205-209 Grange Avenue, Marsden Park

Vegetation Management Plan

M Development Group

30 April 2021

Final

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Report No. 21008RP2

The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or commendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

Version	Date Issued	Amended by	Details
1.0	22/03/2021	SD/TM/KW	Final
2.0	30/04/2021	BF/MP	Final_Version 2.0_Changes Tracked

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Date:	21 June, 2021

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Glossary

Acronym/Term	Definition
Biosecurity Act	NSW *Biosecurity Act 2015*
CBD	Central Business District
CEEC	Critically Endangered Ecological Community
Council	Blacktown City Council
CPW	Cumberland Plains Woodland
DA	Development Application
DIPNR	Department of Infrastructure, Planning and Natural Resources
E3	Environmental Management
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FFA	Flora and Fauna Assessment
GPS	Global Positioning System
IPA	Inner Protection Area
LGA	Local Government Area
LLS	Local Land Service
Locality	Area within 5 km of the subject land
MA	Modification Application
NSW	New South Wales
OEH	Office of Environment and Heritage
OPA	Outer Protection Zone
OWRC	Other Weed of Regional Concern
PCT	Plant Community Type
R3	Medium Density Residential
RFEF	River Flat Eucalypt Forest
RFS	Rural Fire Service
RP	Regional Priority
SEPP	State Environmental Planning Policies
SOFAC	Statement of Facts and Contentions
SP	State Priority
SP2	Local Drainage
SEPP	State Environmental Planning Policy
Subject land	Comprises 205-209 Grange Ave, Marsden Park (Lot 1 DP 781987 and Lots 3 and 4 (Section J) DP 193074)
TEC	Threatened Ecological Community

Acronym/Term	Definition
The Project	Refers to the development at 205-209 Grange Ave, Marsden Park commissioned by M Development Group Pty Ltd.
the 'proponent'	M Development Group Pty Ltd
VMP	Vegetation Management Plan
VMP Area	The area to be managed under this Vegetation Management Plan
WoNS	Weed of National Significance

1. Introduction

1.1. Introduction

Cumberland Ecology has been commissioned by M Development Group Pty Ltd (the 'proponent'), to provide a Vegetation Management Plan (VMP) for 205-209 Grange Avenue, Marsden Park (Lot 1 DP 781987) (the 'subject land') for the proposed development (the 'Project') (see **Figure 1**). This VMP will support a development application under Part 4 of the New South Wales (NSW) Environmental *Planning and Assessment Act 1979* (EP&A Act).

1.2. Project Description

The Project involves the consolidation of three lots into one Torrens Title lot, along with Torrens title subdivision of the consolidated lot into three lots. This will be followed by construction of three residential flat buildings and associated works, including roads, demolition of structures, tree removal, access driveways to basement car parking, stormwater drainage and landscaping works. The extent of construction impacts of the Project is hereafter referred to as the 'Project footprint'.

1.3. Background

A Development Application (DA SPP-20-00004) for the subject land was lodged with Blacktown City Council (Council) on 19 May 2020. This DA was consequently refused by Council, citing additional information regarding biodiversity is required. No ecological assessments or reports had been prepared for the subject land and submitted as part of the DA. Although most of the subject land and all of the Project footprint is located within biocertified land under the North West Growth Centre State Environmental Policy (SEPP) (DPIE 2006) and therefore does not require any further ecological assessment or offsetting, Council has requested a VMP for the subject land in their Statement of Facts and Contentions (SOFAC) filed on 17 December 2020:

"Contention 6 – Biodiversity

Inadequate information on the impacts of the proposal on native vegetation and biodiversity.

Particulars:

b. A Vege*tation Management Plan (VMP) has not been provided for the future management and restoration of the E3 land in Lot 1 DP 781987, in line with objectives for E3 zoning requiring the protection, management and restoration of these areas identified in the Growth Centres SEPP. The VMP must be prepared in accordance with Council's Vegetation Management Plan Guidelines available from our website: https://www.blacktown.nsw.gov.au/Plan-build/Stage-2-plans-and-guidelines/Native-vegetation-management. The plan must be prepared by a suitably qualified and experienced bush regenerator or restoration ecologist.*

1.3.1. Location of the Subject land

The subject land is wholly located within the Blacktown City Council Local Government Area (LGA); approximately 50 km from the Sydney Central Business District (CBD) and 12 km from the Blacktown CBD. The subject land is bound to the south and west by semi-rural properties, to the north by Grange Avenue, and to the east by an unoccupied lot which includes Bells Creek and associated riparian area. **Figure 1** illustrates the immediate locality (5 km) of the subject land.

1.3.2. Description of Subject Land

The subject land is approximately 3.28 ha and is located within the Marsden Park Precinct under the North West Growth Centre SEPP. The subject land currently consists of single-storey brick dwellings and sheds and is surrounded by typical rural garden planting, paddocks and native and exotic vegetation. However, the subject land also contains a small area of River Flat Eucalypt Forest (RFEF) which is listed as an Endangered Ecological Community (EEC) under the BC Act and a Critically Endangered Ecological Community (CEEC) under the EPBC Act, as well as scattered trees consistent with Cumberland Plain Woodland which is listed as a CEEC under both the BC Act and EPBC Act.

1.3.3. Zoning and Land Use

The subject land contains multiple zonings, with the majority of the subject land zoned as E3 – Environmental Management, SP2 – Local Drainage and R3 – Medium Density Residential under the Marsden Park Precinct Plan. The subject land is currently being used for residential purposes but has been used for grazing of livestock in the past. Surrounding land use comprises of low and medium density residential and mixed use. The site is currently surrounded by semi-rural lots to the north, east, south and west.

1.3.4. Landform and Drainage

The subject land is contained on natural depression which runs from west (highest point) to east (lowest point) into Bells Creek located in the adjacent lot.

The subject land contains an existing drainage line in the south-eastern corner which runs in a south to west direction from the dam located in Lot 3 (Section J) DP 193074 through into Bells Creek on the adjacent lot located east of the subject land. This unnamed drainage line is mapped as a first order watercourse by NSW Department of Primary Industries. Consequently, the subject land is considered to be flood prone.

1.4. VMP Area

As detailed in Council's SOFAC, this VMP applies to the E3 zoned land within the subject land located in Lot 1 DP 781987 that is not being impacted by the Project footprint (the 'VMP Area') (**Figure 2**). The VMP area also includes two separate areas zoned as E3 that will be impacted for the construction of a stormwater flood basin and access to the VMP Area. Although both areas will be impacted and are included as the Project footprint, they can be revegetated after completion of the associated works and have therefore been included as part of the VMP Area. The VMP does not apply to hard landscaping areas of any built-up areas, such as driveways, pathways, etc. Council's recommended species list for landscaping is included in Appendix A of the Biodiversity Management Plan (BMP) for the subject land.

1.5. Aims and Objectives

As identified in Contention 6–b of the SOFAC, council requires a VMP to be provided for the future management and restoration of the E3 zoned land within the subject land. This VMP ensures the management of the E3 zoned area within the subject land meets the specific objectives identified in the Growth Centres SEPP; objective being:

- To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.
- To provide for a limited range of development that does not have an adverse effect on those values.

This VMP provides a working document for the medium-term protection and rehabilitation of the bushland to be retained within the subject land. More specifically, the VMP provides guidelines to:

- Revegetate areas of the VMP Area currently mapped as Weeds and Exotics with species characteristic of RFEF, using bushland regeneration techniques; and
- Regenerate areas of the VMP Area currently mapped as RFEF (EEC BC Act), using appropriate weed control techniques;

The aims of the VMP are as follows:

- To improve the biodiversity values of the VMP Area;
- To re-establish native vegetation that is broadly representative of the original plant community in the VMP Area (being RFEF), comprising three strata including understorey small trees, shrubs and groundcovers;
- To establish and enhance habitat for local fauna species with the potential to occur within the VMP Area;
- To enhance the ecological character of the VMP Area by removal and routine control of weed and exotic species present;
- Identify the appropriate timing of vegetation management activities and provide a schedule of works; and
- Assign responsibilities for management actions.

This VMP has been prepared in accordance with Council's Vegetation Management Plan Guidelines by a suitably qualified and experienced ecologist. Cumberland Ecology has extensive experience in the preparation of VMPs within the Greater Sydney region. Cumberland Ecology also has extensive knowledge of the subject land having undertaken the flora and fauna assessment on the subject land, which has assisted in the preparation of this VMP.

1.6. Implementation of VMP

The measures described in this VMP will need to be implemented by a qualified bush regenerator or restoration ecologist. The bush regenerator supervisor responsible for the implementation of this VMP will require the following minimum qualifications and experience:

- Certificate III in Conservation and Land Management and/or Certificate III in Natural Area Restoration;
- Membership of the Association of Australian Bush Regenerators (or the prerequisite qualifications and experience for membership),
- Minimum of 500 hours practical bushland regeneration under an experienced supervisor; and
- Expertise in restoring native vegetation on the Cumberland Plain.

1.7. Duration of VMP

The measures described in this VMP will be implemented for a period of five years, or until the aims and performance criteria identified within this document have been achieved to Council's satisfaction.

1.8. Relevant Legislation

Legislation relevant to this VMP includes:

1.8.1. Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the overarching planning legislation in NSW. This Act provides for the creation of planning instruments that guide land use. The EP&A Act also provides for the consideration of environmental and biodiversity values, which is addressed in Section 5A (Significant effect on species, populations or ecological communities or their habitats) should a land use change be proposed. This includes threatened species, communities, habitat and processes as listed under the BC Act and *Fisheries Management Act 1994* (FM Act).

1.8.2. Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Commonwealth Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places – defined in the EPBC Act as Matters of National Environmental Significance (MNES). Under the EPBC Act, any action (which includes a development, project or activity) that is considered likely to have a significant impact on MNES (including nationally listed threatened ecological communities, species, and listed migratory species) must be referred to the Australian Government Minister for the Environment (the Minister). The purpose of the referral is to allow a decision to be made about whether an action requires approval on a Commonwealth level. If an action is declared a "controlled action", then Commonwealth approval is required.

1.8.3. NSW Biodiversity Conservation Act 2016

The *NSW Biodiversity Conservation Act 2016* (BC Act) is the key piece of legislation in NSW relating to the protection and management of biodiversity and threatened species. The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The BC Act is supported by a number of regulations, including the *Biodiversity Conservation Regulation 2017* (BC Regulation).

1.8.4. NSW Biosecurity Act 2015

Priority Weeds are weeds prioritised for control under the NSW *Biosecurity Act 2015* (Biosecurity Act). State Level Priority Weeds have specific legal requirements for management written into the Biosecurity Act under regulations and controls, while Regional Priority Weeds have recommended management actions and strategic regional responses under the Greater Sydney Strategic Weed Management Plan (LLS: Greater Sydney 2017).

1.8.4.1. Weeds of National Significance

Weeds of National Significance (WoNS) are weed species occurring on a list created under the framework of the National Weeds Strategy (Australian Weeds Committee 2006). Thirty-two WoNS have been agreed upon by Australian governments as the worst weeds in the country based on an assessment process that prioritised weeds based on their invasiveness, potential for spread and environmental, social and economic impacts. No Federal legislation has been created which is applicable to WoNS, and legislative control for these species is currently expected to occur under state and territory legislation pertaining to weeds.

1.8.5. Pesticides Act 1999

The *Pesticides Act 1999* controls the use of herbicides within New South Wales. Under the Act it is illegal to use herbicides for species not listed on a particular herbicide's label, or in a concentration or manner not

outlined on the label. Off-label use of a particular herbicide is permitted only upon obtaining a specific permit.

1.8.6. NSW Water Management Act 2000

The objectives of the *Water Management Act 2000* (WM Act) are to provide for the sustainable and integrated management of the water systems of NSW and to protect, enhance and restore water sources, associated ecosystems and ecological processes.

