, then quadrat sampling to test the success of the works, and to monitor weed control as well as the growth and density of revegetation works. Four (4) quadrats will be undertaken at a minimum.

Monitoring activities will include:

- 1. A photographic record for comparative purposes taken on an annual basis.
- 2. Flora quadrats to measure the growth and density of the revegetation area and to monitor weed densities at selected locations in the conservation zone.
- 3. An overall vegetation condition map based on standard bush regeneration vegetation condition assessment methodology.

Monitoring of the site is required to be set up at the commencement of restoration works. This will allow the determination of pre and post condition of the vegetation and its habitat, and may include identification of any areas suffering from disturbance, sedimentation or in need of contingency rehabilitation, weed control, stabilisation or maintenance of rehabilitated or regenerating areas.

The monitoring and review process will focus on the presence / absence of exotic species, floristic diversity of the bushland, structural integrity of the bushland, revegetation progress and success, and monitoring of any sediment fencing or protective fencing.

Inspections of the site by the project ecologist should be undertaken prior to, during and post operations to ensure that vegetated areas designated for retention and exclusion zones are adequately marked and that other appropriate protection procedures are being maintained.

An inspection is to be undertaken by the project ecologist every month during primary restoration works, with the submission of a compliance certificate at the completion of the revegetation works. The restoration area is to be maintained to a high standard, with no future encroachments of new landscaping beds, tree removal, installed or repaired services, driveways, fences or buildings.

Following the completion of Year 5 of the maintenance period, the project ecologist is to determine whether any additional contingency works are required to satisfactorily achieve the performance targets. These works are to be managed by land owners or under the supervision of the project ecologist.

The formal monitoring program will start immediately after acceptance of this plan and continue for a period of up to five years. Progress reports will be provided to Council and PCA at the following intervals after initial works have commenced every 6 months for the five (5) year life of this VMP.

These progress reports shall be in the form of the template provided below:

1.	Date of plan approval:	
2.	Tick report interval from date of	🗆 6 month
	council consent	
		🗆 1 Year
		1.5 years
		subsequent
3.	Weed cover (%):	
4.	Major weeds:	
5.	Regeneration success:	
6.	Will revegetating be required?	
7	Number of plants planted	
/.	Number of plants planted.	
8.	Source of plant material.	
9.	Success rate (%):	

10.	Additional plants required/comments:
11.	General progress/Comments:
12.	Assistance required:
13.	Compiled by:
14.	Contact details:
15.	Date:
16.	Signature:

9.2 Compliance certification

Compliance certificates will be issued by the project ecologist for the following items:

- Engagement of a bush regeneration company and project ecologist;
- Installation of all protective fencing (permanent and temporary);
- Sediment and erosion control measures;
- Completion of revegetation planting works including planting of tree, shrub and ground cover species
- Completion of primary weed control works
- Completion of secondary weed control works and revegetation maintenance
- Completion of removal of temporary protection features at the end of Year 5
- Satisfactory achievement of performance criteria

9.3 Performance criteria

Maintenance effort must meet the following criteria

- 1. commencement of all tasks outlined in the VMP or evidence of planning for their implementation
- 2. All exotic and non-locally occurring native species are to be removed from the BGHF zone
- 3. follow up (secondary) weeding needs to be undertaken at the appropriate time, in this case, if primary weeding spraying, cut and paint) is undertaken now, then autumn and spring would be an appropriate time to follow up if necessary. Extensive primary weeding may be totally negated if follow up weeding is not undertaken or inappropriate control is implemented.
- 4. minimum of 85% survival rate of all revegetation.
- 5. failed plant stock is to be replaced monthly with the same species (successful establishment is preferred)
- 6. At the end of the 5 year period weed cover must not exceed 10%.
- 7. no adult seeding woody weeds present by the end of the five year period no evidence of seeding annual weeds present across the site
- 8. evidence that existing weed patches have been contained and are not spreading.
- 9. demonstrate increase in the cover of native species in disturbed areas
- 10. the site is to be maintained in a tidy order and kept free of waste litter

10. <u>Schedule of Works</u>

The following Schedule of Works is to be implemented over the 5 year period from the commencement of the official engagement of the bush regeneration contractor and installation of bushland protection fencing.

