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Vegetation Management Plan



25 Moss Vale Road (Lot 1 DP 520502, Lot 110 DP 131219 and Lot 129 DP 3060), Bomaderry NSW

Proposed mixed-use subdivision

Prepared for: Southern Cross Community Housing

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Contents

1	Introduction.....	1
1.1	Background.....	1
1.2	Purpose and objectives of this VMP.....	1
1.3	Site location.....	2
1.4	Proposal details.....	2
1.5	Field assessments.....	2
2	Existing environment.....	6
2.1	Vegetation communities.....	6
2.2	Native vegetation condition.....	7
2.2.1	Exotic grassland.....	7
2.3	Riparian Corridors.....	12
2.4	Threatened species.....	15
2.5	Fauna habitat.....	15
2.6	Weeds.....	16
3	Management actions.....	18
3.1	Preliminary works.....	18
3.2	Weed management techniques.....	19
3.3	Management zones.....	21
3.3.1	Management Zone 1 – PCT 3078 in ‘moderate’ condition.....	21
3.3.2	Management Zone 2 – PCT 3078 in ‘disturbed’ condition.....	21
3.3.3	Management Zone 3 – Exotic grassland.....	22
3.3.4	Management Zone 4 – Aboriginal artefact reburial area.....	23
3.3.5	Management Zone 5 – Buffer zone.....	23
3.4	Revegetation.....	26
3.4.1	Revegetation measures.....	26
3.4.2	Revegetation protocols.....	27
4	Implementation.....	30
4.1	Treatment schedule.....	30
4.2	Cost of implementation.....	32
4.3	Concurrent works.....	33
5	Bushland regeneration contractor, reporting and certification.....	34
5.1	Bushland regeneration contractor.....	34
5.2	Monitoring.....	34
5.3	Reporting.....	34
5.4	Certification.....	34
6	References.....	36



Appendices

Appendix A	Reburial of artefacts	37
Appendix B	Weed control methods	38
Appendix C	Reporting template	40
Appendix D	Flora Inventory	41

Figures

Figure 1.1:	Subject land and VMP area	3
Figure 1.2:	Proposed subdivision sketch (Allen Price and Scarratts 2022).	4
Figure 1.3:	Survey effort (Ecoplanning 2023 and 2025).	5
Figure 2.1:	Validated vegetation in the VMP area (Ecoplanning 2023 and 2025).	9
Figure 2.2:	PCT 3078 in a 'Moderate' condition class in the VMP area.	10
Figure 2.3:	PCT 3078 in a 'Disturbed' condition class in the VMP area.	10
Figure 2.4:	Exotic grassland in the VMP area.....	11
Figure 2.5:	Riparian corridors in the VMP area (DCS 2023).....	13
Figure 2.6:	4 th order and above stream (Bomaderry Creek) along western boundary of the VMP area	14
Figure 3.1:	Management Zones in the VMP area	25

Tables

Table 2.1:	Details of vegetation communities recorded within the VMP areas.....	6
Table 2.2:	High Threat Weeds, Priority Weeds and WoNS identified within the VMP area.	16
Table 3.1:	Planting species and densities in the VMP area.....	28
Table 4.1:	Timing of management actions.....	30
Table 4.2:	Cost of VMP implementation.	33

Glossary and abbreviations

Acronym	Description
BAM	Biodiversity Assessment Method
BC Act	NSW <i>Biodiversity Conservation Act 2016</i>
BDAR	Biodiversity Development Assessment Report
CEMP	Construction Environmental Management Plan
DA	Development Application
DPE	NSW Department of Planning and Environment
DPI	NSW Department of Primary Industry
DPIE	NSW Department of Planning Industry and Environment (replaced by DPE)
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
SLEP	<i>Shoalhaven Local Environment Plan 2014</i>
HBT	Hollow bearing tree
Ha	Hectares
KPI	Key Performance Indicator
LGA	Local Government Area
MZ	Management Zone
PCT	Plant Community Type
PFC	Projected Foliage Cover
RPAs	Registered Aboriginal Parties
SDS	Safety Data Sheet
ToB	Top of Bank



VMP	Vegetation Management Plan
VRZ	Vegetated Riparian Zone
WoNS	Weed of National Significance
*	Denotes exotic species



1 Introduction

1.1 Background

Ecoplanning has been engaged by Allen Price & Scarratts Pty Ltd on behalf of Southern Cross Community Housing to prepare a Vegetation Management Plan (VMP) to accompany a Development Application (DA) for a mixed-use subdivision (the subdivision) at 25 Moss Vale Road, (Lot 1 DP 520502, Lot 110 DP 131219 and Lot 129 DP 3060), Bomaderry NSW. This VMP complements the Biodiversity Development Assessment Report (BDAR) prepared by Eco Logical Australia (2021) for the subdivision and is a requirement of development consent SF10851 (Shoalhaven City Council 2022).

Version 1.1 of this VMP was updated in September 2025 to align with comments received from Shoalhaven City Council (SCC), in particular:

- Increasing the duration of VMP for three to five years.
- Extending the width of the VMP to 50 m from the top of bank.
- Updating costings to account for a 5 year duration of works.
- Updating area stats within the VMP and management zones to account for extended VMP area.
- Addressing weed control measures within the reburial area that will not disturb the soil.
- Providing further details about weed control of Coral Trees and Arum Lilies.

1.2 Purpose and objectives of this VMP

The purpose of this VMP is to provide feasible management actions that will protect and enhance biodiversity within the site. The objectives of this VMP have been informed by the following documents:

- Vegetation Management Plan requirements as per Section 45 of the development consent SF10851 (Shoalhaven City Council 2022).
- *Controlled activities – Guidelines for riparian corridors on waterfront land* (DPE 2022a).
- Proposed Subdivision, 25 Moss Vale Road, Bomaderry BDAR (Eco Logical Australia 2021).
- Aboriginal artefact reburial location (Austral Archaeology 2021).

The primary objectives of this VMP are to:

- Conserve and enhance the existing native vegetation from indirect impacts associated with the development.
- Improve the condition of native vegetation within the VMP area through the management of Priority Weeds, environmental weeds and effective revegetation.



- Revegetate areas of exotic vegetation within the VMP area to establish the native plant community and enhance habitat.
- Provide a program of works that includes suggested timings and budget for site preparation, planting regimes, weed management, monitoring and reporting.
- Provide quantifiable key performance indicators (KPIs) for the restoration of native vegetation.
- Ensure recommendations for vegetation management are compatible with the proposed reburial of Aboriginal artefacts (Austral Archaeology 2021).
- Staging of works has been provided to guide restoration of the VMP area by a suitably qualified bushland regeneration practitioner. The VMP will be implemented over a five-year period.

1.3 Site location

The development site is located at 25 Moss Vale Road Bomaderry, and includes Lot 1 DP 520502, Lot 110 DP 131219 and Lot 129 DP 3060. This land is hereafter referred to as the 'subject land.' The land to which this VMP applies is in the west of the subject land and is referred to as the 'VMP area' (**Figure 1.1**). The VMP area covers a total area of 1.33 ha and contains a riparian area, native woodland and exotic grassland.

The subject land is located within the Shoalhaven Local Government Area (LGA) and is zoned B4 Mixed Use under the *Shoalhaven Local Environmental Plan 2014* (SLEP 2014). It is bordered by Moss Vale Road to the north, Bombaderry Creek to the west, the township of Bombaderry to the east and bushland to the south.

1.4 Proposal details

The mixed-use subdivision comprises of 6 lots, drainage works and a public reserve. A perimeter road will be constructed providing access to the adjacent Moss Vale Road. The 6 lots will provide a range of accommodation and community facilities. Some of the public reserve corresponds with the VMP area in this report (**Figure 1.2**).

1.5 Field assessments

Field surveys for the VMP were undertaken on 4 October 2023 by Sam Mullins (Field Ecologist) and Jaime Askew (Field Ecologist) (**Figure 1.3**). The purpose of the field survey was to identify the ecological values and threats (such as Priority Weeds) present within the VMP area, validate Plant Community Types (PCTs), and determine the overall native resilience of the VMP area and its capacity to respond to regeneration work.

Another field assessment was undertaken by Amy Mortell on Tuesday 16 September 2025 to validate vegetation within the extended VMP area and map the location of Coral Trees and Arum Lilies. Survey tracks are also shown in **Figure 1.3**.