Under the WM Act, approval is required for carrying out a 'controlled activity' that takes place on 'waterfront land' to ensure that the activity to ensure negative impacts upon waterfront land and other water users are avoided or minimised. In this instance, the relevant definition of waterfront land per the WM Act is: *"the bed of any river, together with any land lying between the bed of the river and a line drawn parallel to, and the prescribed distance inland of, the highest bank of the river…where the prescribed distance is 40m or (if the regulations prescribe a lesser distance…) that lesser distance"*.

Controlled activity means:

- Erection of a building;
- Carrying out a work;
- Removing material from waterfront land, such as vegetation or extractive material;
- Depositing material on waterfront land, such as extractive material; and
- Carrying out an activity which affects the quantity or flow of water in a water source.

An application for a 'controlled activity approval' will be refused if the Minister is not satisfied that adequate arrangements are in force to ensure that no more than minimal harm will be done to any waterfront land as a consequence of the carrying out of the proposed controlled activity.

1.8.7. State and Local Government Planning Instruments

Relevant planning instruments that relate to the proposed development include:

- State Environmental Planning Policy (Sydney Region Growth Centres) 2006;
- State Environmental Planning Policy 19 – Bushland in Urban Areas;
- Blacktown LEP (Blacktown City Council 2015); and
- Blacktown Growth Centre Precincts DCP (Blacktown City Council 2010).

1.9. Definitions

Regeneration:

Department of Infrastructure, Planning and Natural Resources (DIPNR) (2003) define "Assisted Natural Regeneration" as: *aiming to trigger the growth of native propagules (such as seed, tubers or rhizomes etc.) already present on site or having the ability to migrate onto the site, and aided by suitable management, to allow natural regeneration processes to occur.*

This form of *in-situ* restoration will be collectively referred to as: "Regeneration" in this report.

Reconstruction:

DIPNR (2003) define Reconstruction through Re-vegetation as: *involving the introduction of locally indigenous plant species, modelled on the diversity and structural characteristics of the original plant community. It is carried-out by planting or re-introducing propagules.*

This form of *ex-situ* restoration is referred to as: "Revegetation" in this report.

2. Methodology

2.1. Desktop Assessment

The preparation of the VMP involved a desktop assessment to identify the vegetation communities present within the subject land. As part of the desktop assessment a literature review of the following documents was undertaken:

- The Fauna and Flora Assessment of the subject land by Cumberland Ecology (Cumberland Ecology 2021);
- Statement of facts and contentions (SOFAC) letter filed on 17 December 2020 - Blacktown City Council;
- The Final Determination of River Flat Eucalypt Forest (RFEF) in the Sydney Basin Bioregion (NSW Scientific Committee 2016);
- The most up to date methods of weed control for exotic species that are present in the subject land; and,
- The Vegetation Community Profile of RFEF within the Sydney Metropolitan Vegetation Community Profiles (OEH 2019b).

2.2. Database Analysis

A number of databases were utilised during the preparation of this VMP. Key databases reviewed included:

- NSW Office of Environment and Heritage (OEH) BioNet Atlas (OEH 2019a);
- Commonwealth Department of the Environment and Energy (DoEE) Protected Matters Search Tool (DoEE 2019b),
- OEH Threatened Species Profile Database; and
- DoEE Species Profile and Threat Database.

Database analysis was conducted for the locality using the OEH BioNet Atlas (OEH 2019a) and the DoEE Protected Matters Search Tool (DoEE 2019b). The locality is defined as the area within a 5 km radius of the subject land. The BioNet Atlas search facility was used to generate records of threatened flora and fauna species and populations listed under the BC Act and/or EPBC Act within the locality. The abundance, distribution and age of records generated within the search areas provided supplementary information for the assessment of likelihood of occurrence of those threatened species within the subject site. The Protected Matters Search Tool generated a list of potentially occurring MNES listed under the EPBC Act within the locality of the subject land.

Previous broad-scale mapping of the Sydney Metropolitan area by the NSW National Parks and Wildlife Service (OEH 2016) and Blacktown Council (OEH 2013) was accessed in order to determine vegetation communities that could occur within the subject land.

This desktop assessment involved a variety of sources including government fact sheets and websites. The personal experience of a Cumberland Ecology botanist with experience in bush regeneration was also utilised.

In order to prepare a species planting list and management strategies for the subject land, field survey data collected by Cumberland Ecology for the Flora and Fauna Assessment for the subject land (CE ref. 21008RP1) was reviewed, along with the Final Determination (NSW Scientific Committee 2019) for RFEF within the

Sydney Basin Bioregion. The species planting list has been prepared to assist with revegetation where required within the subject land and includes species listed as diagnostic for the RFEF vegetation community.

2.3. Flora Surveys

Flora surveys were undertaken by Cumberland Ecology on 3 February 2021. Surveys included vegetation mapping, plot-based vegetation survey and threatened flora surveys. The survey design consisted of random meander searches as well as plot-based surveys, and was guided by the following:

- NSW Government (2017): Biodiversity Assessment Method; and
- NSW Government (2016): NSW Guide to Surveying Threatened Plants.

2.3.1. Vegetation Mapping

The vegetation within the subject land was ground-truthed by Cumberland Ecology to examine and verify the existing mapping including the condition and extent of the different vegetation communities. Where vegetation community boundaries were found to differ from the existing mapping, records were made of new boundaries using a hand-held Global Positioning System (GPS) and mark-up of aerial photographs. The data collected was analysed and the resultant information was synthesised using a Geographic Information System (GIS) to create a spatial database to produce a vegetation map of the subject land.

2.3.2. Plot-based Floristic Survey

A plot-based floristic survey was undertaken within the subject land. The survey was conducted in accordance with the BAM and included establishment of a 20 m x 50 m plot within which the following data was collected:

- Composition for each growth form group by counting the number of native plant species recorded for each growth form group within a 20 m x 20 m plot;
- Structure of each growth form group as the sum of all the individual projected foliage cover estimates of all native plant species recorded within each growth form group within a 20 m x 20m plot;
- Cover of 'High Threat Exotic' weed species;
- Assessment of function attributes within a 20 m x 50 m plot, including:
    - Count of number of large trees;
    - Tree stem size classes, measured as 'diameter at breast height over bark' (DBH);
    - Regeneration based on the presence of living trees with stems <5 cm DBH;
    - The total length in metres of fallen logs over 10 cm in diameter;
- Assessment of litter cover within five 1 m x 1 m plots evenly spread within the 20 m x 50 m plot; and
- Number of trees with hollows that are visible from the ground within the 20 m x 50 m plot.

All vascular plants recorded or collected were identified using keys and nomenclature provided in *PlantNET* (Botanic Gardens Trust 2019).

2.3.3. Threatened Flora Species Searches

Targeted threatened flora surveys were undertaken in conjunction with collection of floristic plot data. Surveys were targeted towards threatened species known to occur in the locality of the study area and were conducted in areas considered to provide potential habitat for these species. Surveys involved foot traverses, and where threatened flora species were observed, the location was recorded with a handheld GPS.

2.3.4. Data Analysis

2.3.4.1. Plant Community Types

The primary nomenclature used within this report is locally defined map units that were determined following field investigations within the subject land. Where relevant, the locally defined map units were matched with the equivalent Plant Community Types (PCTs).

Identification of the PCTs occurring within the subject land was guided by the findings of the floristic survey. The data collected during surveys of the subject land was analysed in conjunction with a review of the PCTs held within the VIS Classification Database (OEH 2019d). Consideration was given to the following:

Occurrence within the Sydney Basin Interim Biogeographic Regionalisation for Australia subregion and Hawkesbury Nepean management area;

- Vegetation formation;
- Alignment with TECs;
- Landscape position;
- Associated upper stratum species; and
- Upper, mid and ground strata species.

Where locally defined map units were not readily able to be matched to PCTs, best-fit communities were selected, or noted as unassigned if comprised of planted or exotic vegetation.

2.3.4.2. Classification of Threatened Ecological Communities

Following review of potentially occurring TECs, the vegetation communities identified within the subject land were examined against the listings of TECs under the BC Act and EPBC Act.

For TECs listed under the BC Act, vegetation communities were examined against the final determinations for potentially occurring TECs. A component of this analysis was to compare the species recorded during the field surveys with the species lists provided in the final determinations. Additional information such as the location, geology and landform detailed in the final determinations were also considered in the assessment.

For TECs listed under the EPBC Act, vegetation communities were examined against the DoEE Species Profile and Threats Database and any associated documentation, such as listing advice and policy statements.

2.4. Fauna Surveys

Fauna surveys were undertaken by Cumberland Ecology on 3 February 2021. Surveys included general habitat assessment, hollow-bearing tree assessment, bird census, and incidental observations.

2.4.1. General Habitat Assessment

A general fauna habitat assessment was undertaken within the subject land during field surveys. This assessment included consideration of important indicators of habitat conditions and complexity as well as the occurrence of micro-habitats such as tree hollows, fallen logs and riparian areas. An assessment of the structural complexity of the vegetation, the age structure of the remnant vegetation and the nature and extent of human disturbance was also undertaken. Notes were taken on specific habitat features that may be utilised by threatened fauna species known to occur in the locality.

2.4.2. Hollow-bearing Tree Assessment

Remnant native vegetation and some areas of planted vegetation were surveyed to determine the presence of hollows. All trees that were observed to contain a hollow visible from the ground were recorded with a hand-held GPS, including both living and dead trees.

2.4.3. Incidental Observations

Visual observation and call identification of diurnal birds was carried out throughout the subject land during the survey period. Diurnal birds were also identified and recorded as they were encountered throughout the subject land.

Any incidental vertebrate fauna species that was observed, heard calling, or otherwise detected on the basis of tracks or signs were recorded and listed in the total species list for the subject land.

3. Existing Biodiversity Values

3.1. Vegetation Communities

Previous broad-scale vegetation mapping conducted by the former Office of Environment and Heritage (OEH) identifies two vegetation communities within the subject land; Cumberland Shale Plains Woodland and Alluvial Forest in the Sydney Basin Bioregion, the former is a CEEC under the BC Act and EPBC Act, and the latter is an EEC listed under the BC Act and CEEC under the EPBC Act. The surveys by Cumberland Ecology for this assessment refined the existing vegetation mapping of the subject land and identified nine vegetation communities (four native and five exotic), which includes two condition states for River-flat Eucalypt Forest. The vegetation communities recorded by Cumberland Ecology within the subject site are provided within **Table 1**, as well as their associated plant community type (PCT), listing status and extent. The distribution of vegetation communities within the subject land and the VMP area is provided in **Figure 3**.

Table 1 Vegetation communities found within the subject land and VMP Area

Vegetation Community	BC Act Status	EPBC Act Status	Subject Land (ha)	VMP Area (ha)
River-flat Eucalypt Forest (Degraded)	EEC	Does not conform to listing	0.12	0.07
River-flat Eucalypt Forest (Scattered Trees)	EEC	Does not conform to listing	0.04	0.00
Cumberland Plain Woodland (Scattered Trees)	CEEC	Does not conform to listing	0.08	0.00
Non-endemic Native	-	-	0.07	0.00
Typha orientalis	-	-	0.04	0.02
Exotic Vegetation	-	-	0.25	0.00
Exotic Grassland	-	-	2.16	0.35
Coral Tree (*Erythrina crista-galli*)	-	-	0.03	0.02
Blackberry (*Rubus fruticosus* spp. agg.)	-	-	0.01	0.01
Dam	-	-	0.02	0.00
Cleared Land	-	-	0.46	0.00
TOTAL			**3.28**	**0.48**

Key: EEC = Endangered Ecological Community, CEEC = Critically Endangered Ecological Community

3.1.1. River-flat Eucalypt Forest

NSW PCT: 835 Forest Red Gum – Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin

River-flat Eucalypt Forest (RFEF) is an open eucalypt forest situated on broad alluvial flats of the Hawkesbury and Nepean river systems and is a TEC listed under the BC Act. It also forms narrower ribbons alongside streams and creeks that drain the Cumberland Plain. Typically, the canopy includes *Angophora floribunda* (Rough-barked Apple), *Eucalyptus tereticornis* (Forest Red Gum) and/or *Eucalyptus amplifolia* (Cabbage Gum). The understorey within RFEF is characterised by an occasional sparse to open small tree stratum of

Melaleuca spp. (Paperbark) and *Acacia* spp. (Wattles). A sparse lower shrub layer featuring *Bursaria spinosa* (Native Blackthorn). The ground layer is characterised by an abundant cover of grasses with small herbs and ferns. River-flat Eucalypt Forest occurs at altitudes between one and 160 metres above sea level and with a mean annual rainfall of 750-1000 millimetres (OEH 2019c).