All works are to be undertaken direction of the project ecologist and bush regeneration contractor.

The area of BGHF management should be burdened with a restriction and a positive covenant using the "vegetation management plan/ restricted development area" terms included in the standard recitals. This would be required prior to the release of the subdivision certificate.

Important milestones:

- Sediment and BGHF protection fencing installed immediately before commencement of works (please cross reference requirements of the approved Soil Water Management Plan)
- Registration of this plan as
- Engage bush regeneration contractor and project ecologist
- Primary weed removal works shall be done prior to the release of the Subdivision Certificate
- Secondary weeding shall be done within 2 months of the completion of primary weed removal works
- Supplementary planting & maintenance weeding
- 6 monthly monitoring/ reporting and final reporting to be provided to Council

Schedule of Works

Activity No.	Activity	Phase	Personnel responsible	Funding source
1	Submission of fee proposal for VMP works Contractor approvals Engage project bush regeneration consultant and project ecologist	Establishment PRIOR TO RELEASE OF SUBDIVISION CERTIFICATE	Applicant	Subdivision Certificate applicant
2	Undertake Tritter machine bulk removal of Morning Glory vines under supervision of BR consultant	Establishment PRIOR TO RELEASE OF SUBDIVISION CERTIFICATE	Machine Operator Contractor and Bush Regen Consultant	Subdivision Certificate applicant
3	Establish composting piles for green waste and cover with black plastic-	Establishment PRIOR TO RELEASE OF SUBDIVISION CERTIFICATE	Bush Regen Consultant	Subdivision Certificate applicant

Activity No.	Activity	Phase	Personnel responsible	Funding source
4	Establish maintenance track through the works area and map it via survey and (can be identified after initial bulk clearing works undertaken)	Establishment PRIOR TO RELEASE OF SUBDIVISION CERTIFICATE	Bush Regen Consultant	Subdivision Certificate applicant
5	Establish boundaries of VMP works area with galvanised starpickets with safety caps	Establishment PRIOR TO RELEASE OF SUBDIVISION CERTIFICATE	Registered surveyor and bush regen consultant	Subdivision Certificate applicant
6	Establish photo monitoring / quadrat points	Establishment PRIOR TO RELEASE OF SUBDIVISION CERTIFICATE	Bush Regen Consultant	Subdivision Certificate applicant
7	Erect signs informing future residential of the BGHF Conservation Area (minimum of 5 signs)	Establishment PRIOR TO RELEASE OF SUBDIVISION CERTIFICATE	Civil works contractor and Bush Regen Consultant	Subdivision Certificate applicant
8	Identify areas for re-planting	Establishment PRIOR TO RELEASE OF SUBDIVISION CERTIFICATE	Bush Regen Consultant	Subdivision Certificate applicant
9	Make plant order with recognised native nursery and show receipts	Establishment PRIOR TO RELEASE OF SUBDIVISION CERTIFICATE	Bush Regen Consultant	Subdivision Certificate applicant
10	Undertake first monitoring report and provide to Council	Establishment PRIOR TO RELEASE OF SUBDIVISION CERTIFICATE	Bush Regen Consultant	Subdivision Certificate applicant
11	Secondary weed control implemented. Comment: target noxious weeds and environmental weeds. Weeds are to be controlled over the entire site, following guidelines set out above.	Within 1 st year	Bush Regen Consultant	Community Association
12	Plant appropriate tubestock. Plant tree, understorey and groundcover species into regeneration area with allowances for any natural regeneration. Erect plant guards and mulch area. water in.	Within 1 st year or 2 nd year (depending on weed control progress and natural regeneration)	Bush Regen Consultant	Community Association
13	Undertake monitoring report and provide to Council	Every 6 months	Bush Regen Consultant	Community Association
14	Site maintenance and weed program. Weeding and general care of plants 3, 6, 9 and 12 months Replace any dead stock.	Ongoing Year 1-5	Bush Regen Contractor	Community Association
16	Final monitoring report to Council	Year 5	Bush Regen Contractor	Community Association

11. Constraints of the Plan

No rehabilitation plan can recreate all the original components of an ecological community, However, establishment of a number of the components may start a process of succession.