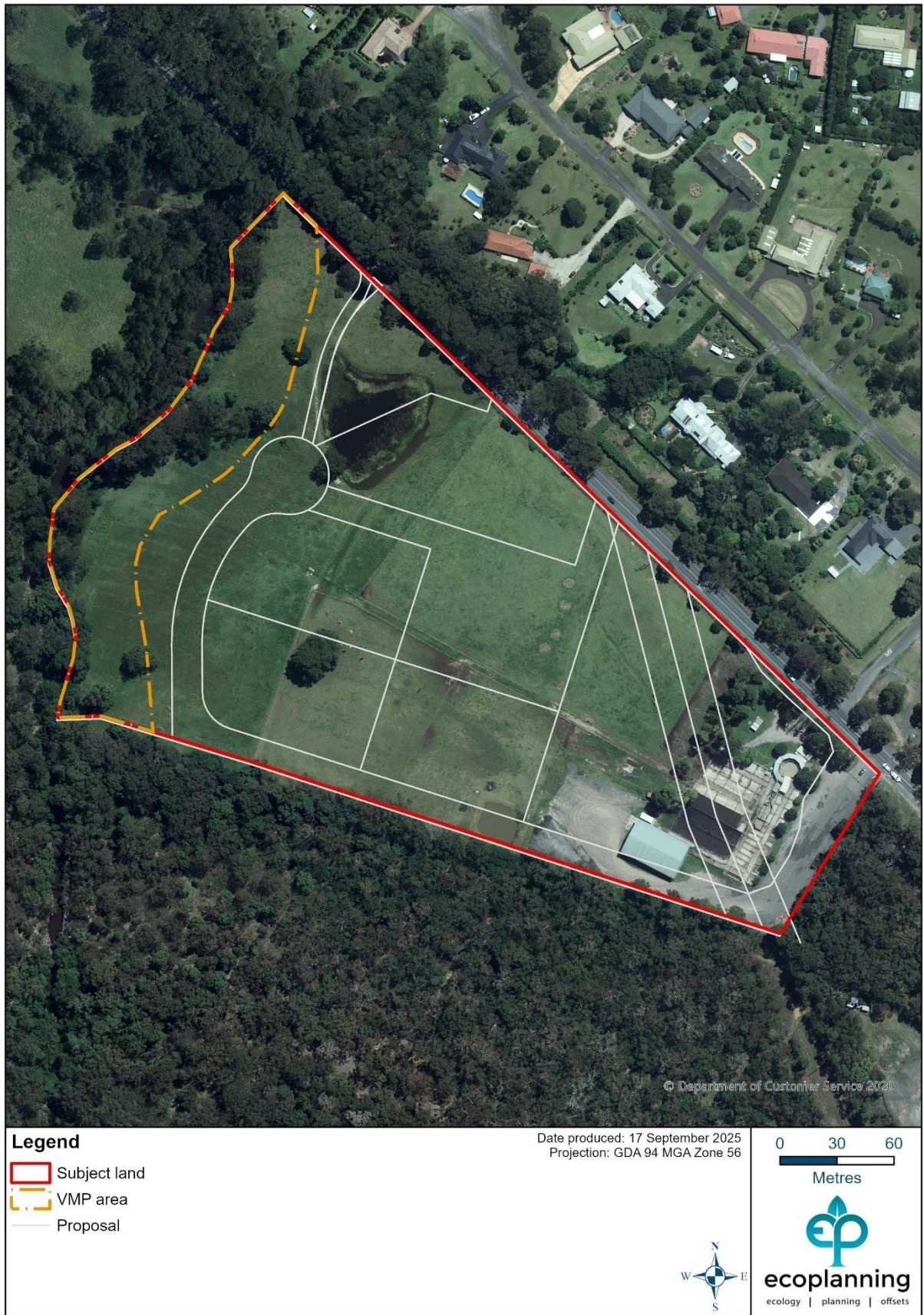


Figure 1.1: Subject land and VMP area.

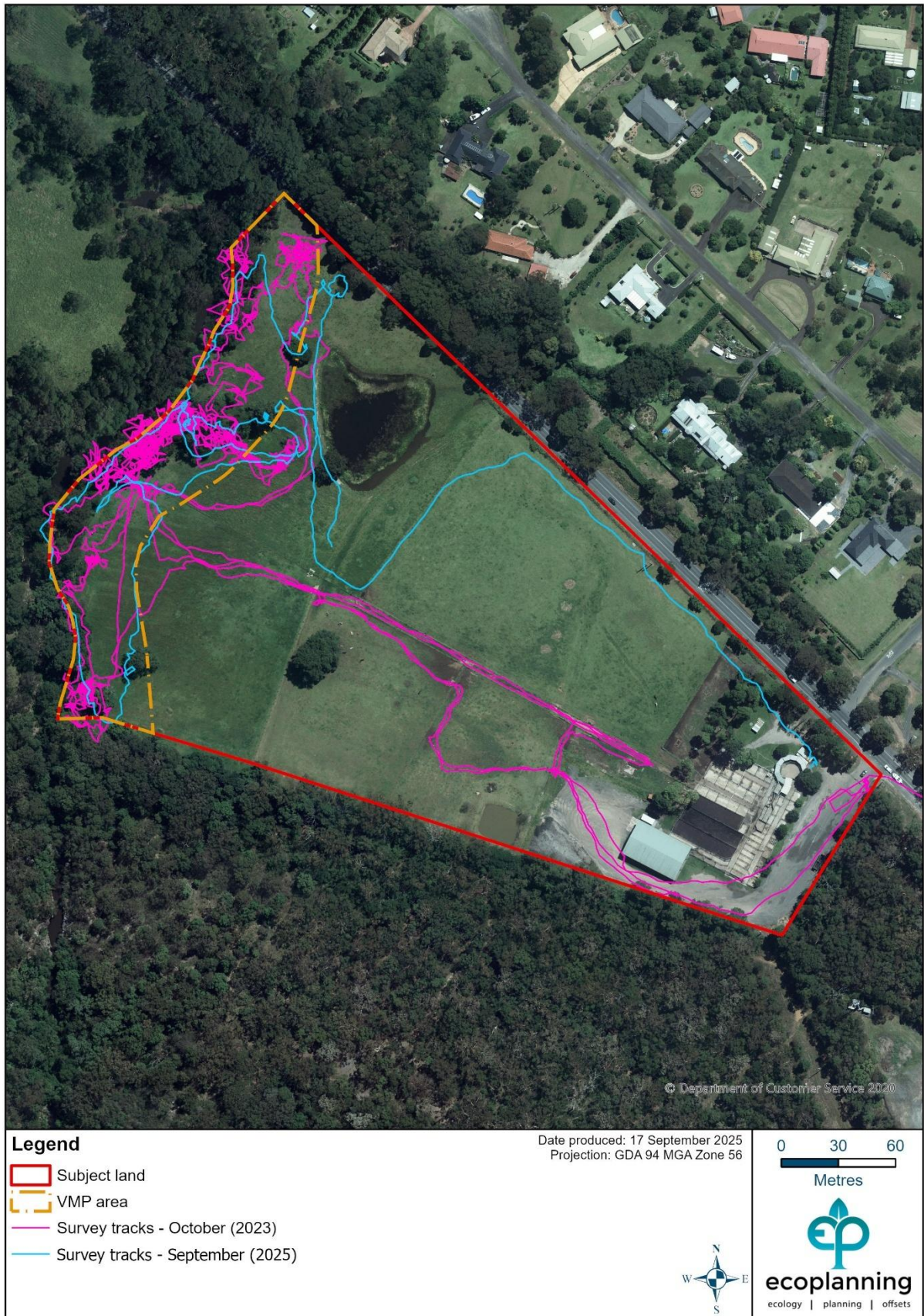


Figure 1.3: Survey effort (Ecoplanning 2023 and 2025).

2 Existing environment

2.1 Vegetation communities

Following a review of previous vegetation mapping by DPE (2022b), and information collected during the field assessment for the BDAR (Eco Logical Australia 2021), one Plant Community Type (PCT) was identified in the VMP area, being PCT 3078 - *Illawarra Lowland Wet Vine Forest*. Approximately 0.54 ha of the total VMP area was identified as supporting PCT 3078 in either a 'moderate' or 'disturbed' condition class. Additionally, 0.79 ha of the VMP area is comprised of exotic grassland.

Table 2.1 below provides details of PCT 3078 identified in the VMP area and the listing status of this community under NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Validated vegetation mapping in the VMP area is also provided in **Figure 2.1**.

Table 2.1: Details of vegetation communities recorded within the VMP areas.

Plant Community Types (PCTs)	Vegetation formation and class	Condition class	BC Act ¹	EPBC Act ¹	Area (ha)
PCT 3078 - Illawarra Lowland Wet Vine Forest	Rainforests / Dry Rainforests	Moderate	EEC	CEEC	0.40
PCT 3078 - Illawarra Lowland Wet Vine Forest	Rainforests / Dry Rainforests	Disturbed	EEC	-	0.14
Total native vegetation cover					0.54
Exotic grassland					0.79
Total exotic vegetation cover					0.79
Total vegetation cover					1.33

¹EEC = Endangered Ecological Community, CEEC = Critically Endangered Ecological Community,

2.2 Native vegetation condition

PCT 3078 – *Illawarra Lowland Wet Vine Forest* occurs along the banks of Bomaderry Creek in the west of the VMP area. The PCT occurs in two condition classes, ‘moderate’ (0.40 ha) and ‘disturbed’ (0.14 ha) (**Figure 2.1**).

PCT 3078 in a ‘moderate’ condition is characterised by a very tall, sclerophyll open forest with small trees, shrubs and vines in the middle stratum. The ground layer contains high leaf litter cover with occasional native ferns, grasses and sedges (**Figure 2.2**). The condition is considered ‘moderate’ because of moderate severity weed infestation. Dominant trees in the canopy include *Eucalyptus botryoides x saligna*, *Corymbia maculata* (Spotted Gum) and *Eucalyptus paniculata* (Grey Ironbark). A diverse mix of small trees and shrubs are found in the middle stratum including *Acacia binervata* (Two-veined Hickory), *Acmena smithii* (Lilly Pilli), *Alphitonia excelsa* (Red Ash), *Casuarina glauca* (Swamp Oak), *Ficus coronata* (Sandpaper Fig), *Pittosporum undulatum* (Sweet Pittosporum), *Notelaea longifolia* (Large Mock Olive), *Acacia mearnsii* (Black Wattle) and *Glochidium ferdinandi* (Cheese Tree). Scramblers such as *Parsonsia straminea* (Common Silkwood) and *Pandorea pandorana* (Wonga Wonga Vine) are also prevalent. The ground layer is comprised of ferns, grasses and sedges such as *Oplismenus* spp. (Basket Grass), *Viola hederacea* (Ivy-leaved Violet), *Lomandra longifolia* (Spiny-headed Mat-rush), *Microlaena stipoides* (Weeping Grass), *Entolasia marginata* (Bordered Panic), *Doodia australis* (Common Rasp Fern) and *Calochlaena dubia* (Rainbow Fern). Dominant weeds found throughout middle stratum and groundlayer include *Lantana camara** (Lantana), *Tradescantia fluminensis** (Trad), *Cenchrus clandestinus** (Kikuyu), *Ehrharta erecta** (Panic Veldtgrass) and *Sida rhombifolia** (Paddy’s Lucerne).