Within the subject land RFEF occurs at lower elevations in the south- and north-western corner of the site adjacent to the dam. It is characterised by the occurrence of *Eucalyptus tereticornis* (Forest Red Gum) and/or *Eucalyptus amplifolia* (Cabbage Gum). The understorey is disturbed and is dominated by exotic grasses.

The RFEF occurs in two condition classes within the subject land; native canopy with exotic dominated understorey and scattered endemic trees.

3.1.1.1. River-flat Eucalypt Forest - native canopy with exotic dominated understorey

BC Act Status: Endangered Ecological Community

EPBC Act Status: Critically Endangered Ecological Community but does not conform to listing – the perennial understorey vegetative cover present is not made up of 30% or more of native species and thus does not meet the condition classes and thresholds for the ecological community located in Table 4 of the EPBC Act Listing Advice (DoEE 2019a).

This variant of RFEF occurs in the lower reaches of the subject land in the south-eastern corner and has previously been under-scrubbed and grazed. The canopy includes *Eucalyptus amplifolia* (Cabbage Gum) and *Eucalyptus tereticornis* (Forest Red Gum). The sub-canopy stratum includes canopy species as well as *Casuarina glauca* (Swamp Oak). There is no intact native shrub layer. The understorey is dominated by *Paspalum dilatatum* (Paspalum) and to lesser extent *Cynodon dactylon* (Couch Grass). Other exotic grasses present include *Bromus catharticus* (Brome grass) and *Setaria parviflora* (Pigeon Grass). The native species present include *Juncus usitatus* (Common Rush), *Paspalum distichum* (Water Couch) and *Centella asiatica* (Indian Pennywort).

An example of this vegetation community is shown in **Photograph 1**.

Photograph 1 RFEF - native canopy with an exotic dominated understorey

3.1.1.2. River-flat Eucalypt Forest - endemic trees (scattered)

BC Act Status: EEC

EPBC Act Status: CEEC but does not conform to listing – the perennial understorey vegetative cover present is not made up of 30% or more of native species and thus does not meet the condition classes and thresholds for the ecological community located in Table 4 of the EPBC Act Listing Advice (DoEE 2019a).

This variant of the RFEF occurs as scattered canopy trees in the north-eastern corner of the subject land. It occurs as a canopy of *Eucalyptus tereticornis* (Forest Red Gum) and the ground cover is maintained as a lawn dominated by *Stenotaphrum secundatum* (Buffalo Grass), *Cenchrus clandestinus* (Kikuyu) and *Cynodon dactylon* (Couch Grass).

An example of this vegetation community is shown in **Photograph 2**.

Photograph 2 RFEF – scattered endemic trees (showing lawn underneath trees behind buildings in the south western corner of the subject land).

3.1.2. Cumberland Plains Woodland – endemic trees (scattered)

NSW PCT: 849 Grey Box – Forest Red Gum Grassy Woodland on Flats of the Cumberland Plain, Sydney Basin.

BC Act Status: CEEC

EPBC Act Status: CEEC, but does not conform to listing –the patch size of the ecological community is less than 0.5ha in area and thus does not meet any of the Condition Thresholds for Patches located in Table 1 of the EPBC Act Listing Advice (DEWHA 2010).

Cumberland Plains Woodland (CPW) is a threatened ecological community (TEC) found throughout the Cumberland Plain. It is one of the plant communities associated with clay-rich shale soil. Tozer *et al.* (2010) define the primary habitat for the community as occurring at elevations less than 150 meters above sea level with some sites occurring at higher elevations where the landscape remains gently inclined. The main canopy species include *Eucalyptus moluccana* (Grey Box), *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus fibrosa* (Red Ironbark) and *Eucalyptus crebra* (Narrow-leaved Ironbark).

This variant of the CPW occurs as scattered trees within the centre of the subject land and along the western edge where trees from the neighbouring lot overhang the site. It occurs as a canopy of *Eucalyptus tereticornis* (Forest Red Gum) above a shrub stratum consisting of *Solanum sisymbriifolium* and the ground cover is dominated by *Cenchrus clandestinus* (Kikuyu), *Paspalum dilatatum* (Paspalum) and *Cynodon dactylon* (Couch Grass).

An example of this vegetation community is shown in **Photograph 3**.

Photograph 3 Cumberland Plain Woodland in the form of scattered endemic trees

3.1.3. Exotic Vegetation

BC Act Status: Not listed

EPBC Act Status: Not Listed

Exotic vegetation occurs throughout the subject land primarily around the dwellings located on the subject site.

It consists of planted garden beds and exotic trees such as *Platanus* × *Acerifolia* (London Plane), *Fraxinus angustifolia*, *Phoenix canariensis* (Canary Island Date Palm), *Schinus Molle* (Pepper Tree) and *Jacaranda mimosifolia* (Jacaranda). These exotic trees include established fruit trees such as *Prunus persica* (Peach) and *Citrus sinensis* (Orange Tree). Other exotic species present include *Solanum sisymbriifolium*, *Senecio madagascariensis* (Fireweed), *Stenotaphrum secundatum* (Buffalo Grass), *Cenchrus clandestinus* (Kikuyu) and *Hypochaeris radicata* (Cats-ear).

This community does not comprise a defined native vegetation unit and does not conform to a listing under either the BC Act or EPBC Act. An example of this vegetation community is shown in **Photograph 4**.

Photograph 4 Exotic Vegetation

3.1.4. Exotic Grassland

BC Act Status: Not listed

EPBC Act Status: Not Listed

Exotic grassland is the dominant vegetation type and is found throughout the entire land. It is dominated by the grass species *Paspalum dilatatum* (Paspalum), *Cenchrus clandestinus* (Kikuyu Grass), *Cynodon dactylon* (Couch) and *Eragrostis curvula* (African Lovegrass). Other grass species present to a lesser extent include *Stenotaphrum secundatum* (Buffalo Grass) and *Lolium perenne* (Perennial Ryegrass). Other non-grass exotic species present include *Rumex crispus* (Curly Dock).

This community does not comprise a defined native vegetation unit and does not conform to a listing under the BC Act or EPBC Act. An example of this vegetation community is shown in **Photograph 5**.

Photograph 5 Exotic Grassland

3.1.5. Cultivated Non-endemic Trees and Shrubs

BC Act Status: Not listed

EPBC Act Status: Not Listed

Non-endemic native trees and shrubs have been planted primarily within garden beds and around the dwellings in the west of the subject land. The species include *Lophostemon confertus* (Brush Box), *Grevillea robusta* (Silky Oak), *Callistemon viminalis* (Weeping Bottlebrush), *Callistemon citrinus* (Crimson Bottlebrush) and *Eucalyptus robusta* (Swamp Mahogany).

An example of this vegetation community is shown in **Photograph 6**.

Photograph 6 Cultivated Non-endemic Trees and Shrubs

3.1.6. *Typha orientalis* (Bulrush) dominated

BC Act Status: Not listed

EPBC Act Status: Not Listed

The native *Typha orientalis* (Bulrush) is associated with the dam acting as a retention basin in the south of the subject land. This vegetation does not conform to the BC Act listed Freshwater Wetlands as it is within an artificially created area (i.e. a dam), which are specifically excluded from the community's final determination (NSW Scientific Committee 2010). This vegetation type surrounds the dam and extends northeast along the northern edge of the drainage line adjacent to the exotic grassland. The vegetation is dominated by *Typha orientalis* (Bulrush) and to a much lesser extent by *Juncus usitatus* (Common Rush). Other species present include *Persicaria decipiens* (Slender Knotweed), *Rubus fruticosus* spp. agg. (Blackberry Complex) and *Rumex crispus* (Curly Dock).

An example of this vegetation community is shown in **Photograph 7**.

Photograph 7 *Typha orientalis* (Bulrush) dominated vegetation in dam

3.1.7. *Rubus fruticosus* (Blackberry Complex)

BC Act Status: Not listed

EPBC Act Status: Not Listed

Rubus fruticosus spp. agg. (Blackberry Complex) is present as a large patch infestation along the eastern boundary of the subject land. Its presence is associated with the drainage line adjacent to the boundary. The dominant species is *Rubus fruticosus* spp. agg. (Blackberry Complex). No other species were recorded associated with this vegetation type.

This community does not comprise a defined native vegetation unit and does not conform to a listing under the BC Act or EPBC Act, and *Rubus fruticosus* spp. agg. is classified as a Priority Weed under the Biosecurity Act and a Weed of National Significance (WoNS).

An example of this vegetation community is shown in **Photograph 8**.

Photograph 8 *Rubus fruticosus* (Blackberry Complex)

3.1.8. *Erythrina crista-galli* (Cockspur Coral Tree)

Erythrina crista-galli (Cockspur Coral Tree) is associated with a drainage line that traverses the subject land from the dam in the south to the eastern boundary of the subject land. The vegetation type is bounded by *Typha orientalis* and the species propagules are dispersed by water. Other species associated with this vegetation type include *Typha orientalis* (Bulrush), *Rubus fruticosus* (Blackberry Complex) and *Rumex crispus* (Curly Dock).

This community does not comprise a defined native vegetation unit and does not conform to a listing under the BC Act or EPBC Act.

3.2. Flora Species

3.2.1. General Species

One hundred and sixty-nine (169) flora species were recorded within the subject land during field surveys, including 41 native species and 128 exotic species. Of the native species recorded in the subject land, the most frequently recorded plant families include the Poaceae (9), Myrtaceae (7) and Chenopodiaceae (4) families. Of the exotic species recorded in the subject land, the most frequently recorded plant families include the Asteraceae (18), Poaceae (17) and Fabaceae (Faboideae) (5).

The floral assemblage across the subject land is a reflection of previous clearing for urban development and current land uses which have resulted in the subject land being dominated by exotic ground cover and understorey, combined with native canopy species. A total species list for the subject land is provided in **Appendix A**.

3.2.2. Priority Weeds and Weeds of National Significance

Priority Weeds are weeds prioritised for control under the *NSW Biosecurity Act 2015*. State Level Priority Weeds have specific legal requirements for management written into the Biosecurity Act under regulations and controls, while Regional Priority Weeds have recommended management actions and strategic regional responses under the Greater Sydney Strategic Weed Management Plan (LLS: Greater Sydney 2019) and are given a status based on the risk they pose to the environment and the particular region in which they are found and include State Priority (SP) weeds, Regional Priority (RP) weeds and Other Weeds of Regional Concern (OWRC).

A total of 19 weeds recorded within the subject land are listed as State Priority (SP) weeds, Regional Priority (RP) weeds, Other Weeds of Regional Concern (OWRC) or Weeds of National Significance (WoNS) under the *Biosecurity Act 2015* and the Greater Sydney Regional Strategic Weed Management Plan 2017 – 2022 (LLS: Greater Sydney 2017). These are identified in **Table 2**.