In this case a viable canopy of the community already exists. With the removal of the thick cover of Morning Glory vine, a successional phase may appear. The BGHF restoration for the site will have to vary in time frame and species diversity as natural processes take place after the life of this VMP.

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APPENDIX 1: COASTAL MORNING GLORY WEED CONTROL INFORMATION

<u>APPENDIX 2: Blue Gum High Forest Critically</u> <u>Endangered Ecological Community listing</u>

The Scientific Committee, established by the Threatened Species Conservation Act, has made a Final Determination to list the Blue Gum High Forest in the Sydney Basin Bioregion, as a critically endangered ecological community in Part 2 of Schedule 1A of the Act, and as a consequence omit reference to the Blue Gum High Forest in Part 3 of Schedule 1 of the Act. Listing of critically endangered ecological communities is provided for by Part 2 of the Act.

The Scientific Committee has found that:

1. Blue Gum High Forest in the Sydney Basin Bioregion is the name given to the ecological community characterised by the species assemblage listed in paragraph 2. All sites are within the Sydney Basin Bioregion.

2. Blue Gum High Forest in the Sydney Basin Bioregion is characterised by the following assemblage of species:

Adiantum aethiopicum
Alphitonia excelsa
Angophora floribunda
Backhousia myrtifolia
Breynia oblongifolia
Carex maculate
Clematis aristata
Dianella caerulea
Elaeocarpus reticulatus
Entolasia stricta
Eucalyptus paniculata
Eucalyptus saligna
Ficus coronate
Glycine clandestina

Hydrocotyle laxiflora	Leucopogon juniperinus
Lomandra longifolia	Marsdenia rostrata
Maytenus silvestris	Morinda jasminoides
Notelaea longifolia forma longifolia	Oplismenus aemulus
Oplismenus imbecillis	Oxalis perennans
Pandorea pandorana	Persoonia linearis
Pittosporum revolutum	Pittosporum undulatum
Platylobium formosum	Poa affinis
Polyscias sambucifolia subsp. A	Pratia purpurascens
Pseuderanthemum variabile	Pteridium esculentum
Rapanea variabilis	Smilax australis
Smilax glyciphylla	Tylophora barbata
Viola hederacea	

3. The total species list of the community is considerably larger than that given above, with many species present in only one or two sites or in low abundance. The species composition of a site will be influenced by the size of the site, recent rainfall or drought condition and by its disturbance (including fire) history. The number of species, and the above ground relative abundance of species will change with time since fire, and may also change in response to changes in fire regime (including changes in fire frequency). At any one time, above ground individuals of some species may be absent, but the species may be represented below ground in the soil seed banks or as dormant structures such as bulbs, corms, rhizomes, rootstocks or lignotubers. The list of species given above is of vascular plant species; the community also includes micro-organisms, fungi, cryptogamic plants and a diverse fauna, both vertebrate and invertebrate. These components of the community are poorly documented.

4. Blue Gum High Forest is dominated by a tall canopy of eucalypts that may exceed 30 m in height. Its understorey is typically multi-layered with a midstorey of mesophyllous shrubs and small trees and a diverse ground layer of herbs, ferns and some grasses. Most stands of the community are in a state of regrowth after past clearing or logging activities, and consequently trees may be shorter, less dense or more dense than less disturbed stands. Blue Gum High Forest is dominated by either *Eucalyptus pilularis* (Blackbutt) or *E. saligna* (Sydney Blue Gum). *Angophora costata* (Smooth-barked Apple) is frequently observed in remnants close to the shale/sandstone boundary, but also occurs