PCT 3078 in a ‘disturbed’ condition was characterised by small patches of predominantly regrowth trees. Past clearing has taken place in the middle stratum, and the ground stratum supports a mix of native and exotic species (**Figure 2.3**). The condition is considered ‘disturbed’ due to the high degree of disturbance which has impacted native vegetation condition. Dominant trees in the canopy include *Eucalyptus botryoides x saligna*, *Corymbia maculata* (Spotted Gum) and *Erythrina x sykesii** (Coral Tree). The middle stratum contains *Casuarina glauca* (Swamp Oak), *Acmena smithii* (Lilly Pilli), *Glochidium ferdinandi* (Cheese Tree) and exotic species such as *Lantana camara** (Lantana) and *Solanum mauritianum** (Wild Tobacco Bush). The groundlayer contains native grasses, sedges and ferns such as *Microlaena stipoides* (Weeping Grass), *Carex appressa* (Tall Sedge), *Cyperus gracilis* (Slender Flat-sedge), *Doodia australis* (Common Rasp Fern), *Juncus usitatus* (Common Rush), *Persicaria* spp. (Knotweeds), *Calochlaena dubia* (Rainbow Fern). However, exotic species are prevalent including *Sporobolus africanus** (Parramatta Grass), *Holcus lanatus** (Yorkshire Fog), *Cenchrus clandestinus** (Kikuyu) and *Ehrharta erecta** (Panic Veldtgrass).

2.2.1 Exotic grassland

The VMP area supports 0.79 ha of cleared land identified as exotic grassland (**Figure 2.4**). Exotic species are dominant including *Sporobolus africanus** (Parramatta Grass), *Holcus lanatus** (Yorkshire Fog), *Cenchrus clandestinus** (Kikuyu), *Ehrharta erecta** (Panic Veldtgrass), *Briza maxima** (Quaking Grass), *Briza minor** (Shivery Grass), *Plantago lanceolata** (Lamb’s Tongues), *Bromus cartharticus** (Prairie Grass), *Taraxacum officinale** (Dandelion) and *Trifolium* spp.* (a clover). No native canopy or middle stratum species are

present. However, scattered patches of native grasses and sedges can be found comprising of *Carex appressa* (Tall Sedge), *Microlaena stipoides* (Weeping Grass), *Juncus usitatus* (Common Rush) and *Cynodon dactylon* (Couch).



Figure 2.1: Validated vegetation in the VMP area (Ecoplanning 2023 and 2025).



Figure 2.2: PCT 3078 in a 'Moderate' condition class in the VMP area.



Figure 2.3: PCT 3078 in a 'Disturbed' condition class in the VMP area.



Figure 2.4: Exotic grassland in the VMP area.

2.3 Riparian Corridors

Mapping by NSW Spatial Services (DCS 2023) has identified one 1st order and one 4th order and above stream in the VMP area (**Figure 2.5**). The 4th order and above stream is known as Bomaderry Creek, which flows along the western boundary of the VMP area and is a tributary of the Shoalhaven River (**Figure 2.6**). The 1st order stream flows from Moss Vale Road to Bomaderry Creek via a farm dam. The 1st order stream will be subject to drainage works as part of the subdivision. A Vegetated Riparian Zone (VRZ) either side of a mapped watercourse, measured 40 m from top of bank (ToB) for a 4th order and above stream is recommended by DPE (2022a). The VMP area follows the outline of the VRZ, plus an additional 10 m buffer from the outer edge of the VRZ as required by SCC. The 40 m buffer to Bomaderry Creek meets the recommendations for avoiding and minimising impacts on biodiversity in the BDAR (Eco Logical Australia 2021). Therefore, the VMP area accommodates the required VRZ (40 m) for Bomaderry Creek.

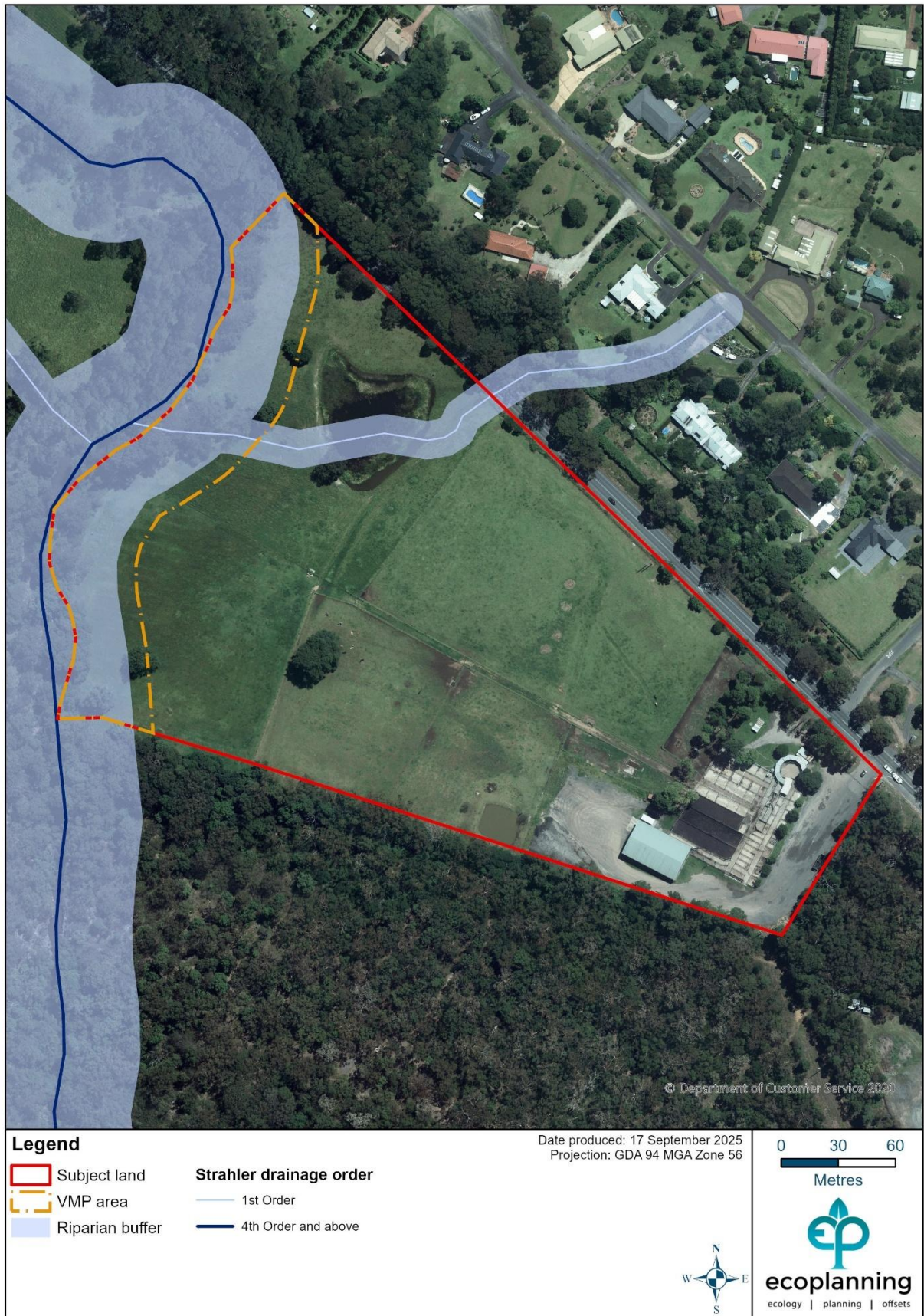


Figure 2.5: Riparian corridors in the VMP area (DCS 2023).



Figure 2.6: 4th order and above stream (Bomaderry Creek) along western boundary of the VMP area.

2.4 Threatened species

No threatened flora or fauna species listed under the BC Act or the EPBC Act were recorded during the field assessment for this VMP. Surveys for threatened species undertaken as part of the BDAR (Eco Logical Australia 2021) identified Grey-headed Flying-fox (*Pteropus poliocephalus*) in the development site.

Searches of relevant databases (BioNet Atlas, DPE 2023) identified 53 threatened species which have previously been recorded within a 5 km radius of the VMP area. This included one amphibian, 2 reptiles, 21 birds, 15 mammals and 14 plants. Based on a high number of records in the previous 20 years (>10 records) and habitat features recorded in the VMP area, the following threatened species are considered likely to utilise the VMP area:

- *Calyptorhynchus lathami lathami* (South-eastern Glossy Black-Cockatoo)
- *Callocephalon fimbriatum* (Gang-gang Cockatoo)
- *Cercartetus nanus* (Eastern Pygmy-possum)
- *Lophoictinia isura* (Square-tailed Kite)
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat)
- *Ninox strenua* (Powerful Owl)
- *Petaurus australis* (Yellow-bellied Glider)
- *Pteropus poliocephalus* (Grey-headed Flying-fox)

2.5 Fauna habitat

Several fauna habitat features are present within the VMP area, including, hollow bearing trees (HBTs), riparian areas, underground burrows, farm dams and drainage channels. HBTs are trees with cavities formed in the trunk or branches of a live or dead tree. Such hollows often take a long time to form and are characteristic of older, mature, and over mature trees. The VMP area contains several small to medium sized (5-15 cm diameter) tree hollows within both living and dead trees. HBTs constitute important breeding habitat for some birds, microbats and arboreal mammals. Additionally, the VMP area contains several artificial habitat boxes which show signs of occupation (i.e. scratch marks around entrances).