Table 2. Priority Weeds and WoNS recorded within the subject land

Family	Scientific Name	Common Name	Weed Status
Alliaceae	*Agapanthus praecox*	Agapanthus	OWRC
Arecaceae	*Phoenix canariensis*	Canary Island Date Palm	OWRC
Arecaceae	*Syagrus romanzoffiana*	Cocos Palm	OWRC
Asteraceae	*Senecio madagascariensis*	Fireweed	SP, WoNS
Cactaceae	*Opuntia stricta*	Common Prickly Pear	SP, WoNS
Caprifoliaceae	*Lonicera japonica*	Japanese Honeysuckle	OWRC
Convolvulaceae	*Ipomoea indica*	Morning Glory	OWRC
Fabaceae (Caesalpinioideae)	*Senna pendula*	Winter Cassia	OWRC
Fabaceae (Faboideae)	*Erythrina crista-galli*	Cockspur Coral Tree	OWRC
Fabaceae (Faboideae)	*Robinia pseudoacacia*	Black Locust	OWRC
Lauraceae	*Cinnamomum camphora*	Camphor Laurel	OWRC
Oleaceae	*Olea europaea* subsp. *cuspidata*	African Olive	RP
Poaceae	*Cenchrus clandestinus*	Kikuyu Grass	OWRC
Poaceae	*Chloris gayana*	Rhodes Grass	OWRC
Poaceae	*Eragrostis curvula*	African Lovegrass	OWRC
Rosaceae	*Rubus fruticosus* spp. agg.	Blackberry Complex	SP, WoNS
Rutaceae	*Murraya paniculata*	Mock Orange	OWRC
Salviniaceae	*Salvinia* spp.	Salvinia	SP, WoNS
Verbenaceae	*Lantana camara*	Lantana	SP, WoNS

Key: RP = Regional Priority, SP = State Priority, WoNS = Weed of National Significance, OWRC = Other Weed of Regional Concern.

3.2.3. Threatened Flora Species

No threatened flora species have been recorded within the subject land or are considered likely to occur. The understorey vegetation in the subject land is too disturbed and is comprised mostly of previously cleared areas and exotic grasses and weeds. An analysis of the likelihood of occurrence within the subject

land for all threatened flora species recorded within the locality or that have the potential to occur due to the presence of suitable habitat is provided in Appendix B of the Flora and Fauna Assessment report (CE ref 21008RP1). Of the 25 threatened species known or predicted to occur within the locality, none are considered likely to occur within the subject land.

3.3. Fauna Habitat

The majority of the subject land, especially the understorey and ground cover, is comprised of a mixture of exotic and native vegetation which has limited value for native fauna. The canopy consists of mature trees consistent with RFEF and CPW which may provide foraging habitat for microchiropteran bats and native birds. Some these trees are being retained in the subject land all trees within the subject land are being retained as part of the Project. Nineteen (19) vertebrate fauna species have been recorded from the subject land during surveys.

3.3.1. General Species

Nineteen (19) vertebrate fauna species have been recorded from the subject land during surveys. A number of introduced species were recorded during field surveys, including common farm animals such as chickens, domestic goats and sheep as well as introduced feral birds including the Common Myna (*Acridotheres tristis*). A total species list for the subject land is provided in **Table 3.**

Table 3 Fauna species recorded within the subject land

Scientific Name	Common Name	Exotic	BC Act Status	EPBC Act Status	Observation Type
Acanthiza chrysorrhoa	Yellow-rumped Thornbill		-	-	O/W
Acanthiza pusilla	Brown Thornbill		-	-	O/W
Acridotheres tristis	Common Myna	*	-	-	O/W
Anas superciliosa	Pacific Black Duck		-	-	O
Capra aegagrus hircus	Domestic Goat	*	-	-	O/W
Corvus coronoides	Australian Raven		-	-	O
Cracticus tibicen	Australian Magpie		-	-	O/W
Cryptoblepharus pulcher	Elegant Snake-eyes Skink		-	-	O
Gallus domesticus	Chicken	*	-	-	O/W
Grallina cyanoleuca	Magpie-Lark		-	-	O/W
Hirundo neoxena	Welcome Swallow		-	-	O
Lampropholis guichenoti	Common Garden Skink		-	-	O
Limnodynastes peronii	Striped Marsh Frog		-	-	W
Malurus cyaneus	Superb Fairywren		-	-	O/W
Manorina melanocephala	Noisy Miner		-	-	O/W
Ocyphaps lophotes	Crested Pigeon		-	-	O/W
Ovis aries	Sheep	*	-	-	O/W
Rhipidura leucophrys	Willie Wagtail		-	-	O/W
Trichoglossus moluccanus	Rainbow Lorikeet		-	-	O/W

Key: O = Observed, W = heard

3.3.2. Threatened Fauna Species

No threatened fauna species were recorded within the subject site during surveys, however 14 have been assessed as having potential to occur within the subject land due to the presence of suitable habitat. An analysis of the likelihood of occurrence within the subject land for all threatened flora species recorded within the locality or that have the potential to occur due to the presence of suitable habitat is provided in Appendix C of the Flora and Fauna Assessment report (CE ref 21008RP1).

3.4. Key Threats to Biodiversity and Management Issues

Key ecological threats across Blacktown City and in the North West Growth Centres as well as their management actions is detailed in **Table 4** below.

Table 4 Key ecological threats and management actions

Key Threat	Management Actions
Weed Occurrence	Some weeds are present within the VMP Area which will need to be managed under this VMP. Measures include weed control by qualified bush regenerators in accordance with the weed specific control methods detailed in **Appendix C** (which includes herbicide application, cut and paint, scrape and paint, use of machinery, hand weeding etc. as appropriate).
Land Clearing	Some land is proposed to be cleared in the north eastern corner of the VMP Area to allow for the construction of the proposed road. Planting of tubestock in the cleared area immediately adjacent to the road, and in-fill planting as part of the road reserve landscaping will aid rehabilitation in the area. Additionally, some land clearing is proposed to allow for the installation of the flood basin in the south-eastern corner of the VMP Area. The planting of aquatic and semi-aquatic fringing vegetation will aid rehabilitation in the area.
Rubbish/debris	Some metal and other wooden materials within the VMP Area will need to be removed and disposed of appropriately as part of the management and rehabilitation of Management Zone 2 of this VMP. Further details regarding rubbish removal and disposal are described in Section
Feral Animals	No obvious signs of feral animals were observed during surveys (e.g. rabbit warrens), however it is likely that animals such as feral cats and foxes may utilise the VMP area on occasion. Baiting or trapping is not deemed necessary is the impact of feral animals on the VMP Area is not significant at present. Fencing around the VMP Area should allow for the dispersal of native fauna and is therefore unlikely to prevent feral animals such as cats or foxes from entering the site, however will prevent domestic animals such as goats and sheep entering the VMP area and browsing vegetation . No specific measures regarding feral animal control is proposed at present, however, suitable measures can be implemented at a future date if the impact of feral animals is deemed significant during the monitoring period of the VMP.
Erosion	Erosion measures will have to be put in place during construction works to ensure that no run off occurs from the Project into the VMP Area, in particular the drainage line. A retaining wall should be installed around the proposed road and the area immediately adjacent to the road should be revegetated with plantings. The walls of the proposed flood basin will also be revegetated with suitable plantings.

Key Threat	Management Actions
Logging/collection of firewood	Salvage logs from the vegetation clearing during the construction works will be re-used in the VMP Area. Additionally, canopy species will also be planted as part of the rehabilitation works for Management Zone 1 of the VMP Area. A permanent fence should be installed between the VMP Area boundary and the Project footprint with clear signage to prevent unauthorised personnel access. No collection of firewood is to permitted within the VMP Area.
Illegal trails/bike tracks/etc.	No illegal trails are currently present within the VMP Area, however a permanent fence with a gate and clear signage between the VMP Area boundary and the proposed road should be installed to restrict unauthorised personnel access. No vehicle access is permissible into the VMP Area except for regeneration and monitoring purposes as part of the VMP implementation.

4. Vegetation Management Zones

As discussed in **Chapter 3**, the subject land has been highly modified since its pre-European state. Under this VMP, the entire VMP Area will be revegetated with native, endemic plant species characteristic of RFEF. Areas in the south-eastern corner comprised of remnant RFEF canopy species over degraded and exotic-dominated groundcover will be managed to improve its current condition.

Rubbish within the VMP Area will be removed and permanent sedimentation/erosion controls will be implemented to protect the unnamed watercourse. All access to the VMP Area will be from a proposed gate on the south-eastern corner of the proposed road. Works within the VMP Area should commence immediately following approval of the DA. A detailed timing of management actions proposed to be undertaken is provided in **Chapter 9**.

It is expected that the intensive actions detailed in the VMP will be undertaken over a five year period, or until the aims and performance criteria identified within this VMP have been achieved to Council's satisfaction.

4.1. Management of the VMP Area

The VMP Area contains areas of native vegetation occurring as canopy trees. The understorey has been significantly altered from its original condition. For the purposes of this VMP, two management zones have been identified.

- **Management Zone 1**: Areas of RFEF vegetation (of moderate resilience) to be subject to revegetation and long-term management of retained vegetation and weed management;
- **Management Zone 2***:* Areas of RFEF vegetation (of low resilience) consisting of Weeds and Exotic vegetation to be revegetated with RFEF species and subject to weed management.

The specific objectives and actions to be undertaken within each management zone are described below and the locations of the management zones within the VMP Area are identified in **Figure 4**.

4.1.1. Management Zone 1: Moderate Resilience Vegetation

Management Zone 1 comprises 0.07 ha of moderate resilience RFEF vegetation as well as 0.01 ha of *Typha orientalis*, 0.25 ha of Exotic Grassland, 0.01 ha of Blackberry (*Rubus fruticosus* spp. agg.) and 0.02 ha of Coral Tree (*Erythrina crista-galli*). Note that the installation of the proposed flood basin will require the removal of 0.015 ha of moderate resilience RFEF, 0.118 ha of Exotic Grassland, 0.003 ha of Blackberry (*Rubus fruticosus* spp. agg.) and 0.002 ha of Coral Tree (*Erythrina crista-galli*).

This management zone is characterised by a canopy of *Casuarina glauca* (Swamp Oak), *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus amplifolia* (Cabbage Gum). Weed infestation of *Paspalum dilatatum*. (Paspalum) occurs across the entire VMP Area. The area occupied by this management zone would have originally been RFEF prior to alteration and clearing of the understory. Revegetation will include the planting of trees as well as an array of groundcover/shrub species as identified in **Appendix B** and the Council approved VMP Booklet (Blacktown City Council 2021). Revegetation will also include the stormwater flood basin proposed to be located in this management zone.

4.1.1.1. Objectives

Objectives for this management zone are:

- Systematic and gradual removal of exotic vegetation to a target of <10% cover by the end of the fifth year;
- Long-term management of retained vegetation;
- Replanting of on array of native canopy, shrub and groundcover species characteristic of RFEF where possible;
- Replanting of aquatic and semi-aquatic fringing species around the banks of the flood basin;
- Protect revegetated areas (if required); and
- Control exotic weed species.

4.1.1.2. Actions

Initial actions within Management Zone 1 of the VMP Area will be the removal of all exotic vegetation. In particular, the removal of the priority weeds identified in **Table 2**. All existing native shrub, tree and understorey species will be retained where possible. After the clearance of all exotic ground layer and shrubs, characteristic RFEF canopy, shrub and understory species (listed in **Appendix B**) will be planted. Revegetation within this management zone is required due to the density of exotic groundcover species present and the lack of native species in the ground and shrub layers. Once the flood basin has been installed, revegetation of banks and surrounding area will be undertaken.

4.1.2. Management Zone 2: Low Resilience Highly Modified Vegetation

Management Zone 2 is comprised of 0.10 ha of low resilience highly modified River-flat Eucalypt Forest – in the form of Exotic Grasslands in areas that are likely to have once been this community. Note that the 0.04 ha of River-flat Eucalypt Forest – in the form of endemic trees (scattered) which are present within the E3 zoned land are all proposed to be cleared to allow for the construction of the road. Zone 2 is characterised by an exotic grassland groundcover, with minimal native species present and a small number of native and exotic tree species. Significant weed infestations of Blackberry (*Rubus fruticosus* spp. agg.), Coral Tree (*Erythrina crista-galli*), Paspalum (*Paspalum dilatatum*) and other weed species are present within the management zone. Zone 2 has no canopy trees present.

4.1.2.1. Objectives

Objectives for this management zone are:

- Systematic and gradual removal of exotic vegetation to a target of <5% cover by the end of the fifth year; and
- Replanting of on array of native canopy, shrub and groundcover species characteristic of RFEF;
- Removal of the old shed and other rubbish/scrap metal material;
- Control of Priority weed species.