infrequently on deep shale soils, as does A. floribunda (Rough-barked Apple). Eucalyptus paniculata (Grey Ironbark) is typically found on upper slopes. A relatively diverse stratum of small trees is usually present, and includes Pittosporum undulatum (Sweet Pittosporum), Elaeocarpus reticulatus (Blueberry Ash) and Allocasuarina torulosa (Forest Oak). Shrub species are typically mesophyllous, such as Breynia oblongifolia (Coffee Bush), Pittosporum revolutum, (Yellow Pittosporum), Clerodendrum tomentosum, Notelaea longifolia forma longifolia (Large Mock-olive), Maytenus sylvestris (Narrow-leaved Orange Bark), Polyscias sambucifolia subsp. A (Elderberry Panax) and Rapanea variabilis (Muttonwood). Mesophyllous species are generally more common in gullies associated with both shale and volcanic soils than slopes and ridgetops. Sclerophyllous species such as Persoonia linearis (Narrow-leaved Geebung) and Leucopogon juniperinum (Prickly Bearded-heath) occur more frequently closer to the shale/sandstone boundary. The ground stratum is often dense and contains a mixture of herb, grass and fern species including Adiantum aethiopicum, Entolasia marginata (Bordered Panic), Lomandra longifolia (Spiny-headed Matrush), Calochlaena dubia (Common Groundfern), Dianella caerulea (Blue Flax Lily), Pseuderanthemum variabile (Pastel Flower) and Oplismenus imbecillis. Vine species are also frequently present, in particular Tylophora barbata (Bearded Tylophora), Eustrephus latifolia, (Wombat Berry), Clematis aristata (Old Man's Beard) and Pandorea pandorana (Wonga Wonga Vine).

5. While no systematic fauna surveys have been carried out across the range of Blue Gum High Forest a number of mammal and bird species listed as threatened in NSW have been recorded as resident or transient in the community. These include the Grey-headed Flying Fox (Pteropus poliocephalus), Yellow-bellied Sheathtail-bat (Saccolaimus flaviventris), Glossy Black cockatoo (Calyptorhynchus lathami) and the Powerful Owl (Ninox strenua).

6. Blue Gum High Forest is typically associated with soils derived from Wianamatta Shale (Tozer 2003), though may occur in adjacent areas underlain by Hawkesbury Sandstone . The community also occurs on soils associated with localised volcanic intrusions, 'diatremes' (Benson and Howell 1994). Typically, Blue Gum High Forest occurs more than 100m above sea level, where rainfall exceeds 1050 mm per annum, although it may be present in sheltered locations with lower rainfall (Tozer 2003). In drier areas and approaching the shale/sandstone boundary, it intergrades with Sydney Turpentine Ironbark Forest, which is currently listed as an Endangered Ecological Community under the TSC Act. Stands that exhibit intermediate characteristics are collectively covered by the Determinations of these communities and may be diagnosed by detailed consideration of the assemblage of species present at the site.

7. Vegetation surveys carried out across the range of Blue Gum High Forest include those of Benson and Howell (1990, 1994) and Tozer (2003). All of these studies describe and map this community as 'Blue Gum High Forest', including map unit 6b 'Tall open-forest: Eucalyptus pilularis - Eucalyptus saligna' of Benson and Howell (1994) and map unit 153 of Tozer (2003). In addition, Benson and Howell (1994) map separately that part of this community which occurs on soils associated with diatremes as 'Glen Forest, map unit 6c, i. Tall open-forest: Eucalyptus saligna', noting that this vegetation was 'very similar to the Blue Gum High Forest of the north shore [i. e. map unit 6b]'. Blue Gum High Forest belongs to the North Coast Wet Sclerophyll Forests vegetation class of Keith (2004).

8. Blue Gum High Forest is found on the north shore and northern suburbs of Sydney and has been recorded from the local government areas of Lane Cove, Willoughby, Ku-ring-gai, Hornsby, Baulkham Hills, Ryde and Parramatta within the Sydney Basin Bioregion and may occur elsewhere in the Bioregion.