Riparian areas often act as corridors for wildlife movement. In regions where native vegetation has been cleared for human use, such as the subject land and surrounding locality, vegetated riparian areas provide foraging habitat and cover for species moving across the landscape. The riparian area in the VMP area provides some connectivity between larger patches of intact native vegetation.

Field survey identified numerous underground wombat burrows within the VMP area. These burrows are important habitat for the local wombat population and other burrowing animals. The VMP area also contains a drainage channel which contains aquatic and emergent vegetation as well as areas of open water. These waterbodies provide habitat for amphibians and waterbirds.

2.6 Weeds

A total of 30 weed species were identified within the VMP area during the field assessment. Weeds were present throughout the entirety of the VMP area. Thirteen (13) High Threat Weeds as classified by the Biodiversity Assessment Method (BAM; DPIE 2020) were identified during the field assessment (**Table 2.2**). Two of these weeds, *Lantana camara** (Lantana) and *Senecio madagascariensis** (Fireweed) are also listed as Priority Weeds under the NSW *Biosecurity Act 2015* for Southeast NSW, which includes the Shoalhaven Council LGA. *Lantana camara** (Lantana) and *Senecio madagascariensis** (Fireweed) are also listed as a Weed of National Significance (WoNS), which encompasses the highest priority weeds targeted for sustained nationally coordinated action under the Australian Weeds Strategy (Invasive Plants and Animals Committee 2017).

Table 2.2: High Threat Weeds, Priority Weeds and WoNS identified within the VMP area.

Weed species	High Threat Weeds	Priority weeds	WoNS	Duty*
<i>Acer negundo</i> (Box Elder)	✓	-	-	-
<i>Araujia sericifera</i> (Moth Vine)	✓	-	-	-
<i>Cenchrus clandestinus</i> (Kikuyu Grass)	✓	-	-	-
<i>Cinnamomum camphora</i> (Camphor Laurel)	✓	-	-	-
<i>Delairea odorata</i> (Cape Ivy)	✓	-	-	-
<i>Ehrharta erecta</i> (Panic Veldtgrass)	✓	-	-	-
<i>Lantana camara</i> (Lantana)	✓	✓	✓	<p>Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.</p> <p>Regional Recommended Measure Containment zone: Eurobodalla, Shoalhaven, Wollongong, Shellharbour and Kiama Local Government Areas. Exclusion zone: Whole of region except containment zone. <i>Whole of region: Land managers mitigate the risk of new weeds being introduced to their land. A person should not deal with the plant, where dealings include but are not limited to buying,</i></p>

Weed species	High Threat Weeds	Priority weeds	WoNS	Duty*
				<i>selling, growing, moving, carrying or releasing the plant. Within exclusion zone: Land managers should eradicate the plant from the land and keep the land free of the plant. Notify local control authority if found. Within containment zone: Land managers should reduce the impact of the plant on assets of high economic, environmental and/or social value. Land managers should mitigate spread of the plant from their land.</i>
<i>Ligustrum sinense</i> (Small-Leaf Privet)	✓	-	-	-
<i>Ranunculus repens</i> (Creeping Buttercup)	✓	-	-	-
<i>Rumex sagittata</i> (Turkey Rhubarb)	✓	-	-	-
<i>Senecio madagascariensis</i> (Fireweed)	✓	✓	✓	Prohibition on certain dealings Must not be imported into the state, sold, bartered, exchanged or offered for sale.
<i>Sporobolus africanus</i> (Parramatta Grass)	✓	-	-	-
<i>Tradescantia fluminensis</i> (Wandering Jew)	✓	-	-	-

*All pest plants in NSW are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose.

3 Management actions

Vegetation management actions will consist of weed control and revegetation to retain and enhance the environmental values of the VMP area.

3.1 Preliminary works

Seed collection

Collection of seed specifically for the project is not considered necessary. Plants should be sourced from a local nursery or bush regeneration company that supply high quality indigenous stock (not horticultural varieties). Species recommended for revegetation are listed in **Section 3.3**.

Construction site establishment

Although this VMP primarily deals with management of vegetation within the VMP area, contractors undertaking clearing, and construction works within the subject land must observe the following protocols to ensure the integrity of surrounding native vegetation patches. Unless explicitly assigned to other parties, the responsibility for adhering to the protocols outlined below lies with the contractor carrying out the works described. The following procedures are to be undertaken prior to clearing, construction, and other development works:

- Project boundaries including vegetation clearing limits and the VMP area are to be clearly identified on all site plans used by personnel conducting development works on site.
- Contractors are to be made aware of clearing limits and how they are marked.
- Contractors are to be informed that they are not to encroach on areas beyond the clearing limits. Such encroachment includes but is not limited to:
 - Vehicle movements
 - Vehicle parking
 - Storage of materials and machinery
 - Stockpiling of soil, vegetation, or timber
- Plant and machinery will be cleaned of any foreign soil and seed prior to being transported to the site to prevent the spread of weeds. All vehicles and machinery must be inspected prior to site entry and those failing inspection are to be sent away for cleaning. Appropriate records of inspections must be maintained.
- Prior to commencement of clearing, vegetation scheduled for removal will be clearly delineated by the contractor and clearing boundaries should be pegged out by a surveyor. Flicker tape or similar should be installed at boundaries of the VMP area.
- Signage should be positioned along the boundary of the subdivision and VMP area and should state that the VMP area is being managed for biodiversity conservation purposes.

Aboriginal cultural heritage

Aboriginal objects were identified on the subject land and will be impacted (Austral Archaeology 2022 cited in Heritage NSW 2022). Vegetation management actions will disturb the top layer of soil and there is a possibility that Aboriginal objects will be discovered during works. In accordance with the development consent SF10851 (Shoalhaven City Council

2022), if an Aboriginal object (including evidence of habitation or remains) are discovered during works, all excavation or disturbance of the area must stop immediately, and Southern Cross Community Housing notified.

Additionally, a portion of the VMP area has been demarcated for the reburial of Aboriginal artefacts (**Appendix A**). Management actions recommended in this VMP must avoid disturbing the soil surface of this area. Following the reburial of Aboriginal artefacts, this VMP may be updated with management actions to restore native vegetation at the reburial area. Recommended management actions must be made in consultation with Registered Aboriginal Parties (RAPs) and Heritage NSW.

3.2 Weed management techniques

Primary, secondary and maintenance weed control works are required to retain and enhance the environmental values of the VMP area. The aim of primary weed control will be to eradicate weeds from the canopy and shrub layer and significantly reduce priority weeds and WoNS. Secondary weed control will focus on follow-up treatment of weeds in the canopy and shrub layer and further reducing the abundance of Priority Weeds and WoNS. The aim of maintenance works will be to prevent the re-establishment of Priority Weeds and WoNS, while also controlling weeds emerging in revegetation areas.

The field assessment identified 5 Management Zones (MZs) in the VMP area (**Figure 3.1**). Management zones were determined based on ecological character, environmental values, weed occurrences, native species resilience and management constraints. Different management actions are required for each MZ, which are described in **Section 3.3**.

Weed removal techniques should be appropriate to the weed type, growth form, ecology, and existing conditions (Buchanan 2000; Bradley 2002) of the VMP area. Wherever possible, weed removal should be carried out prior to annual seed set. Herbicide application, such as backpack spraying, should be avoided where loss of native species is likely to occur, and the application of herbicide needs to be considered for its suitability around waterways / water. Herbicide spraying should be conducted in accordance with the product label and associated Safety Data Sheet (SDS) as well as any permits which may be required. Furthermore, NSW WeedWise (DPI 2023) is a useful resource which should be consulted before undertaking weed control.

Weed control works are to be undertaken broadly as detailed in the following sections, however, the bushland regeneration contractor will ultimately be responsible for determining the timing and frequency of weed control works in response to site conditions. The most appropriate weed control techniques to achieve the performance targets outlined below are to be determined by the bushland regeneration contractor, but are likely to include hand removal, mechanical removal, herbicide application (where necessary) and slashing. Disturbance of the soil during the weed management process should be always minimised (see Buchanan 2000, Bradley 2002 and **Appendix B**).

Primary weed control

Primary weed control is the initial removal of weed species. Primary weed control will focus on eradicating weeds from the canopy and shrub layer, significantly reducing Priority Weeds and WoNS, and controlling broadleaf and grass weeds around native ground covers.



Woody weed control targeting *Lantana camara** (Lantana), *Ligustrum sinense** (Small-Leaf Privet) and *Solanum mauritianum** (Wild Tobacco Bush), *Acer negundo** (Box Elder) and *Cinnamomum camphora** (Camphor Laurel) should be conducted at this stage using the cut and paint or stem injection method.

The location of *Erythrina x sykesii** (Coral Trees) is shown in **Figure 3.1**, with three trees contained within PCT 3078 (disturbed). Early removal of Coral Trees is recommended, while they are accessible with machinery, due to their location below the proposed earthworks/internal road. Method for removal depends on the bush regeneration contractor, but options include cut and paint method and removal of cut sections from the site, or stem injection and felling once the trees are dead. Allowing the trees to die *in situ* does create a safety hazard because the trees are prone to dropping limbs. Following treatment of woody weeds including Coral Trees, dead timber can be rafted and left onsite as 'habitat piles' for local native fauna. However, Coral Trees have a propensity to reshoot from cut sections of the tree, so care must be taken to ensure the timber is dead.