The objective for this zone is to reduce the threatening processes of weed invasion.

4.1.2.2. Actions

Initial actions within Management Zone 2 of the subject land will be the removal of Priority weed species and removal of rubbish material. Long-term actions include the gradual removal and reduction of exotic vegetation over the length of the VMP management period. In addition to the removal of exotic vegetation, all rubbish will be removed from Management Zone 2 and sediment/erosion controls will be implemented

along the VMP Area boundary to prevent future impacts to the unnamed drainage line. After the clearance of all exotic species, removal of rubbish and installation of sediment/erosion controls has taken place, canopy, shrub and understory species characteristic of RFEF (listed in **Appendix B**) will be planted.

4.1.3. Timing of Actions

Within the first year of commencement of the VMP, the following actions will need to be undertaken within the VMP Area:

- All exotic groundcover and understorey will be removed;
- All rubbish is removed;
- Sediment/erosion controls have been installed in areas upslope of the unnamed drainage line in accordance with an approved sedimentation/erosion control plan;
- Native groundcover, shrubs, understorey and canopy will be planted;
- Native aquatic and semi-aquatic fringing vegetation will be planted around the banks of the flood basin; and
- Fencing will be installed around the entire VMP Area to restrict access.

In every subsequent year of implementation of the VMP, the following actions will need to be undertaken:

- Follow up weeding to remove any exotic species that may have grown from the seed bank; and
- Replacement of any deceased plantings.

5. Vegetation Clearing Plan

This chapter outlines the protocols to be followed during clearing to minimise the impacts on native flora and fauna. More details are provided in the associated BMP (CE ref 21008RP3).

5.1. Hygiene Protocols

To avoid the spread of *Phytophthora cinnamomi* and other soil borne pathogens appropriate hygiene procedures and guidelines described in Best Practice Management Guidelines for *Phytophthora cinnamomi* within the Sydney Metropolitan Catchment Management Authority Area (Botanic Gardens Trust 2008) will be followed.

This will involve all machinery, clothing (such as boots and gloves), and tools, which will have contact with soil being disinfected with a spray prior to entering and leaving the site.

Recommended disinfectant products include:

- Non-corrosive disinfectants including Coolacide®, Phytoclean®, or Biogram® which can be for cleaning footwear, tools, tyres, machinery and other items in contact with soil;
- 70% Methylated spirits solution in a spray bottle which is suitable for personal use (clothing); and
- Sodium Hypochlorite 1%, which is effective, but can damage clothing and degrades rapidly in light.

5.1.1. Amphibian Chytrid Fungus

The Project is considered to have a low likelihood of spreading the amphibian Chytrid fungus as vehicle and machinery will access the subject land during construction and the VMP Area during the implementation of the VMP. The following hygiene protocols should be implemented during works for plant, equipment and personnel to avoid spread of fungal disease, in accordance with the Hygiene Guidelines: Protocols to Protect Priority Biodiversity Areas in NSW from *Phytophthora cinnamomi*, Myrtle Rust, Amphibian Chytrid Fungus and Invasive Plants (EES 2020):

- Prior to entering/leaving the VMP Area, all vehicles/tools/footwear will be inspected to ensure they are free of soil and other organic matter. If soil/organic matter is present, the vehicle/tools/footwear should be either washed and/or disinfected. Washing should be done with water and a brush. Disinfecting should be done with a disinfectant containing benzalkonium chloride; and
- The handling of frogs should only be undertaken by a qualified ecologist or wildlife carer and should only occur if absolutely necessary (i.e. if a frog appears injured or unwell, or is within the works area and will no self-relocate). The handling of frogs will be undertaken using latex gloves, which must be changed after the handling of each frog.

5.2. Ecological Inductions

Inductions will be undertaken for all personnel who will work within the VMP Area prior to the commencement of any works. The induction will describe the ecological importance of protecting the retained vegetation within the VMP Area, detail the protection status of the communities under state legislation, and detail penalties under the BC Act. The induction will specify in detail which areas of vegetation are approved to be removed and the importance of not damaging retained vegetation. The induction will specify that unauthorised personnel are not permitted to enter retained vegetation areas, and that no machinery or stockpiling of materials is permitted within the VMP Area.

5.3. Marking Limits of Vegetation Clearing

5.3.1. Protection of Vegetation during the Construction Phase

Vegetation clearing will take place within the Project footprint identified in **Figure 2**. Appropriate measures are needed to protect retained vegetation within the VMP Area. Prior to clearing being undertaken, the boundaries of the VMP Area will need to be delineated. Clearing limits can be marked with high visibility tape, fencing, or other appropriate boundary markers. To avoid unnecessary damage to vegetation or inadvertent habitat removal, disturbance is to be restricted to the delineated area. No stockpiling of equipment, soils, or machinery is to take place beyond delineated boundaries of the VMP Area.

In any area in which construction machinery is to be used with the potential to damage surrounding vegetation to be retained, temporary construction fencing will be installed to delineate the Tree Protection Zone around vegetation to be retained. Temporary fencing should be a metal fence at least 2 m high so as to physically protect vegetation as well as visually delineate vegetation to be retained. This fencing is to remain in place until all works are completed in adjoining areas. No vehicles or machinery will be permitted to enter the VMP Area, except during the construction of the flood basin and subsequently to allow access for rehabilitation works. Detailed tree protection measures to be implemented during construction works include the use of pier and beam and suspended slabs.

The person responsible for the clearance activities will be responsible for ensuring that the boundary markers and fences are installed to enable the suitable environmental and technical inspections of the proposed disturbance to be undertaken, and to protect vegetation.

Sediment control measures will be installed to prevent run-off of soil, weed propagules, excess nutrients, and pollutants into adjacent vegetated areas. Sediment fencing should be installed along the entire northern boundary of the VMP Area to protect all retained vegetation. Additional sediment fencing will also be required in areas adjacent to an unnamed watercourse to prevent pollutants and sediments from entering the waterway, particularly during the construction of the flood basin.

5.3.2. Signage

Signs will be placed on temporary construction fencing at a spacing that a sign is always visible to personnel working in any adjacent area within the subject land. The sign will detail the presence of native vegetation being managed and that the vegetation is protected and not to be impacted upon. Example text for the signs is "WARNING – This is a protected native vegetation area. No encroachment or access is permitted within this area."

5.4. Fauna Habitat Salvage

During the removal of vegetation from the Project footprint, logs (i.e. felled native trees) should be salvaged and placed within areas of the VMP Area to provide habitat for native fauna. The placement of salvage logs will replace areas of rubbish and weeds to be removed that provided habitat for native fauna.

Logs provide habitat for fauna species including invertebrate species and reptile species which may utilise logs for basking, shelter or for laying eggs. Any suitable logs (i.e. native trees) removed will be salvaged and stockpiled (outside of the VMP area). These items will be placed within Management Zone 1 prior to commencement of planting with RFEF species. Details regarding the salvage of habitat features is described in Section 3.3 of the BMP (CE ref. 21008RP3) for the Project.

5.5. Management of Weed Spread

As vegetation will be cleared in close proximity to the VMP Area, there is potential for spread of weeds propagules in water and soil if appropriate measures are not implemented. As such the amount of bare soil exposed at any one time should be minimised, and sediment fencing should be installed along the boundary of the VMP Area, and downslope of any activities involving earthworks to prevent the spread of weed seeds.

Any weed materials will need to be carefully removed off site in a manner appropriate to the species or at the direction of the ecologist (used for pre-clearing surveys as detailed in ***Section 5.4*** below or as required by Council, so as to prevent the spread of propagules to uncleared areas of native vegetation, both on and off site.

A wash-down station will be established and all construction vehicles entering and leaving the site will be required to be washed down to prevent weed seeds entering or leaving the site. These procedures will also assist in preventing the introduction of *Phytophthora cinnamomi* and Chytrid fugus, which are pathogens of native vegetation and amphibian species respectively that are carried in contaminated soil.

Machinery and tools involved in weed management will also be washed down prior to entry to the site and following activities on site to prevent new weed infestations.

5.6. Pre-clearance Surveys

Pre-clearing surveys are to be undertaken by a suitably qualified ecologist. Pre-clearing surveys will include the provision of a report following the completion of a pre-clearing survey, detailing the location and type of each habitat feature.

Targeted searches for the Cumberland Plain Land Snail will be conducted as part of the pre-clearing surveys to ascertain the presence of this species on the subject land.

To minimise impacts to native fauna species, clearing is to be undertaken in the following two-stage process under the supervision of a suitably qualified ecologist:

- The initial phase of clearing will involve clearing around identified habitat features and leaving the features overnight; and
- The second stage will involve clearing of the habitat features left overnight followed by an inspection.

Provisions will be made to protect any immobile native fauna during clearing activities by the following means:

- All persons working on the vegetation clearing will be briefed about the possible fauna present and should avoid injuring any present;
- Animals disturbed or dislodged during the clearance but not injured should be assisted to move to the adjacent bushland; and
- If animals are injured during the vegetation clearance, appropriate steps will be taken to humanely treat the animal.

5.7. Timing of Clearing

Clearing should not take place during periods of heavy rain in order to minimise erosion and sediment run-off.

5.8. Fauna Relocation and Clearing Protocols

The fauna ecologist will be present while clearing to rescue animals injured during the clearance operation. Any fauna found will be captured and relocated to nearby remnant vegetation and released. Any animals that are inadvertently injured will be taken to the nearest veterinary clinic for treatment, or if the animal is unlikely to survive, humanely euthanised. All fauna handling will be carried out by licensed wildlife carers and/or ecologists. Details regarding the clearing of vegetation within the subject land is described in Section 3.1 of the BMP for the Project (CE ref. 21008RP3).

5.9. Erosion and Sediment Control

During construction works adequate erosion control measures, such as silt fencing, are to be installed to prevent movement of weed seeds and nutrient-enriched soils during rain events. This will prevent nutrient enrichment and weed spread within the VMP Area and potentially within surrounding offsite vegetation and Bells Creek. Sediment fencing should be installed along the entire northern border of the VMP Area to protect all retained vegetation and the unnamed drainage line.

5.10. Disposal of Cleared Vegetation

All vegetation to be removed from site will be disposed of at a waste facility that accepts and processes green waste and will be transported in a way that prevents the spread of exotic weed propagules.

5.11. Rubbish Removal

All rubbish removed from the lot will be disposed of at a Council approved site.

5.12. Nest Box Installation

Nest boxes are to be installed in suitable trees within the Management Zone 1 of the VMP which will not be impacted by the Project (see **Figure 5**). Nest boxes must be installed at a ratio of 1:1 (i.e. one nest box for every hollow removed). Nest boxes must be installed as a minimum height of 4 m on trees that do not already contain hollows and have a minimum diameter at breast height of 30 cm. Exact locations will be determined on the day of installation under supervision of an ecologist. Details regarding the installation of nest boxes is further described in Section 6.6 of the BMP for the Project (CE ref. 21008RP3).

5.13. Riparian Protection Area

The unnamed drainage line present within the subject land is not mapped as a Riparian Protection Area under the Marsden Park Precinct Plan. However, considering it is mapped as a first order watercourse under the *Water Management Act 2000* (WM Act), a 10 m buffer from the drainage line should be applied as a riparian zone. Due to logistical constraints associated with installing the proposed flood basin within the E3 zone, a 10 m buffer could not be achieved, instead the banks of the basin are proposed to be located within the outer 50% of the VRZ zone (i.e. 5 m from the edge of the basin walls to the creek line).

The following should be applied to the riparian zone in order to conserve and manage the native vegetation present:

- Except for vegetation required to be removed to allow for the installation of the flood basin, all native vegetation is to be maintained and rehabilitated, as detailed in the measures for Management Zone 1;
- All infrastructure, stockpiles, machinery are to be located outside of the riparian zone;

- The boundary of the VMP Area should be clearly marked and fenced to prevent unnecessary access to the riparian zone;
- Erosion and sediment control measures such as a sediment fencing should be installed around the boundary of the VMP and in proximity of the drainage line if required during regeneration works (e.g. removal of Coral Tree (*Erythrina crista-galli*) and installation of weed suppressing material) as well as during the installation of the flood basin;
- Fencing within the riparian zone is not necessary and should be avoided.