9. Blue Gum High Forest has a very highly restricted geographic distribution, and is currently estimated to cover an extant area of less than 200 ha (Tozer 2003). The distribution comprises a series of small remnant patches, the largest of which is less than 20ha. Highly modified relics of the community also persist as small clumps of trees without a native understorey. All remnants of the community are now surrounded by urban development. Consequently, the distribution of Blue Gum High Forest is severely fragmented. Fragmentation of habitat contributes to a very large reduction in the ecological function of the community.

10. Prior to European settlement, about 200 years ago, Blue Gum High Forest is estimated to have covered an area of approximately 3700 ha (Tozer 2003). Its current extent amounts to less than 5% of this original distribution. The dominant eucalypts of the community live for several hundred years. Blue Gum High Forest has therefore undergone a very large reduction in its geographic distribution within a time span appropriate to the life cycle and habitat characteristics of its component species. Small-scale clearing associated with residential subdivision, road upgrading, extension and maintenance of service easements, etc. pose a threat of ongoing decline in the extent of the community. Clearing of native vegetation is listed as a Key Threatening Process under the Threatened Species Conservation Act 1995.

11. Changes in structure of Blue Gum High Forest have occurred as a consequence of the extensive removal of large old trees. A number of stands of Blue Gum Forests have highly modified understories, in which the native woody component has been largely replaced by woody exotic species or by increased abundance of native and exotic grasses. Continued underscrubbing, frequent burning and mowing may maintain the understorey in an artificially open state and prevent recruitment of species with the community. The loss of large trees removes essential habitat for a range of tree-dependent fauna (Gibbons and Lindenmeyer 1996). The reduction of understorey complexity, through the reduction of native shrub cover, degrades habitat for a range of bird and mammal species (Catling 1991). These processes contribute to a very large reduction in the ecological function of the community.

12. The influx of stormwater, which brings excessive moisture, pollutants and nutrients to the remnant forests from surrounding urban areas, is a significant ongoing threat to the ecological integrity of Blue Gum High Forest. This, together with the legacy of past disturbances and the abundance and dispersal of weed propagules from nearby urban areas, results in the invasion, establishment and spread of weeds (Thomson and Leishman 2005). Problematic weed species in Blue Gum High Forest include the following:

Asparagus asparagoides	Bridal Creeper
Cinnamomum camphora	Camphor laurel

Lantana camara	Lantana
Ligustrum lucidum	Large-leaved Privet
Ligustrum sinense	Small-leaved Privet
Ochna serrulata	
Passiflora edulis	Passionfruit
Passiflora subpeltata	Passionfruit
Pennisetum clandestunum	Kikuyu
Rubus ulmifolius	Blackberry
Senna colutioides	
Tradescantia fluminensis	

'Invasion and establishment of exotic vines and scramblers', 'Invasion of native plant communities by exotic perennial grasses' and 'Invasion, establishment and spread of Lantana (Lantana camara L. sens. lat)' are listed as Key Threatening Processes under the Threatened Species Conservation Act. The influx of stormwater, pollutants and nutrients, and the invasion of weeds contribute to a very large reduction in the ecological function of the community.

13. Blue Gum High Forest in the Sydney Basin Bioregion is eligible to be listed as a critically endangered ecological community as, in the opinion of the Scientific Committee, it is facing an extremely high risk of extinction in New South Wales in the immediate future, as determined in accordance with the following criteria as prescribed by the Threatened Species Conservation Regulation 2002:

Clause 25

The ecological community has undergone, is observed, estimated, inferred or reasonably suspected to have undergone, or is likely to undergo within a time span appropriate to the life cycle and habitat characteristics of its component species:

(a) a very large reduction in geographic distribution.

Clause 26

The ecological community's geographic distribution is estimated or inferred to be:

(b) very highly restricted,

and the nature of its distribution makes it likely that the action of a threatening process could cause it to decline or degrade in extent or ecological function over a time span appropriate to the life cycle and habitat characteristics of the ecological community's component species.