Primary works should also prioritise the control of invasive vines, in particular *Araujia sericifera** (Moth Vine), *Delairea odorata** (Cape Ivy) and *Rumex vulgaris** (Turkey Rhubarb). Skirting and careful hand removal or scape and paint are the preferred methods. Depending on the presence of native plants and proximity to these exotic vines, spraying of vines can also be a good treatment option.

Arum Lily's are present at the locations shown in **Figure 3.1** and presently occur at low densities of 2-3 plants with the northern occurrence containing 10-12 plants. This species can quickly colonise low swampy areas, so while at low densities, these plants should be removed by hand.

In addition to the control of woody weeds and vines, herbicide spray application should focus on treating weed species in the ground layer which are known to be particularly invasive such as Priority Weeds and High Threat Weeds (DPIE 2020). Herbicide spot spray application is the recommended treatment method; however, hand removal should also be implemented where appropriate. Hand removal is the recommended treatment method in areas containing native ground cover.

Primary weed control will occur in Year 1.

Secondary weed control

Secondary weed control involves follow-up weed control to remove seedlings that have emerged after primary control and treatment have been completed. Any new Priority Weeds and WoNS infestations identified must be controlled. Broadleaf and grass weeds around native ground covers and weeds emerging in the buffer zone of planted native vegetation must be treated during secondary control.

Secondary weed control will occur in Year 1-2.

Maintenance

The long-term management of a site aims to prevent weeds from becoming re-established after primary and secondary work. Substantial effort should be focussed on eradicating Priority

Weeds and WoNS and supporting the growth of planted native vegetation. Weeds emerging in the buffer zone of planted native vegetation must be treated.

Maintenance weed control will occur in Year 3 to 5.

Weed disposal

Weed material pertaining to seeding broadleaf and herbaceous weeds as well as tubers which are removed mechanically, should be bagged, removed from the VMP area, and disposed of at an appropriate green waste facility. As discussed above, woody weed material should be rafted neatly onsite and left in 'habitat piles', which are no larger in size than 4 m².

3.3 Management zones

3.3.1 Management Zone 1 – PCT 3078 in 'moderate' condition

This zone corresponds with PCT 3078 identified in a 'moderate' condition. MZ1 covers an area of approximately 0.40 ha.

Weed management

Primary weed control within MZ1 will consist of woody weed control using cut and paint or stem injection methods. Herbicide spot spraying or hand removal should target invasive broadleaf and grass weeds throughout the zone. Additionally, weedy vines should be hand removed or scape/ painted. Where possible, occurrences of *Zantedeschia aethiopica** (Arum Lily) are to be removed by hand, or the cut and paint method applied.

Secondary weed control will involve follow-up spot spraying of areas sprayed during primary weed control works, treatment of any woody or vine weeds which reshoots and herbicide spot spraying or hand removal of weeds emerging amongst naturally regenerating areas. Maintenance works will involve herbicide spot spraying and hand removal of weeds in areas sprayed during secondary weed control works and weeds emerging in naturally regenerating or revegetated areas.

No erosion control works are considered necessary; however, care must be taken when removing weeds near the embankment of Bomaderry Creek to ensure the structural stability of the creek edge. Wherever possible, plant and root material should be left in situ after chemical treatment. Due to high native species resilience in this zone, no revegetation is recommended.

3.3.2 Management Zone 2 – PCT 3078 in 'disturbed' condition

This zone corresponds with PCT 3078 identified in a 'disturbed' condition. MZ2 covers an area of approximately 0.13 ha.

Weed management

Primary weed control within MZ2 will consist of woody weed control using cut and paint or stem injection methods. Herbicide spot spraying or hand removal should target broadleaf and grass weeds surrounding native vegetation, especially groundcovers. Slashing of broadleaf and grass weeds may be required before herbicide spot spraying is undertaken. Due to the high

level of disturbance in this zone, the removal of all grass weeds is not considered practical. Therefore, the control of exotic grasses should focus on species identified in **Table 2.2**. Additionally, exotic vines should be hand removed or scape/ painted.

Secondary weed control will involve follow-up spot spraying of areas sprayed during primary weed control works, treatment of any woody or vine weeds which reshoots and herbicide spot spraying or hand removal of weeds emerging amongst revegetation or naturally regenerating areas. Maintenance works will involve herbicide spot spraying and hand removal of weeds in areas sprayed during secondary weed control works and weeds emerging in naturally regenerating or revegetated areas.

Revegetation

Following secondary weed control works, 1 m² round buffer zones are to be herbicide spot sprayed to make space for plantings. Tree species should only be planted in areas with no canopy cover overhead. Shrub species should be distributed randomly throughout MZ2. The 1 m² round buffer zones are not to be prepared in portions of MZ2 containing native groundcover, preference should be given to areas of low native resilience. Tree and shrub species should be planted at the densities listed in **Table 3.1**.

3.3.3 Management Zone 3 – Exotic grassland

This zone corresponds with areas mapped as exotic grassland. MZ3 covers an area of approximately 0.48 ha.

Weed management

MZ3 is dominated by exotic grass species, particularly *Cenchrus clandestinus** (Kikuyu Grass). The removal of exotic grasses is not considered practical because there is a significant weed grass seedbank and the high likelihood of succession with broadleaf weeds which are presently at manageable levels. Therefore, primary weed control will consist of herbicide treatment or hand removal targeting broadleaf weeds, in particular *Cirsium vulgare** (Spear Thistle), *Senecio madagascariensis** (Fireweed) and *Sida rhombifolia** (Paddy's Lucerne).

Secondary weed control will involve follow-up herbicide spraying of areas sprayed during primary weed control works, and herbicide spot spraying or hand removal of weeds emerging amongst naturally regenerating areas. Maintenance works will involve herbicide spot spraying and hand removal of weeds in areas sprayed during secondary weed control works and weeds emerging in naturally regenerating or revegetated areas. Areas which contain patches of native grass such as *Microlaena stipoides* (Weeping Grass) should be identified by the bushland regeneration contractor and hand removal is the preferred method in these areas.

Revegetation

Following primary weed control works, 1 m² round buffer zones are to be herbicide spot sprayed to make space for plantings. Trees and shrub species should be distributed randomly throughout MZ3. The 1 m² round buffer zones are not to be prepared in portions of MZ3 containing patches of native groundcovers and preference should be given to areas of low

native resilience (i.e. areas with high *C. clandestinus** cover). Tree and shrub species should be planted at the densities listed in **Table 3.1**.

3.3.4 Management Zone 4 – Aboriginal artefact reburial area

The proposed reburial area is 0.05 ha and is shown in **Figure 3.1** and as proposed by Austral Ecology (2021) in **Appendix A**.

Weed management

MZ5 is dominated by exotic grass species, particularly *Cenchrus clandestinus** (Kikuyu Grass). Weed control that does not disturb the soil can be undertaken within the reburial area, with the aim to suppress weeds and prevent spread to surrounding areas. Options include cut and paint for woody weeds (if present) and herbicide treatment of grasses and broadleaf weeds, in particular *Cirsium vulgare** (Spear Thistle), *Senecio madagascariensis** (Fireweed) and *Sida rhombifolia** (Paddy's Lucerne).

Secondary and maintenance weed control will involve follow-up herbicide spraying of areas sprayed during primary weed control works, and herbicide spot spraying of weeds emerging amongst naturally regenerating areas. Areas which contain patches of native grass such as *Microlaena stipoides* (Weeping Grass) should be identified by the bushland regeneration contractor and care taken to avoid spraying these areas.

Revegetation

Following the reburial of Aboriginal artefacts, this VMP may be updated with management actions to restore native vegetation at the reburial area. Recommended management actions must be made in consultation with Registered Aboriginal Parties (RAPs) and Heritage NSW. Tree and shrub species should be planted at the densities listed for MZ3 in **Table 3.1**.

3.3.5 Management Zone 5 – Buffer zone

This buffer zone extends east from the edge of the 40 m riparian zone for a width of 10 m and is 0.27 ha as shown in **Figure 3.1**. Earthworks are required within parts of this zone, including a 1:3 batter slope that will be created below the proposed internal road and cul-de-sac. This area will need to be stabilised following construction with jute matting recommended on steep slopes and low growing groundcovers that meet the requirements of an inner protection area for APZ purposes. This area should be fenced after construction work is complete to ensure the best successful for plantings and to prevent machinery entering the area.

Weed management

The parts of MZ5 not subject to earthworks are dominated by exotic grass species, particularly *Cenchrus clandestinus** (Kikuyu Grass). The removal of exotic grasses is not considered practical because there is a significant weed grass seedbank and the high likelihood of succession with broadleaf weeds which are presently at manageable levels. Therefore, primary weed control will consist of herbicide treatment or hand removal targeting broadleaf weeds, in particular *Cirsium vulgare** (Spear Thistle), *Senecio madagascariensis** (Fireweed) and *Sida rhombifolia** (Paddy's Lucerne).

Secondary weed control will involve follow-up herbicide spraying of areas sprayed during primary weed control works, and herbicide spot spraying or hand removal of weeds emerging amongst naturally regenerating areas and jute mat /planted areas over earthworks. Maintenance works will involve herbicide spot spraying and hand removal of weeds in areas sprayed during secondary weed control works and weeds emerging in naturally regenerating or revegetated areas. Areas which contain patches of native grass such as *Microlaena stipoides* (Weeping Grass) should be identified by the bushland regeneration contractor and hand removal is the preferred method in these areas.

Revegetation

Due to adjacent development, revegetation within the 10 m buffer zone is required to meet the standards for an inner protection area (IPA) as specified in Appendix 4 of *Planning for Bushfire Protection* (NSW RFS 2019). Following weed control works, 1 m² round buffer zones are to be herbicide spot sprayed to make space for plantings. The 1 m² round buffer zones are not to be prepared in portions of MZ5 containing patches of native groundcovers and preference should be given to areas of low native resilience (i.e. areas with high *C. clandestinus** cover). Tree and shrub species should be planted at the densities listed in **Table 3.1**.