6. Weed Management Plan

6.1. Introduction

This chapter details how weeds within the VMP Area will be managed and controlled. Weeds identified within the subject land are listed with their respective control measures in **Appendix C** which form the basis of this Weed Management Plan. Priority weeds for the Greater Sydney Region recorded on the lot are listed in **Table 2**.

6.1.1. Application of Regeneration and Revegetation restoration strategies within the management zones of the VMP Area

Both Management Zones are dominated by exotic groundcover species and therefore weed control activities will be carried out to assist regeneration of native species. Revegetation with species consistent with RFEF is also required in both Management Zones as it is unlikely that the native vegetation will regenerate the VMP Area otherwise.

6.2. Weed Management Objectives

The aim of weed management measures described in the VMP are to systematically and gradually reduce the abundance of exotic vegetation and weeds to enable for the revegetation and regeneration of native species characteristic of RFEF.

following weed management objectives apply to both Management Zones of the VMP. Weed coverage should be:

- <50% at the end of the first year;
- <40% at the end of the second year;
- <30% at the end of the third year;
- <20% at the end of the fourth year; and
- <10% at the end of the fifth year.

Due to the extensive nature of exotic vegetation present within the VMP Area, the complete removal of all exotic vegetation prior to restoration works is not feasible. Instead, the first control measure should be to remove areas of significant weed infestations such as Blackberry (*Rubus fruticosus* spp. agg.) and Coral Tree (*Erythrina crista-galli*) as well as regular slashing of Paspalum (*Paspalum dilatatum*) to prevent it from seeding.

6.2.1. Best Management Practice

Contractors for weed removal within the VMP Area will have regard to the following, to minimise impacts upon existing vegetation and habitats:

- The main principles of the Bradley Method of bush regeneration, i.e. not over-clearing (remove only targeted species), employment of minimal disturbance techniques to avoid soil and surrounding vegetation disturbance, and replacement of disturbed mulch/leaf-litter;
- Removal of fruiting/seeding parts of weeds carefully, when present, to minimise spread of plant propagules;
- Use of chemicals and sprays only during suitable weather conditions (i.e. not during wet or windy conditions), and only during appropriate seasons;

- All equipment should be thoroughly cleaned prior to entering the site to minimise contamination;
- Proximity to watercourses and swampy areas; and
- Presence of native fauna or nesting/breeding sites

6.2.2. Species Lists

Weeds identified by Cumberland Ecology within the subject land and VMP Area (see **Appendix B**) make up the weed species lists used for the basis of this Weed Management Plan. A list of control methods for specific weeds recorded on the lot is provided in **Appendix C**.

Priority weeds for the Greater Sydney Region recorded on the lot are listed in **Table 2**.

6.3. Weed Control Methods

Weed control is to be implemented across both management zones of the VMP Area using the strategies outlined below.

6.3.1. Manual Weed Removal

Manual removal, or hand weeding, is an effective form of weed control when all viable parts of the plant are removed from the soil (roots, fruiting material and rhizomes) and site. All weeds removed by hand will be handled according to best practice bush regeneration techniques to prevent subsequent seed set from the removed weeds. Any weed material containing propagules, or plant parts capable of asexual reproduction will be bagged and removed from site.

6.3.2. Use of Herbicides

All herbicides should be used according to recommendations on the herbicide label. Appropriate Personal Protective Equipment (PPE) should be worn and consideration given to time of day, likelihood of rainfall, wind direction and likely impact on native species as per guidelines on the label. Use of glyphosate will be appropriate for most species. Glyphosate is the preferred herbicide for use in environmentally sensitive areas as it is rapidly broken down by microbes in the soil so residue and is short lived and will not affect remnant and planted native individuals in the long-term following application. In areas near watercourses, an appropriate form of the herbicide should be used to minimise impact to aquatic life and amphibians. Herbicide use should be avoided within 2m of the riparian edges. Examples of appropriate herbicide forms are Roundup Biactive and Clearup Bio 360 which have surfactants that are formulated to minimise harm to amphibians. As runoff is a likely means of herbicide residue entering watercourses, chemical treatment should be avoided prior to or directly after rains.

It is important to note that there can be legal restrictions and permit requirements for use of specific herbicides for specific plants, and chemical labels and permit requirements always need to be read prior to herbicide application. While the recommended methods for weed treatment detailed in **Appendix C** are effective, some will require a permit. Some relevant permit numbers are PER9907, and PER11916. These permits need to be obtained from the Federal Government body, the Australian Pesticides and Veterinary Management Authority.

Manual removal will be an appropriate form of control for some species, and all chemical treatment should be carried out according to best practice guidelines.

Planting should not be undertaken within 10 days of herbicide application.

6.4. Weed Management in the VMP Area

6.4.1. Initial Weed Treatment of Management Zones 1 and 2

Weed control methods for all exotic and non-endemic species recorded on the site are located in **Appendix C**. The preparation of weed control methods involved a literature review to determine the most up-to-date methods of weed control for exotic species that are present on the site. This literature review involved a variety of sources including government fact sheets and websites. The previous professional experience of a Cumberland Ecology botanist with experience in bushland restoration was also utilised.

6.4.1.1. Priority Weeds

The first priority for weed treatment in regeneration areas (Management Zone 1 and 2) will be targeting mature individuals of State Level Priority Weeds and Regional Priority Weeds (**Table 2**). Many of these species are perennial and take several years to reach reproductive maturity so are easily controlled provided juveniles are continuously eradicated before reaching maturity.

6.4.1.2. Primary Weeding

Following control of mature individuals of priority weed species, primary weeding should be undertaken throughout Management Zone 1 and 2. The aims of primary weeding will be:

- Eliminating any woody weed species; and
- Targeting and eliminating any large infestations of exotic herbs and grasses, particularly species identified within the Greater Sydney Regional Strategic Weed Management Plan as being of regional concern.

Prior to chemical treatment any seed on mature exotic plants should be bagged to prevent seed fall and addition to the soil seed bank.

In areas where native herbs and grasses are sporadic amongst infestations of exotic weeds, plastic tree guards should be installed around them to protect them from herbicide drift during spraying. The goal of primary weeding for regeneration areas will be to eliminate all the larger weed infestations to allow planting to take place to fill gaps in the understorey and canopy without competition from weed species.

During site visits for primary weeding the bushland maintenance team should start from one end of the management zone and work towards the other end to achieve the aims listed above through the entirety of the management zone. Spot spraying with herbicide will be used in any areas where there is negligible risk damage to native vegetation as it is more cost and time effective than hand weeding techniques.

6.4.2. Site-preparation for Revegetation of Management Zones 1 and 2

The directions under the following headings should be undertaken sequentially during site preparation of both Management Zones.

6.4.3. Sediment Fencing

Areas designated for revegetation will require site preparation prior to revegetation. Initially, it should be determined whether the topography of the land will result in soil erosion after initial weed management works are completed. In areas where soil erosion is likely, such as around the edge of the flood basin, temporary silt sediment fencing will be installed around the area to be revegetated, to prevent soil loss during rainfall.

6.4.4. Installation of Tree Guards around Native Plants

Prior to commencing initial weed management, the ground layer of the VMP area should be searched for native shrubs, herbs and grasses present within the area. These plants where practical should have a plastic tree guard installed around them to protect them from herbicide drift. Tree guards should remain installed around remnant, native herbaceous plants until such time as they mature and set seed. This will prevent predation by species such as rabbits before they contribute seed to the soil seed bank and protect them from herbicide drift during maintenance site visits by the bushland contractor.

6.4.5. Laying of Weed Suppression Material

The following details for weed suppression materials are provided for any areas in which complete revegetation is required. Use of weed suppression materials in areas with native plants persisting is not recommended as they also inhibit native regrowth.

Several days after the second application of herbicide weed suppression materials will be installed across the soil surface. This will inhibit germination of weed seed in the soil, inhibit vegetative regrowth of resilient weeds, and prevent soil erosion until native plantings have become sufficiently established to prevent erosion. Weed suppression material can be a form of biodegradable matting such as jute matting, or mulch.

Jute matting is a commonly used biodegradable form of matting for bushland regeneration works. The heavier available forms of this product suppress weed growth. Holes would be needed to be cut in the matting if used to allow it to be placed around native plants on the site, and holes would also need to be cut to plant tube stock into. As this is labour intensive, the most cost-effective method of weed suppression for the reconstruction areas would be using mulch.

Mulch can be laid across the VMP area in areas that contain no native plants or have an exotic groundcover of >95% cover. In areas containing native plants, the mulch can be spread on the ground surface around native plants. If mulch is used it should be free of weed seeds and rubbish. While mulch or any other form of weed suppression across the ground will inhibit regrowth of weeds, it will also inhibit regrowth of native plants. For this reason, weed suppression matting or mulch should only be used initially to establish the revegetation site while intensive weed control is required, and be allowed to biodegrade over time without being reapplied, unless required during the establishment period. Following application of weed suppression materials the reconstructed bushland areas will be planted out with native plants as per **Chapter 7**.

6.4.6. Ongoing Weed Maintenance in Management Zones 1 and 2

Weed suppression methods such as mulching/matting will suppress mass regrowth of weeds in revegetation areas initially, but not entirely prevent regrowth of weeds. The most cost and time effective method of controlling weed regrowth in a revegetation area or weedy bushland area is by spraying a non-selective Glyphosate herbicide.

Ongoing maintenance of the reconstruction and regeneration areas should generally occur for a five year period by the contracted bushland regeneration company, and each area is recommended to be covered in its entirety once every month (particularly during warmer months), to diminish the soil seed bank of weeds present on site. In order to eliminate these species, they need to be controlled before they have a chance to set seed.

Tree guards should remain around existing herbaceous native plants, and native plants that have been planted, for at least six months to protect them from herbivory. Tree guards will also allow herbicide to be used, without damage to native plants through herbicide drift.

The following sequential steps are recommended to manage each area of the site effectively for each site visit:

1. Initially the bushland regeneration team visiting the site should sweep from one end of each area to the other. During this sweep weeds within each tree guard alongside native plants should be removed by hand along with any weeds within an area dominated by native species (such as a patch of native grasses). During this sweep and woody weeds that require other techniques such as manual removal, stem injection or basal bark application etc. should be targeted.

2. A member of the team should then sweep the entire area, spraying all regrowth weeds between native plantings/remnant natives in open areas with herbicide, and spot spraying where possible in regeneration areas.

It is important that during site visits for ongoing weed maintenance that as many weed species as possible are controlled. This will minimise maturity and set seed of weeds between site visits. Many weeds can have seed that remains viable in the soil for long periods of time. In order to effectively diminish the soil seed bank it is important that individuals are not allowed to set seed.

During site visits for weed control, Priority Weeds (**Table 2**) should be prioritised for control. Individuals of these species should also not be allowed to set seed.

Temporary sediment fencing should be retained until it is determined plants have established enough to prevent surface soil runoff.

7. Revegetation Plan

7.1. Introduction

This chapter presents a Revegetation Plan that will be implemented to improve the vegetation condition across Management Zones of the VMP Area. The revegetation of River Flat Eucalypt Forest will enhance the value of the VMP Area as a habitat resource for threatened fauna species.

7.2. Objectives

The long-term management goals of both Management Zones are to improve the health and viability of canopy, groundcover and shrub layers. Where appropriate the canopy, groundcover and shrub layers will be revegetated to improve the quality of native vegetation throughout the VMP Area. The short to medium term management goals are to eradicate all major weed infestations and to revegetate the ground and shrub layers where possible.

The aim for the vegetation to be retained and planted within Management Zones are to achieve the following performance-based outcomes:

- Control threats affecting the health of regenerating native vegetation and inhibiting the future regeneration of the community;
- Increase species diversity and cover of native species by planting additional shrub and ground-layer vegetation within the planting area;
- Improve the resistance of native vegetation within the planting area to future weed colonisation and establishment and related threats, by initiating the two above aims; and
- Use measurable indicators to monitor regeneration responses and to assist in prioritising bushland regeneration works during the proposed works program.