Clause 27

The ecological community has undergone, is observed, estimated, inferred or reasonably suspected to have undergone, or is likely to undergo within a time span appropriate to the life cycle and habitat characteristics of its component species:

- (a) a very large reduction in ecological function,
- as indicated by any of the following:
- (b) change in community structure
- (c) change in species composition
- (f) disruption of ecological processes
- (g) invasion and establishment of exotic species
- (h) degradation of habitat
- (i) fragmentation of habitat

<u>Appendix 3: List of local recognised native</u> <u>nurseries</u>

ReVeg- It – Hornsby

Nursery Operator, Mr Fardin Pelarek, (02) 4356 1427 or 0402 659 653

Toolijooa Nursery – Ingleside

Tel. (02) 9970 8709

Toolijooa Nursery – Dural

628 Old Northern Rd, Dural

Tel. (02) 9651 3859

Ku-ring-gai Community Nursery – St Ives

Tel. (02) 9498 0825

Harvest Seeds and Native Plants – Terrey Hills

Tel. (02) 9450 2699

Wirreanda Nursery – Ingleside

Tel. (02) 9450 1400

Sydney Wildflower Nursery – Terrey Hills

Tel. (02) 9450 1555

Tharwa Propagation Nursery – Terrey Hills

Tel. (02) 9450 1967

<u>APPENDIX 4: RELEVANT QUALIFICATIONS &</u> <u>EXPERIENCE OF THE AUTHOR</u>

Alexander Fraser

alohafraser@gmail.com

0423238193

665 The Scenic Rd Macmasters Beach, NSW 2251

Key skills

- 12+ years private ecological consulting (Fraser Ecological Consulting)
- 15 + years local government ecological assessment for DAs (Hornsby Shire Council – current employer)
- 10 + years Land & Environment Court expert witness experience
- 2 years state government ecological assessment (NSW OEH)
- High level botanical field identification skills, plot surveys and project management
- Fauna survey and field assistant experience
- Biodiversity Assessment Reporting (BDAR) preparation and Stewardship Site (BSAR) under the NSW BOS Credit Scheme

Qualifications

Bachelor Environmental Science (Honours) Southern Cross University

Certificate 3 Natural Area Restoration

Certificate 3 Vertebrate Animal Pest Control (NSW DPI, Orange)

NPWS Scientific Licence - S10445

Animal Ethics Authority - 11/4299

Accredited under the Biodiversity Assessment Methodology - BAM (Accreditation No. BAAS18156)

Practising member of NSW Ecological Consultants Association (ECA)

Summary

Alex Fraser (Principal Ecologist, Fraser Ecological) has extensive experience in DA related ecological assessment as both an assessor (Hornsby Shire Council) and private consultancy (Fraser Ecological) which actively and currently involve a wide array projects. Fraser Ecological is based locally on the Central Coast, however, project experience extends to South Coast, Blue Mountains, Mid-north Coast and mainly in the Sydney Basin Bioregion.

Previous work roles include ecological consulting for Parsons Brinckerhoff (large infrastructure), NPWS threatened species unit (biodiversity surveys), former NSW Department of Climate Change/ OEH (SIS DGRs and major projects assessment) and Hornsby Shire Council (DA assessment officer) have focussed primarily on ecological survey, development assessment, project management and policy development for consent authorities.

Alex offers high level botanical ID and field survey skills which includes targeted surveys and BAM plot surveys. Fraser Ecological has extensive experience in the preparation of over 15 BDARs under the new BC Act 2016 BOS credit trading scheme. Alex has experience dealing with consent authorities including Council, Crown Lands, Metropolitan Land Council, RFS, Biodiversity Conservation Trust and Department of Planning for major projects including SSDI proposals.

Fraser Ecological has established a wide network of ecological specialists including the Royal Botanic Gardens and Australian Museum as well academic institutions for expert advice when required. Alex is a current member of the North Sydney Regional Land Managers Group that includes staff from Central Coast Council, Northern Beaches, Ku-ring-gai Council, Hornsby Council (HSC), NPWS and Crown Lands) as project manager developing the Natural Area Recreation Strategy for HSC. Current main role at Council is development assessment and review of Flora and Fauna Reports and Biodiversity Assessment Reports.