Trees and shrub species should be distributed randomly throughout MZ5, but not within the areas subject to earthworks, which should be treated with jute matting and dense groundcover plantings to stabilise the soil. Trees must be <15 % cover at maturity and are suggested for planting within the northern section of MZ5, which is not subject to earthworks. Trees canopies at maturity should not touch or overhang buildings and should have a 5 m separation from other tree canopies, including those planted within the adjacent MZ3. Shrubs must be planted in separate 1 m² buffer zones (ie. not with trees) and should be <10 % of the ground cover. Clusters of shrubs should be widely spaced to create discontinuous gaps.



Figure 3.1: Management Zones in the VMP area.

3.4 Revegetation

The revegetation program will use a combination of active planting, weed management and monitoring to meet the overall objectives of enhancing the environmental values of the VMP area. Revegetation will commence at the end of Year 1, following the completion of primary weed control. Revegetation is not recommended in the area where Aboriginal artefact reburial is proposed (**Appendix A & Figure 3.1**).

3.4.1 Revegetation measures

Revegetation measures will vary by management zone and will include both active planting and natural regeneration supported by weed management as appropriate to the management zone. Revegetation measures are employed to restore and enhance the naturally occurring PCT 3078 - *Illawarra Lowland Wet Vine Forest* in the VMP area.

Revegetation has not been recommended in all portions of the VMP area. Specifically, areas mapped as PCT 3078 in a 'moderate' (MZ1) condition class do not require revegetation. This community supports sufficient native species richness which will respond favourably to bush regeneration. Due to the high level of disturbance, restoration of the ground layer is not recommended for PCT 3078 in a 'disturbed' condition class (MZ2) and exotic grassland (MZ3). In these areas, the restoration of the upper and middle strata is prioritised, which will enhance landscape function and improve habitat connectivity. Groundcovers are recommended within MZ5 on areas requiring soil stabilisation following construction.

Revegetation measures will include:

- **Weed management:** Priority Weeds, WoNS and environmental weeds in the VMP area will be treated during primary weed control works prior to the commencement of the revegetation works. Secondary and maintenance weed control works will treat weeds emerging in revegetated areas.
- **Tree guards:** To protect planted trees and shrubs from herbicide spray drift, foraging animals and wind damage. Tree guards should be cardboard or another biodegradable guard instead of plastic.
- **Jute mat squares:** To suppress weed growth and increase moisture retention in the soil at the base of trees and shrubs.
- **Revegetation plantings to improve vegetation integrity:** The priority of revegetation is to enhance the condition of the VMP area and re-establish the native plant community. Plantings will be concentrated, but not limited to, areas of comparatively low resilience.
- **Monitoring:** Vegetation condition within the VMP area will be monitored to ensure that there is no, or minimal, loss of vegetation integrity due to indirect effects from construction activities. Plantings will be monitored to track their success and support an adaptive management program. If vegetation condition is negatively affected within the VMP area by external impacts, or plantings are not successful, the bushland regeneration contractor or project ecologist will recommend appropriate adaptive management measures (such as additional weed control activities or compensatory plantings).

3.4.2 Revegetation protocols

A planting palette must be composed of species from the list provided in **Table 3.1**, which are species known to occur in PCT 3078. Tubestock must be sourced which uses local provenance stock and plantings must be at the densities listed in **Table 3.1**, or alternatively, in such numbers and densities as will, in the judgement of the project ecologist or bushland regeneration contractor, provide the best prospect of retaining and enhancing PCT 3078.

Revegetation works are to be carried out as follows:

- The proponent is to engage a suitably qualified and experienced bushland regeneration contractor to undertake revegetation within the VMP area, in accordance with guidance from the project ecologist.
- Revegetation works are to commence following primary weed control works and should take place in autumn and winter (spring at the latest).
- Planting of tubestock is favoured over broad scale seed application, such as direct seeding or brush matting.
- Where jute matting is installed, tubestock will be planted in pre-made slits made in the jute mat. This will be required in areas requiring soil stabilisation (MZ5)
- A water-retaining and fertilising product (e.g. Terraform™) should be applied to each tubestock hole, to assist in the establishment of the plants.
- Plantings are to be installed in jute mat squares with pre-made slits and protected with a tree guard pinned down with hardwood stakes.
- The bushland regeneration contractor shall be responsible for irrigation of plantings until plants become established. Irrigation is to occur on an 'as required' basis in response to climatic conditions (i.e. frequent watering if planting has occurred before summer; less frequent watering may be required if planting has occurred in autumn).
- Concurrent with ongoing weed monitoring, the bushland regeneration contractor is to monitor the condition of revegetation plantings to detect survival rate

Table 3.1: Planting species and densities in the VMP area.

Scientific name	Common name	Stratum	Planting density per Management Zone (MZ)
<i>Acacia maidenii</i>	Maiden's Wattle	Upper (trees)	<ul style="list-style-type: none"> • >1 tree per 40 m² <ul style="list-style-type: none"> ○ MZ2 – 32 trees • >1 tree per 20 m² <ul style="list-style-type: none"> ○ MZ3 – 240 trees • Tree cover must be less than 15% within MZ5 <ul style="list-style-type: none"> ○ MZ5 - 4 trees
<i>Acemna smithii</i>	Lilly Pilly		
<i>Alphitonia excelsa</i>	Red Ash		
<i>Casuarina glauca</i>	Swamp Oak		
<i>Clerodendrum tomentosum</i>	Hairy Clerodendrum		
<i>Corymbia maculata</i>	Spotted Gum		
<i>Eucalyptus botryoides X saligna</i>	-		
<i>Eucalyptus paniculata</i>	-		
<i>Eucalyptus quadrangulata</i>	White-topped Box		
<i>Eucalyptus saligna</i>	Sydney Blue Gum		
<i>Eucalyptus tereticornis</i>	Forest Red Gum		
<i>Ficus coronata</i>	Creek Sandpaper Fig		
<i>Glochidion ferdinandi</i>	Cheese Tree		
<i>Guioa semiglauca</i>	Guioa		
<i>Notelaea longifolia</i>	Large Mock-olive		
<i>Planchonella australis</i>	Black Apple		
<i>Polyscias elegans</i>	Celery Wood	Middle (shrubs)	<ul style="list-style-type: none"> • >1 shrub per 10 m² <ul style="list-style-type: none"> ○ MZ2 –130 shrubs • >1 shrub per 8 m² <ul style="list-style-type: none"> ○ MZ3 – 600 shrubs • Shrubs must be <10 % cover in MZ5 <ul style="list-style-type: none"> ○ MZ5 – 27 shrubs
<i>Abutilon oxycarpum</i>	Lantern Bush		
<i>Acacia mearnsii</i>	Black Wattle		
<i>Alectryon subcinereus</i>	Wild Quince		
<i>Backhousia myrtifolia</i>	Grey Myrtle		
<i>Breynia oblongifolia</i>	Coffee Bush		
<i>Callistemon salignus</i>	Willow Bottlebrush		
<i>Claoxylon australe</i>	Brittlewood		
<i>Croton verreauxii</i>	Green Native Cascarilla		
<i>Diospyros australis</i>	Black Plum		
<i>Elaeodendron australe</i>	-		
<i>Hibiscus heterophyllus</i> subsp. <i>heterophyllus</i>	Native Rosella		

Scientific name	Common name	Stratum	Planting density per Management Zone (MZ)
<i>Melaleuca styphelioides</i>	Prickly-leaved Tea Tree		
<i>Melicope micrococca</i>	Hairy-leaved Doughwood		
<i>Melicytus dentatus</i>	Tree Violet		
<i>Myrsine variabilis</i>	Mutton Wood		
<i>Pittosporum multiflorum</i>	Orange Thorn		
<i>Pittosporum revolutum</i>	Rough Fruit Pittosporum		
<i>Pittosporum undulatum</i>	Sweet Pittosporum		
<i>Rhodamnia rubescens</i>	Scrub Turpentine		
<i>Rubus parvifolius</i>	Native Raspberry		
<i>Wilkiea huegeliana</i>	Veiny Wilkiea		
<i>Austrostipa ramosissima</i>	Stout Bamboo Grass	Ground covers	<ul style="list-style-type: none"> • MZ5 – soil stabilising area only. 1 groundcover/ m². <ul style="list-style-type: none"> ○ 2000 plants
<i>Carex longebrachiata</i>			
<i>Carex appressa</i>	Tall Sedge		
<i>Carex inversa</i>			
<i>Cyperus gracilis</i>	Slender Flat-sedge		
<i>Chloris ventricosa</i>	Plump Windmill Grass		
<i>Cymbopogon refractus</i>	Barbed Wire Grass		
<i>Dichelachne micrantha</i>	Shorthair Plumegrass		
<i>Entolasia marginata</i>	Bordered Panic		
<i>Entolasia stricta</i>	Wiry Panic		
<i>Ficinia nodosa</i>	Knobby Club-rush		
<i>Imperata cylindrica</i>	Blady Grass		
<i>Lepidosperma laterale</i>			
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush		
<i>Microlaena stipoides</i>	Weeping Grass		
<i>Oplismenus imbecillis</i>	Creeping Beard Grass		
<i>Poa labillardierei</i> var. <i>labillardierei</i>	Tussock		
<i>Themeda triandra</i>	Kangaroo Grass		

4 Implementation

4.1 Treatment schedule

The implementation of the management actions outlined in **Section 3** are summarised with responsibilities, key performance indicators (KPIs) and timing in **Table 4.1** below.