The works outlined in ***Section 7.3*** below detail the work required to regenerate and revegetate RFEF within Management Zones and accomplish the aims provided above.

7.3. Recommended Revegetation Techniques

Appropriate species for RFEF revegetation are provided in **Appendix B**. The species identified in **Appendix B** should be used for revegetation and all plants will be sourced from local provenance; these may come from collected seed or cuttings from within the existing remnant vegetation within the VMP Area.

7.3.1. Species Selection and Planting Densities

7.3.1.1. Species Selection

It is recommended that a mix of local small trees, shrubs, and ground layer plants are replanted at the specified densities outlined below. Lists of suitable plant species for RFEF revegetation are provided in **Appendix B**. Suitable native aquatic and semi-aquatic fringing vegetation such as *Typha*, *Juncus* and *Cyperus* species should also be planted around the banks of the flood basin.

All plants will be disease and pest-free, hardened off and well-watered at the time of planting. All plants are to be provided in a healthy condition. They must have good root development and a sturdy shoot system.

Final species selection will be based upon:

- Availability of seed/plant material;

- Exclusion of plants likely to naturally regenerate on the site; and
- Previous experience with species performance in re-vegetation.

7.3.1.2. Planting Densities

The recommended planting specifications for RFEF are listed below. The planting densities recommended are:

- Trees and shrubs @ 1 plants / 4 m^2
- Groundcovers @ 4 plants / 1m^2 planted in clumps/thickets

Planting densities should be modified as required (reduced) with regard to existing native vegetation. These planting densities are provided as a guide only.

7.3.1.3. Species Richness of Plantings

The goal of revegetation should be to match the species richness benchmark for PCT 835. The benchmark for PCT 835 is four tree species, eight shrub species, eight grasses/graminoids, seven forb species, two ferns, and three other species (i.e. vines and twiners) . It is recognised that the ability to match benchmark species richness will be dependent on stock able to be obtained from local nurseries. As such specific performance criteria against the benchmark are provided in **Table 6**.

7.4. Maintenance of Plantings

After planting works have been completed, treated areas should be maintained by appropriately by qualified personnel, selectively spot spraying and hand weeding around native plants, watering plants and replacing deceased plants as needed.

Provision should be made to irrigate plantings, as required, in the first three months after planting, (on at least four to five occasions, depending on rainfall).

Re-growing weeds will be treated following planting as detailed in ***Section 6.4.6***.

Plants that have died should be replaced as required. Plants that a have died should be replaced by the bushland maintenance team with a planting of the same form during the next site visit by the team. At the end of the maintenance period the density of living planted plants should be as outlined in the performance criteria detailed ***Section 7.3.1.2***.

7.5. Installation of Protective Fencing

Following the completion of the initial planting works within Management Zone 2, protective fencing will be installed in order to restrict access into the VMP Area. The fencing should be chain-link, a minimum of 2.7 m high, and painted black or green to improve aesthetics. Fencing will be installed around the northern and western perimeter of the VMP Area.

It is recommended that all fencing will also include permanent educational signage that will identify the importance of the vegetation being managed as well as any threatened species that are known to utilise these communities. It is expected that the signage installed will have to be approved by Council prior to its installation.

7.6. Rabbit Control

If significant herbivory is occurring due to the feral European Rabbit (*Oryctolagus cuniculus*) resulting in loss and a requirement of replanting of greater than 20% of plant stock at any one time, pest control measures should be undertaken. Measures to be used should be humane and consistent with guidelines published at https://pestsmart.org.au/.

8. Monitoring, Reporting and Costing

A project manager/supervisor and bushland regeneration contractor should be assigned to coordinate, supervise and manage all works and correspondence with respect to the management of the VMP Area. The project manager must be available for the duration of the project and become familiar with the site and progress of all aspects of works undertaken.

The project manager will be responsible for allocation of maintenance tasks to personnel in response to establishment issues and other factors as monitoring results are reported (e.g.: plant losses/re-planting, weed control, irrigation). Regular monitoring and feedback from personnel will assist in the allocation of labour relative to available funds.

8.1. Monitoring Program

8.1.1. VMP Monitoring

A qualified regeneration contractor or ecological consultant will carry out a program of regular monitoring of the implementation of the VMP in each management zone. The consultant will be responsible for ensuring the measures outlined in this VMP are implemented and that plant stock is replaced, as needed.

The monitoring program will be carried out for the duration of the VMP and a monitoring survey will be completed every six months in Year 1 and 2 and then annually for the remainder of the five-year management period of the VMP.

The monitoring program will involve the establishment of 20 m x 50 m plots, comprising a 50 m transect along the midline as well as a 20 m x 20 m (i.e.. 10 m on either side of the start of the midline) plot. General observations of the nature and condition of the vegetation in each management zone will be undertaken along with the collection of quantitative data during monitoring including:

- Establishment one (1) fixed monitoring point in each management zone of the VMP Area. The locations of these fixed monitoring plots are shown in **Figure 5**. Note that due to the small and irregular shape of the VMP Area, each monitoring plot may extend beyond the boundary of each management zone as well as into the flood basin.
- Take photographs annually along the start and end of the 50 m transect for each monitoring point, as well as in a north, south, east, and west direction from the start of the transect (midline). Compare photographs to previous years;
- Monitoring plots should be in accordance with the Biodiversity Assessment Method (20 m x 50 m) in which the following data is to be collected:
    - Composition for each growth form group by counting the number of native plant species recorded for each growth form group within a 20 m x 20 m plot;
    - Structure of each growth form group as the sum of all the individual projected foliage cover estimates of all native plant species recorded within each growth form group within a 20 m x 20m plot;
    - Cover of 'High Threat Exotic' weed species;
    - Assessment of function attributes within a 20 m x 50 m plot, including:

- Count of number of large trees;
- Tree stem size classes, measured as 'diameter at breast height over bark' (DBH);
- Regeneration based on the presence of living trees with stems <5 cm DBH;
- The total length in metres of fallen logs over 10 cm in diameter;

- Assessment of litter cover within five 1 m x 1 m plots evenly spread within the 20 m x 50 m plot; and
- Number of trees with hollows that are visible from the ground within the 20 m x 50 m plot.

- Estimates of the success rate of plantings and natural regeneration, and assessment of plant replacement requirement (in particular RFEF species), weed abundance and locations of woody weeds and priority weeds in each management zone;
- Note areas where erosion control is inadequate and needed;
- Monitor the health of remaining canopy trees (in particular RFEF species);
- Provide recommendations for corrective measures and/or vegetation management.

Monitoring will be conducted before weed control commences to document the baseline condition of the VMP Area, then every six months for the life of the VMP (five years). During the period of six-monthly monitoring, if maintenance weeding is conducted, each patch of land where weed control has taken place should be checked approximately a month afterwards, or after rain, to determine whether more weed control is required.

8.1.2. Nest Box Monitoring

In addition to the monitoring above, nest boxes will be monitored annually for a period of five years. Monitoring will include the following tasks:

- Photographs taken of each nest box to document condition;
- Inspection of each nest box utilising an endoscopic camera on an extendable pole to document fauna presence and/or usage (i.e. presence of individuals, scats, nesting material); and
- General notes recorded on the condition of nest boxes, fauna utilisation and recommendations for repairs/replacing boxes due to damage or occupation by feral bees.

8.2. Reporting

A brief and concise report will be prepared annually for the life of the VMP and submitted to Council. This report will document the progress of VMP works (including nest boxes) and provide recommendations for the next year's works. The report will include the following items identified in **Table 5** below, as per Council's VMP Guidelines.

Table 5 Annual report requirements

Report Section	Details to be included in annual report
Management actions completed	Management actions completed (e.g. planting, rubbish removal)
	Timing/dates when management action was completed.

Report Section	Details to be included in annual report
	Total hours spent undertaking the work.
Performance criteria	Location(s) where weeding was completed.
	Methods used and target species.
	Type and total chemicals used on-site.
Results of monitoring	Floristic condition monitoring, raw data attached.
	Photo monitoring, photos attached.
	Planting success monitoring.
	Notable observations.
Performance criteria	List of performance criteria, with advice on how management actions completed during the year met the performance criteria.
	Comparison of monitoring data in relation to performance criteria.
Non-compliance	List of any scheduled actions that were not completed during the year, and advice on why these were not completed.
	List of performance criteria that were not met, and details as to why that was the case.
Contingency measures required	List of management actions that are needed to meet the performance criteria (e.g. undertake supplementary planting).
	Provide a timeframe and cost for these management actions to be completed.

The report should contain the photographs, as well as a short description of weeds in each quadrat and a short comparison of the photographs to the previous years. Any other notable weed infestations should also be reported. The report should also recommend and prioritise areas for weed control.

A final report will be prepared at the end of the five-year maintenance period documenting the success of the works against performance criteria.

Performance criteria for weeding and maintenance of plantings are provided in **Table 6**.

8.3. Long Term Management

Following the completion of works under this five-year VMP, vegetation management and maintenance within the subject land is required in perpetuity under the current land zoning and protection zones.

Long term management should include ongoing weed control, assistive regeneration (if required) in areas where there is limited natural regeneration and monitoring. The frequency for each of these actions should be determined based on vegetation condition at the end of the life of this VMP and a new ongoing management plan should be prepared accordingly.

Performance criteria for long term weeding and maintenance of plantings are provided in **Table 6**.

8.4. Adaptive Management

The implementation of the management actions detailed in this VMP is flexible and can be modified to address changes in site conditions as long as those modification continue to achieve the aims, objectives and established performance criteria of the VMP.

9. Timing and Responsibilities

9.1. Timing

The timing of the management actions to be undertaken within the VMP Area, performance criteria required to be achieved, and the entity responsible for each component is presented in **Table 6**.

The key phases are:

- Phase 1 – Site preparation;
- Phase 2 – Restoration works commence;
- Phase 3 – Maintenance;
- Phase 4 – Monitoring and reporting; and
- Phase 5 - Long term maintenance.

9.2. Timing, Responsibilities, and Performance Criteria

The property owner will be responsible for implementation of this VMP and for engaging contractors such as a Bush Regeneration Contractor or Ecologist to undertake individual management actions. Responsibilities for management actions are detailed in **Table 6** below.

Table 6 Timing, responsibilities, and performance criteria

Management Area	Action	Responsibility	Performance Criteria	Timing
Phase 1: Site Preparation				
	Delineation of clearing boundary	Property Owner or Construction Subcontractor	Marking using GPS and high visibility flagging tape and boundary markers.	Before construction works commence
VMP Area	Establish fixed monitoring points and quadrats	Bush Regeneration Contractor or Ecologist	Using star pickets (or something smaller like a small stake and pink flagging) and GPS establish two monitoring sites that can be used for photograph points, comparison, measuring weeds and plant retention.	Prior to commencement of restoration works

Management Area	Action	Responsibility	Performance Criteria	Timing
Development footprint	Vegetation Clearance	Construction Contractor	Planned vegetation clearing completed	During Construction Works
VMP Area	Salvage of logs cleared	Construction Contractor	Salvaged logs have been placed within the VMP Area.	During Construction Works
Management Zone 1	Nest box installation	Construction Contractor/Ecologist	All nest boxes have been installed.	Prior to clearing works.
Tree Protection Zone	Tree Protection	Construction Contractor	Establishing a physical barrier to protect the trees to be retained (as detailed in the Arborist Report)	Before construction works commence
Phase 2: Restoration Works Commence				
VMP Area	Fixed Point Monitoring.	Bush Regeneration Contractor	Photographs of fixed monitoring sites before initial weeding.	Prior to commencement of restoration works for each area.
VMP Area	Carry out primary weeding.	Bush Regeneration Contractor	Main weed infestations removed, including Priority Weeds - Reproductively mature plants absent from site.	First two months of restoration works for each Zone.
VMP Area	Fixed Point Monitoring	Bush Regeneration Contractor	Photographs of fixed monitoring sites prior to weeding each month.	Once a month for duration of VMP restoration works
Management Zone 1 & 2	Revegetate with canopy, shrubs and ground cover species within both Management Zones.	Bush Regeneration Contractor	Native plants have been planted (species from **Appendix B**) in all vegetation strata.	Immediately upon establishment of revegetation areas – within first month.