Fraser Ecological has been engaged by various Councils (Central Coast, Ku-ring-gai, Liverpool City, Blacktown City Council, Hornsby Shire Council and Hawkesbury City Council) to undertake biodiversity assessments for major civil works projects. He is continuously providing biodiversity assessments for private clients for a range od development proposals across coastal and western NSW. We have also undertaken threatened flora and fauna species survey and monitoring for the NSW OEH Save our Species grants.

Key skills:

- Targeted flora and fauna surveys
- BAM plots in accordance with the BAM
- Ecological monitoring & Opportunity and Constraints mapping
- Preparation of BDARs, BAM calculator and credit reporting
 - Retirement of credits for approved projects via BCT and brokers
- Establishment of stewardship sites and other offset packages
- Expert witness reporting and attendance in the LAEC Compliance investigations and auditing
- Preparation of Vegetation Management Plans
- Preparation of Nestbox Monitoring Plans



CERTIFICATE OF ACCREDITATION AS A BIODIVERSITY ASSESSMENT METHOD ASSESSOR under the *Biodiversity Conservation Act 2016* (NSW)

BAM Assessor		
Alexander Fraser		
Accreditation number	Accreditation date (Date of issue)	Expiry Date of
BAAS18156	17 October 2021	17 October 2024

The person named above is accredited under section 6.10 of the *Biodiversity Conservation Act 2016* (NSW) (**BC Act**) as a Biodiversity Assessment Method Assessor to apply the Biodiversity Assessment Method in connection with the preparation of biodiversity stewardship site assessment reports, biodiversity development assessment reports and biodiversity certification assessment reports pursuant to Part 6 of the BC Act.

The accreditation is in force until and including the Expiry Date. The accreditation is subject to the conditions set out in the *Accreditation Scheme for the Application of the Biodiversity Assessment Method*, under the BC Act, and the conditions specified on the reverse of this certificate.

LUCIAN MCELWAIN

Manager Ecosytem Programs Department of Planning, Industry & Environment

NOTES

- DPIE maintains a register of Accredited Biodiversity Assessment Method (BAM) Assessors accessible from the DPIE website.
- The BAM Assessor's accreditation expires on the Expiry Date unless renewed in accordance with the *Accreditation Scheme for the Application of the Biodiversity Assessment Method*. It is the BAM Assessor's responsibility to monitor the Expiry Date of their accreditation, and apply for any renewal with sufficient time for the application to be processed prior to the Expiry Date.
- Words and expressions used in this accreditation instrument and which are also used in the Act have the same meaning.

SUMMARY OF CONDITIONS UNDER SCHEME

The following are conditions of all accreditations granted under the Scheme:

- 1. an accredited person must prepare Biodiversity Assessment Reports (and conduct surveys and other activities in connection with the preparation of such reports) in accordance with:
 - a. the Biodiversity Assessment Method Manual,
 - b. the Credit Calculator Operational Manual,
 - c. Accredited Person Code of Conduct.
 - d. this Scheme,
 - e. any guidance materials published by the Department of Planning, Industry and Environment in connection with preparation of Biodiversity Assessment Reports or the application of the BAM
 - f. any accreditation requirements notified by the Department of Planning, Industry and Environment to the accredited assessor from time to time.
- 2. an accredited person must maintain a detailed and up to date working knowledge of, and comply with, all relevant legislation.
- 3. an accredited person must maintain records of surveys and assessments, including field data sheets and targeted flora and fauna surveys, undertaken and used as part of the preparation of a Biodiversity Assessment Report, for at least ten years after certification of the relevant Biodiversity Assessment Report.
- 4. all records required kept by an accredited person must be in legible form, or in a form that can be readily be reduced to a legible form.
- 5. an accredited person must provide to the Department of Planning, Industry and Environment any information related to biodiversity assessment reports required to be provided by all accredited persons, or by a group of accredited persons, by way of a notice specified on a website maintained by it, in the form and within the time frames required in that notice.
- 6. an accredited person must comply with any scientific licence conditions relating to survey records.
- 7. an accredited person must possess, or operate under, an appropriate scientific licence as required for the type work, they are completing in the Biodiversity Offsets Scheme.