Table 4.1: Timing of management actions.

Action	Responsibility	KPI	Timing
All site areas			
VMP area shown on all site plans	The proponent / contractors	The VMP area is clearly marked on all site plans and documents used by the contractors on site.	Prior to commencement of any works on site
Aboriginal artefact reburial location	The proponent / contractors	The Aboriginal artefact reburial location is clearly marked on all site plans and documents used by the contractors on site.	Prior to commencement of any works on site
Contractor inductions	Contractors	All personnel on site are aware of relevant sections of this VMP, including clearing limits, equipment hygiene, Aboriginal cultural heritage and activities prohibited in VMP.	Prior to commencement of any works on site
VMP area			
Primary weed control works	Bushland regeneration contractor	<ul style="list-style-type: none"> Priority Weeds reduced to <5% cover in all MZs. Woody weeds reduced to <5% cover in all MZs. Vine weeds reduced to <5% cover in all MZs. Broadleaf and grass weeds reduced to <10% cover in MZ1. Broadleaf weeds reduced to <15% cover in MZ2 and MZ3. 	Year 1
Secondary weed control works	Bushland regeneration contractor	<ul style="list-style-type: none"> Priority Weeds reduced to <2% cover in all MZs. Woody weeds reduced to <1% cover in all MZs. Vine weeds reduced to <2% cover in all MZs. Broadleaf and grass weeds reduced to <5% cover in MZ1. Broadleaf weeds reduced to <10% cover in MZ2 and MZ3. 	Year 1 and 2
Revegetation preparation	Bushland regeneration contractor	<ul style="list-style-type: none"> 1 m² round buffer zones prepared for plantings in MZ2 and MZ3. 	Year 1 and 2

Action	Responsibility	KPI	Timing
		<ul style="list-style-type: none"> Species planted as per Section 3.3 and Table 3.1 	
Tree guarding/ jute squares and Irrigation of plantings	Bushland regeneration contractor	<ul style="list-style-type: none"> Tree guarding/ jute squares in MZ2, MZ3 and MZ5 Irrigation in MZ2, MZ3 and MZ5 >90% of tubestock survival If survival rates fall below 90%, undertake compensatory planting as outlined above 	Ongoing after revegetation until all plants have become established.
Maintenance weed control works	Bushland regeneration contractor	<ul style="list-style-type: none"> Priority Weeds maintained at <2% cover in all MZs. Woody weeds maintained at <1% cover in all MZs. Vine weeds maintained at <2% cover in all MZs. Broadleaf and grass weeds maintained at <5% cover in MZ1. Broadleaf weeds maintained at <10% cover in MZ2 and MZ3. 	Year 3 -5
Ongoing weed monitoring	Bushland regeneration contractor	<ul style="list-style-type: none"> Photo monitoring taken at established photo points. Weed cover exceeding KPIs is recorded. 	Frequency to be determined by the bushland regeneration contractor. No less than annually for the duration of VMP implementation
Certification	Council	<ul style="list-style-type: none"> Priority Weeds reduced to <2% cover in all MZs. Woody weeds reduced to <1% cover in all MZs. Vine weeds reduced to <2% cover in all MZs. Broadleaf and grass weeds reduced to <5% cover in MZ1. Broadleaf weeds reduced to <10% cover in MZ2 and MZ3. >90% of tubestock survival. Tree guards removed. 	End of Year 5
Development area			
Equipment hygiene	Contractors	All machinery or other equipment on site is to be cleaned of foreign soil and seed prior to arrival on site	During development works

4.2 Cost of implementation

The costing for the VMP has been calculated over a five-year period and is estimated at a total of **\$125,056**. This includes the cost of the implementation of the VMP and associated reporting. This figure includes a cost of **\$77,656** during Year 1-2, a cost of **\$20,200** during Year 3 and a cost of **\$27,200** during Year 4-5. Reporting costs have been estimated at a total of **\$2,000**, which is incorporated into the costing for each year.

The costs have been calculated based on the employment of trained bush regenerators at a rate of \$550 pp/day (\$60 pp/hr for an 8-hour working day), which covers crew and supervisor wages, equipment, herbicides, and all other associated business costs. In addition, an indicative cost is provided for the monitoring report, which is to be produced annually.

The costing indicates how many crew members are required for each task, based on the size of the site, extent of weed infestation and expected timeframes for the completion of KPIs for weed control, and revegetation (**Table 4.1**). The costs are indicative of commercial bush regeneration rates, and some variation is expected depending on the bush regeneration company used and their associated charge out rates.

Table 4.2: Cost of VMP implementation.

Timing	Task	Cost (ex. GST)
Year 1-2	<u>Primary weed control and secondary weed control</u> based on a cost of employing a team of 4 bush regenerators at \$550 (\$68.75 per hour for 8 hours) pp/day to attend the site one day every month.	\$52,800
Year 1-2	<u>Revegetation planting</u> 3,007 plants @ \$8 per plant (cost of tubestock, planting, tree guards, jute squares, retaining pins and maintenance).	\$24,056
End of Year 1 and 2	Cost of 12-monthly report. The report should consist of a one to two-page report detailing the works conducted on site (\$400 per report).	\$800
Year 1-2 total		\$77,656
Year 3	<u>Maintenance weed control and revegetation maintenance</u> based on a cost of employing a team of 3 bush regenerators at \$550 (\$68.75 per hour for 8 hours) pp/day to attend the site one day every month.	\$19,800
Year 3	Cost of 12-monthly report. Report should consist of a one to two-page report detailing the works conducted on site (\$400 per report).	\$400
Year 3 total		\$20,200
Year 4-5	<u>Maintenance weed control and revegetation maintenance</u> based on a cost of employing a team of 2 bush regenerators at \$550 (\$68.75 per hour for 8 hours) pp/day to attend the site one day every month.	\$26,400
Year 4-5	Cost of 12-monthly report. Report should consist of a one to two-page report detailing the works conducted on site (\$400 per report).	\$800
Year 4-5 total		\$27,200
Cost of VMP implementation over 5-year period		\$125,056

Note: These prices are estimates based on industry standards. Bushland regeneration contractor quote will determine final costing. Contingency plantings to satisfy tubestock survival KPI's are not included.

4.3 Concurrent works

Vegetation management works will be carried out concurrently with civil construction works, therefore, planning between the bushland regeneration contractor and civil works supervisor must be undertaken. A Construction Environmental Management Plan (CEMP) should be implemented to avoid, minimise and mitigate any unforeseen or unexpected impacts to biodiversity in the VMP area.

5 Bushland regeneration contractor, reporting and certification

5.1 Bushland regeneration contractor

Suitably qualified and experienced bushland regeneration contractors who are members of the Australian Association of Bush Regenerators or who fulfil the membership criteria must undertake all vegetation management works. In addition to this, team leaders should hold a Certificate III in Conservation & Land Management or possess equivalent field experience and certification. The contractor should carry out best practice bush regeneration techniques as described by Buchanan (2000) and Bradley (2002).

A flexible approach to this site is recommended which is consistent with adaptive management principles. It allows the contractor to develop and build on site knowledge whilst implementing this VMP to achieve the required performance criteria.

5.2 Monitoring

The bushland regeneration contractor will monitor the vegetation for changes over time. The objective of the monitoring and reporting program is to record changes to the vegetation resulting from the vegetation management works. Monitoring works will require liaison with the land manager and the bushland regeneration contractor.

Monitoring will include fixed photo points marked on ground using star pickets. Photos and associated notes and observations are to be taken annually to demonstrate native regeneration, weed coverages and tubestock planting.

5.3 Reporting

A report will be provided to Council regarding the progress and milestones of the VMP within a year of implementing the VMP, and then annually for the duration of the VMP (see **Appendix C**). Reports are to include the results of the monitoring and an assessment of works against the performance criteria. The reports will also identify contingency measures should performance criteria not be met.

5.4 Certification

Completion criteria for this VMP are to achieve the following by the end of year 5:

- Priority Weeds reduced to <2% cover in all MZs.
- Woody weeds reduced to <1% cover in all MZs.
- Vine weeds reduced to <2% cover in all MZs.
- Broadleaf and grass weeds reduced to <5% cover in MZ1.
- Broadleaf weeds reduced to <10% cover in MZ2, MZ3 and MZ5.
- >90% of tubestock survival.
- Tree guards removed.

In accordance with Section 45(a) of development consent SF10851 (Shoalhaven City Council 2022) the establishment of targets for native cover are required. Native cover targets are not considered necessary for MZ1 because in this zone all native stratum

are intact, meaning bush regeneration over a 5-year period will result in a modest increase in native cover.

At the end of year 3, native cover targets for planted trees in MZ2, MZ3 and MZ5 is 10% projected foliage cover (PFC) and targets for planted shrubs in MZ2 and MZ3 is 20% PFC. PFC for native planted shrubs in MZ5 must be <10 % to meeting the IPA APZ standards. PFC is variable and subject to prevailing climatic condition. Therefore, at the end of year 5, if native cover targets for planted trees and shrubs are not met, but >90% of tubestock survival is achieved, the revegetation is considered established and the completion criteria is met.

The bushland regeneration contractor will issue a report to Council detailing compliance with these completion criteria within the annual report for year 5. The report will include photographs and a description of the vegetation present within each management zone in the VMP area and any other relevant matters (e.g. success or failure of revegetation in specific areas). The certification report will include a review of the VMP and recommendation of corrective actions or additional management actions to retain and enhance the environmental values for the life of the development.

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Appendix A Reburial of artefacts



Figure x.x - Proposed location for the reburial of artefacts

2109 - 25 Moss Vale Road - N27790

Source: NSW LPI Basemap

Drawn by: WA Date: 2021-04-07



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Appendix B Weed control methods

Acceptable weed removal techniques

Note this list is not exhaustive. It is intended to provide a guide to assist in VMP implementation. Note that given the nature of the site and the position in proximity to a drainage area, mechanical and hand removal techniques are preferred, wherever possible.

General

- The contractor shall take all care not to poison existing desirable vegetation when undertaking herbicide control methods.
- The correct herbicide shall be selected and used appropriately in accordance with instruction on the label and to ensure effective results on all priority weeds.
- Herbicide control is not to be used within or near water courses. The contractor shall obtain all required permits prior to use of herbicides near any water course and submit details of proposed spraying and chemicals to be used for approval prior to commencement.
- All herbicide spraying is to be undertaken using apparatus deemed as appropriate, generally this will be backpack or vehicle mounted spray boom in large areas. All other methods of herbicide application are not to be used onsite unless discussed and approved in writing by the Project Ecologist.
- The contractor shall ensure any spray drift is kept to an absolute minimum.

Herbicide spraying

- Herbicides should not be applied prior to rain occurring. This reduces the herbicides effectiveness as well as being transported in runoff to creek lines and waterways.
- The use of herbicides should be considered when:
 - There are small areas of dense priority weeds with few or no native plants to protect.
 - There are large areas of priority weeds.
 - The priority weeds are growing too rapidly for physical removal; and
- The spraying of weeds must only be undertaken by experienced persons with ChemCert (AQF-3) or equivalent qualifications. The success of each treatment must be evaluated by the operator after a set period of time and re-applied (if necessary) according to the labelled effectiveness for each herbicide. Care must be taken when applying herbicides near drainage lines to avoid excess use due to the sensitivity of the water bodies into which runoff will eventually flow.

Mechanical removal

- Mechanised removal using plant in a manner that does not impact adjacent native vegetation.
- Once initial treatment has occurred follow up cut and paint will be required to ensure any remaining plants are treated. Should any plants be found that are small enough to pull out successfully by hand this is preferred. Ensure that all roots are removed. Hand pulling techniques are outlined below.



- Hand removal will likely be required after initial treatment and will be used in the event of new seedling emergence which will have recolonised after initial removal. Hand removal shall be employed ensuring that all roots are removed as described below.

Hand removal

- Best undertaken when the soil profile is moist to ensure full and ease of removal and disposal off site.
- Apparent seeds and fruit are to be removed and placed in a bag for removal and disposal off site.
- Firmly take hold of the seedling at ground level, pull and manipulate backwards and forwards until it releases cleanly. If the plant is held too high it may break resulting in root material left behind in the soil. Remaining plant material may re-establish in this instance.
- All roots remaining within the soil shall be removed.
- Should the seedling have a spreading root system, roots will require individual removal.
- All seedlings and hand pulled weeds are to be placed in a bag, removed from site and disposed of sensibly.

Woody weed removal techniques

- Cut and paint woody weeds to 10 cm basal diameters.
- Stem injection.
- Frilling or chipping - 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 to treat each stem individually.
- Herbicides must be injected immediately before plant cells close (within 30 seconds) and translocation of herbicide ceases.

Appendix C Reporting template

Date			
Name of Contractor:			
Hours worked on site since last monitoring report:			
Site Condition:	Zone		
	Weed cover %		
	Seedling survival %		
	Planting numbers		
	Herbicide used (in Litres)		
	Other		
Describe relevant weed management techniques:			
Describe problems; e.g. weed invasions, damage to planted material, etc.:			
Photographic evidence:			
Planned work before next monitoring report:			



Appendix D Flora Inventory

Family	Scientific name	Common name	Native/ Exotic
Adiantaceae	<i>Adiantum aethiopicum</i>	Common Maidenhair	Native
Apiaceae	<i>Hydrocotyle sibthorpioides</i>	-	Native
Apocynaceae	<i>Araujia sericifera</i>	Moth Vine	Exotic
	<i>Parsonsia straminea</i>	Common Silkpod	Native
Araceae	<i>Zantedeschia aethiopica</i>	Arum Lily	Exotic
Asteraceae	<i>Cirsium vulgare</i>	Spear Thistle	Exotic
	<i>Delairea odorata</i>	Cape Ivy	Exotic
	<i>Gamochaeta</i> spp.	-	Exotic
	<i>Senecio madagascariensis</i>	Fireweed	Exotic
	<i>Sigesbeckia orientalis</i> subsp. <i>orientalis</i>	Indian Weed	Native
	<i>Tagetes minuta</i>	Stinking Roger	Exotic
	<i>Taraxacum officinale</i>	Dandelion	Exotic
Bignoniaceae	<i>Pandorea pandorana</i>	Wonga Wonga Vine	Native
Blechnaceae	<i>Doodia</i> spp.	-	Native
Casuarinaceae	<i>Casuarina</i> spp.	-	Native
Commelinaceae	<i>Commelina cyanea</i>	Native Wandering Jew	Native
	<i>Tradescantia fluminensis</i>	Wandering Jew	Exotic
Cyperaceae	<i>Cyperus gracilis</i>	Slender Flat-sedge	Native
	<i>Cyperus</i> spp.	-	Native
Cyperaceae	<i>Isolepis</i> spp.	Club-rush	Native
Fabaceae (Faboideae)	<i>Erythrina x sykesii</i>	Coral tree	Exotic
	<i>Glycine clandestina</i>	Twining glycine	Native
	<i>Glycine tabacina</i>	Variable Glycine	Native

Family	Scientific name	Common name	Native/ Exotic
	<i>Lotus uliginosus</i>	Birds-foot Trefoil	Exotic
	<i>Trifolium</i> spp.	A Clover	Exotic
Fabaceae (Mimosoideae)	<i>Acacia binervata</i>	Two-veined Hickory	Native
	<i>Acacia decurrens</i>	Black Wattle	Native
	<i>Acacia mearnsii</i>	Black Wattle	Native
Geraniaceae	<i>Geranium homeanum</i>	-	Native
Lauraceae	<i>Cinnamomum camphora</i>	Camphor Laurel	Exotic
Lomandraceae	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	Native
Luzuriagaceae	<i>Eustrephus latifolius</i>	Wombat Berry	Native
Malvaceae	<i>Sida rhombifolia</i>	Paddy's Lucerne	Exotic
Moraceae	<i>Ficus coronata</i>	Creek Sandpaper Fig	Native
	<i>Maclura</i> spp.	-	Native
	<i>Streblus brunonianus</i>	Whalebone Tree	Native
Myrtaceae	<i>Acmena smithii</i>	Lilly Pilly	Native
	<i>Corymbia maculata</i>	Spotted Gum	Native
	<i>Eucalyptus saligna</i> x <i>botryoides</i>	Sydney Blue Gum	Native
	<i>Eucalyptus</i> spp.		Native
	<i>Syzygium australe</i>	Brush Cherry	Native
	<i>Tristaniopsis laurina</i>	Kanooka	Native
Oleaceae	<i>Ligustrum sinense</i>	Small-leaved Privet	Exotic
	<i>Notelaea venosa</i>	Veined Mock-olive	Native
Phormiaceae	<i>Dianella caerulea</i>	Blue Flax-lily	Native
Phyllanthaceae	<i>Breynia oblongifolia</i>	Coffee Bush	Native
	<i>Glochidion ferdinandi</i>	Cheese Tree	Native
Pittosporaceae	<i>Pittosporum revolutum</i>	Rough Fruit Pittosporum	Native

Family	Scientific name	Common name	Native/ Exotic
	<i>Pittosporum undulatum</i>	Sweet Pittosporum	Native
Plantaginaceae	<i>Plantago lanceolata</i>	Lamb's Tongues	Exotic
Poaceae	<i>Briza maxima</i>	Quaking Grass	Exotic
	<i>Briza minor</i>	Shivery Grass	Exotic
	<i>Bromus catharticus</i>	Prairie Grass	Exotic
	<i>Cenchrus clandestinus</i>	Kikuyu Grass	Exotic
	<i>Cynodon dactylon</i>	Common Couch	Native
	<i>Ehrharta erecta</i>	Panic Veldtgrass	Exotic
	<i>Entolasia marginata</i>	Bordered Panic	Native
	<i>Holcus lanatus</i>	Yorkshire Fog	Exotic
	<i>Microlaena stipoides</i>	Weeping Grass	Native
	<i>Oplismenus aemulus</i>	-	Native
	<i>Oplismenus imbecillis</i>	-	Native
	<i>Poa</i> spp.	-	Native
<i>Sporobolus africanus</i>	Parramatta Grass	Exotic	
Polygonaceae	<i>Acetosa sagittata</i>	Rambling Dock	Exotic
Polypodiaceae	<i>Pyrrosia rupestris</i>	Rock Felt Fern	Native
Primulaceae	<i>Myrsine howittiana</i>	Brush Muttonwood	Native
Ranunculaceae	<i>Ranunculus repens</i>	Creeping Buttercup	Exotic
Rhamnaceae	<i>Alphitonia excelsa</i>	Red Ash	Native
Sapindaceae	<i>Acer negundo</i>	Box Elder	Exotic
Solanaceae	<i>Physalis peruviana</i>	Cape Gooseberry	Exotic
	<i>Solanum mauritianum</i>	Wild Tobacco Bush	Exotic
	<i>Solanum nigrum</i>	Black-berry Nightshade	Exotic
Urticaceae	<i>Urtica incisa</i>	Stinging Nettle	Native

Family	Scientific name	Common name	Native/ Exotic
Verbenaceae	<i>Lantana camara</i>	Lantana	Exotic
Violaceae	<i>Viola hederacea</i>	Ivy-leaved Violet	Native