Note. Information that the Environment Agency Head (EAH) may require to be provided may include information collected during the application of the BAM such as site specific survey data.

Note. In addition to the conditions above, accredited persons must comply with obligations under the BC Act and regulations, including Part 6 Division 3 of the BC Act. Failure to comply with any of the conditions above may result in the EAH exercising the power to vary, suspend or cancel that accreditation under Part 5 of this Scheme.

Certificate of Accreditation for Alexander Fraser (BAM Assessor Number BAAS18156) as a Biodiversity Assessment Method Assessor under the *Biodiversity Conservation Act 2016*



Certificate of Currency

Professional Indemnity

This Certificate:

- is issued as a matter of information only and confers no rights upon the holder;
- does not amend, extend or alter the coverage afforded by the policy listed;
- is only a summary of the cover provided. For full particulars, reference must be made to the current policy wording;
- is current only at the date of issue.

Name of Insured	Alex Fraser Trading As Fraser Ecological Consulting (ABN: 79763740114)
Occupation	Consultancy Occupations Environmental Consulting
Policy Number	SOB/18206/000/22/N
Policy Period	4.00pm Local Standard Time on 28 June 2022 to 4.00pm Local Standard Time on 28 June 2023
Limit of Indemnity	Professional Indemnity : AUD\$5,000,000 any one claim and in the aggregate. The overall aggregate limit is subject to the number of reinstatements on the policy.
Excess	Professional Indemnity : AUD\$0 each and every claim.
Reinstatements	1
Interested Party	None Noted
Underwriter	DUAL Australia Pty Ltd on behalf of certain underwriters at Lloyd's in accordance with the authorisation granted under Unique Market Reference Number: B1736DU2200001
Signature	regolded
Name of Signatory	Michael Gottlieb (BizCover)
Capacity/Title	Director
Date	20 Oct 2022

Please note

This Certificate is issued subject to the policy's terms and conditions and by reference to the insured's declaration. The information set out in this Certificate is accurate as at the date of signature and there is no obligation imposed on the signatory to advise of any alterations.

BizCover Pty Ltd (**ABN** 68 127 707 975; **AFSL** 501769). **Mail to:** Level 2, 338 Pitt Street, Sydney 2000 **T:** 1300 249 268 (1300 BIZCOVER) **E:** support@bizcover.com.au


Certificate of Currency Public Liability

This Certificate:

- is issued as a matter of information only and confers no rights upon the holder;
- does not amend, extend or alter the coverage afforded by the policy listed;
- is only a summary of the cover provided. For full particulars, reference must be made to the current policy wording;
- is current only at the date of issue.

Name of Insured	Alex Fraser Trading As Fraser Ecological Consulting (ABN: 79763740114)
Policy Number	PB/27002/000/22/N
Policy Period	4.00pm Local Standard Time on 28 June 2022 to 4.00pm Local Standard Time on 28 June 2023
Interest Insured	Public Liability
Situation	665 The Scenic Road, MACMASTERS BEACH, NSW, 2251
Sum Insured	Public Liability: \$10,000,000
Interested Party	None Noted
Underwriter	DUAL Australia Pty Ltd on behalf of certain underwriters at Lloyd's in accordance with the authorisation granted under Unique Market Reference Number: B1736DU2200001
Signature	regulad
Name of Signatory	Michael Gottlieb (BizCover)
Capacity/Title	Director
Date	20 Oct 2022

Please note

This Certificate is issued subject to the policy's terms and conditions and by reference to the insured's declaration. The information set out in this Certificate is accurate as at the date of signature and there is no obligation imposed on the signatory to advise of any alterations.



ECOLOGICAL **CONSULTANTS** ASSOCIATION of NSW Inc



2023

PRACTISING MEMBER