Management Area	Action	Responsibility	Performance Criteria	Timing
VMP Area	Fixed Point Monitoring.	Bush Regeneration Contractor	Photographs of fixed monitoring sites to compare the survival and retention of plantings.	Every 3 months after the first year of plantings. Every 6 months following the initial year for the life of the VMP.
VMP Area	Carry out secondary weeding.	Bush Regeneration Contractor	Weed regrowth following primary weeding removed. Work has commenced on control of annual weed species. Weed coverage should be < 50% at end of first year, < 40% at end of second year, < 30% at end of third year, < 20% at end of fourth year, < 10% at end of fifth year. Coverage of Priority Weeds at end of first year should be <10%, <5% at end of second and third year, and at <2% at end of fourth and fifth year.	Following primary weeding, site visits monthly.
Phase 3: Maintenance				
VMP Area	Carry out maintenance weeding	Bush Regeneration Contractor	Existing weed growth minimised or controlled.	Monthly for each zone for duration of

Management Area	Action	Responsibility	Performance Criteria	Timing
	throughout management zones		Regrowth following secondary weeding controlled.	5-year maintenance period under VMP
			No new weed species or infestations.	
Management Zones 1 & 2	Maintenance of plantings (if required)	Bush Regeneration Contractor	Any dead plantings replaced.	Monthly duration of 5-year maintenance period under VMP
			Plants watered when drought stressed.	
			Additional plantings where required due to observed gaps in any strata.	
			At end of first six months species richness should be 50% of benchmark in all strata, 55% at end of year one, 60% at end of year two, 65% at end of year three, and 70% at end of year five, six and in perpetuity. Benchmark data is provided in **Section 7.2.3**.	
Phase 4: Monitoring and reporting				
VMP Area	Biannual inspection of site.	Bushland Management or Ecologist	Site inspection completed as outlined in Chapter 8.	Every 6 months for 5-year maintenance period of VMP

Management Area	Action	Responsibility	Performance Criteria	Timing
Management Zone 1	Inspection of nest boxes	Ecologist	All nest boxes have been inspected	Annually for 5-year maintenance period of VMP.
VMP Area	Progress report preparation	Bushland Management or Ecologist	Annual Report prepared on progress of restoration works.	Once a year for the 5-year maintenance period of VMP
VMP Area	Final Inspection of Site.	Bushland Management or Ecologist	Final inspection carried out at completion of VMP.	After 5 years of maintenance under VMP
VMP Area	Final Report.	Bushland Management or Ecologist	Final report detailing success of restoration or outlining further works needed.	After 5 years of maintenance under VMP
Phase 5: Long term maintenance				
VMP Area	Carry out maintenance weeding throughout management zones.	Bush Regeneration Contractor	Existing weed growth minimised or controlled.	Quarterly or as required for each zone in perpetuity.
			Regrowth following secondary weeding controlled.	
			No new weed species or infestations.	
			Weed coverage maintained at < 10% in perpetuity and <2% priority weed cover.	
Management Zones 1 & 2	Maintenance of plantings.	Bush Regeneration Contractor	Additional plantings undertaken if greater than 10% loss of plantings.	Quarterly or as required for each area in perpetuity.
			Plants watered when drought stressed.	

Management Area	Action	Responsibility	Performance Criteria	Timing
			Additional plantings where required due to observed gaps in any strata.	

10. VMP Costing

Cost estimates for implementation of the management directions under this VMP are included in **Table 7**. The estimates provided are approximate only and accurate costing must be obtained by putting the project to tender with Bushland Regeneration Companies. Quotes will vary between companies. The following should be noted regarding the approximate nature of the cost estimates provided:

- These estimates have been amended from an estimate for a different site (approximately 1 ha) by a single BRC to reflect the size of the VMP Area; and
- Due to the small area of the VMP Area it is assumed that each site visit after the initial weed treatment will be a full day site visit by a team of three, with numbers of team members and time spent on site decreased after year three when weed coverage is diminished and plantings are well established.

Table 7 High level cost estimate for implementation of the VMP

Task	Establishment Cost	Year 1	Year 2	Year 3	Year 4	Year 5	All Years
Permanent Fence (500 m of fence @ $15/m + $1000 for gate installation)	$8,500						
Rubbish/debris removal (10 m^3)	$100						
Signage installation (2 x signs @ $150 each)	$300						
Installation of nest boxes (6 x nest boxes @ 300 each inc. installation)	$1,800						
Installation of salvage logs (contractor quote of $2500)	$2,500						
Temporary Fence (if required - 500 m of fence @$10/m)	$5,000						
Sediment fence (~200 m)	$2,200						
Site Preparation (Initial Weeding) - 2 days for bush regen team @$2500/day	$5,000						
3000 m2 Jute matting or hardwood mulch (if used)	$21,000						
4 Star pickets (monitoring locations)	$72						
Hiko Planting Canopy (1 units/4 m2 for 4800 m^2)	$2,375						
Hiko planting Shrub (1 units/4 m2 for 4800 m^2)	$3,000						
Hiko Planting Ground cover (4 units/1 m^2 for 4800 m^2)	$19,200						
Tree guards (if used - estimate for 1000 guards, cost includes stakes)	$85						
Contingency (10% of all costs)	$7,113						
Maintenance Costs (weeding, with associated monitoring and reporting)		$14,135	$13,505	$9,785	$7,931	$6,077	$9,937
Total Establishment Costs	**$78,932**	12 visits	12 visits	9 visits	9 visits	9 visits	
Total cost over 5 years							**$140,302**

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APPENDIX A :
Flora Species Recorded

Table 8 Flora species list for the subject land

Family	Scientific Name	Common Name	Exotic	Weed Status
Acanthaceae	*Justicia brandegeeana*		*	
Adoxaceae	*Viburnum odoratissimum* var. *awabuki*		*	
Agavaceae	*Yucca* spp.			
Alliaceae	*Agapanthus praecox*	Agapanthus	*	OWRC
Amaranthaceae	*Alternanthera denticulata*	Lesser Joyweed		
Amaranthaceae	*Alternanthera pungens*	Khaki Weed	*	
Amaranthaceae	*Amaranthus retroflexus*	Redroot Amaranth	*	
Anacardiaceae	*Pistacia chinensis*	Chinese Pistachio	*	
Anacardiaceae	*Schinus molle*	Pepper Tree	*	
Apiaceae	*Centella asiatica*	Indian Pennywort		
Apiaceae	*Cyclospermum leptophyllum*	Slender Celery	*	
Apiaceae	*Petroselinum crispum*	Parsley	*	
Apocynaceae	*Catharanthus roseus*	Madagascar Periwinkle	*	
Apocynaceae	*Nerium oleander*	Oleander	*	
Araceae	*Colocasia* spp.		*	
Araceae	*Monstera deliciosa*	Fruit Salad Plant	*	
Arecaceae	*Phoenix canariensis*	Canary Island Date Palm	*	OWRC
Arecaceae	*Syagrus romanzoffiana*	Cocos Palm	*	OWRC
Aspleniaceae	*Asplenium australasicum*	Bird's Nest Fern		
Asteraceae	*Artemisia arborescens*	Tree Wormwood	*	
Asteraceae	*Aster subulatus*	Wild Aster	*	
Asteraceae	*Bidens pilosa*	Cobbler's Pegs	*	
Asteraceae	*Cirsium vulgare*	Spear Thistle	*	
Asteraceae	*Conyza bonariensis*	Flaxleaf Fleabane	*	
Asteraceae	*Conyza sumatrensis*	Tall fleabane	*	
Asteraceae	*Dimorphotheca ecklonis*	Cape Daisy	*	
Asteraceae	*Eclipta platyglossa*	Yellow Twin-heads		
Asteraceae	*Gamochaeta americana*	Purple Cudweed	*	
Asteraceae	*Gamochaeta pensylvanica*	Cudweed	*	
Asteraceae	*Gazania linearis*		*	
Asteraceae	*Gazania rigens*		*	
Asteraceae	*Hypochaeris albiflora*	White Flatweed	*	
Asteraceae	*Hypochaeris radicata*	Catsear	*	

Family	Scientific Name	Common Name	Exotic	Weed Status
Asteraceae	*Lactuca serriola*	Prickly Lettuce	*	
Asteraceae	*Senecio madagascariensis*	Fireweed	*	SP, WoNS
Asteraceae	*Sonchus asper*	Prickly Sowthistle	*	
Asteraceae	*Sonchus oleraceus*	Common Sowthistle	*	
Asteraceae	*Tagetes erecta*		*	
Betulaceae	*Betula pendula*	European White Birch	*	
Bignoniaceae	*Jacaranda mimosifolia*	Jacaranda	*	
Brassicaceae	*Brassica fruticulosa*	Twiggy Turnip	*	
Brassicaceae	*Brassica oleracea*	Collards	*	
Buxaceae	*Buxus microphylla*		*	
Cactaceae	*Opuntia stricta*	Common Prickly Pear	*	SP, WoNS
Caprifoliaceae	*Lonicera japonica*	Japanese Honeysuckle	*	OWRC
Caryophyllaceae	*Paronychia brasiliana*	Chilean Whitlow Wort, Brazilian Whitlow	*	
Casuarinaceae	*Casuarina glauca*	Swamp Oak		
Celastraceae	*Euonymus japonicus*	Japanese Spindletree	*	
Chenopodiaceae	*Atriplex prostrata*		*	
Chenopodiaceae	*Beta vulgaris*	Wild Beet	*	
Chenopodiaceae	*Chenopodium album*	Fat Hen	*	
Chenopodiaceae	*Dysphania pumilio*	Small Crumbweed		
Chenopodiaceae	*Einadia hastata*	Berry Saltbush		
Chenopodiaceae	*Einadia nutans*	Climbing Saltbush		
Chenopodiaceae	*Einadia nutans* subsp. *linifolia*	Climbing Saltbush		
Commelinaceae	*Commelina cyanea*	Native Wandering Jew		
Convolvulaceae	*Dichondra repens*	Kidney Weed		
Convolvulaceae	*Ipomoea indica*	Morning Glory	*	OWRC
Cucurbitaceae	*Cucurbita* spp.		*	
Cucurbitaceae	*Momordica charantia*	Bitter Melon	*	
Cupressaceae	*Cupressus sempervirens*	Italian Cypress	*	
Cupressaceae	*Juniperus communis*		*	
Cyperaceae	*Cyperus brevifolius*		*	
Cyperaceae	*Cyperus eragrostis*	Umbrella Sedge	*	
Cyperaceae	*Cyperus gracilis*	Slender Flat-sedge		
Cyperaceae	*Cyperus polystachyos*			
Cyperaceae	*Cyperus* spp.			

Family	Scientific Name	Common Name	Exotic	Weed Status
Euphorbiaceae	*Euphorbia peplus*	Petty Spurge	*	
Euphorbiaceae	*Euphorbia prostrata*	Red Caustic Weed	*	
Fabaceae (Caesalpinioideae)	*Bauhinia galpini*	African Plume	*	
Fabaceae (Caesalpinioideae)	*Ceratonia siliqua*	Carob	*	
Fabaceae (Caesalpinioideae)	*Senna pendula*	Winter Cassia	*	OWRC
Fabaceae (Faboideae)	*Erythrina crista-galli*	Cockspur Coral Tree	*	OWRC
Fabaceae (Faboideae)	*Glycine tabacina*	Variable Glycine		
Fabaceae (Faboideae)	*Medicago polymorpha*	Burr Medic	*	
Fabaceae (Faboideae)	*Phaseolus vulgaris*		*	
Fabaceae (Faboideae)	*Robinia pseudoacacia*	Black Locust	*	OWRC
Fabaceae (Faboideae)	*Trifolium repens*	White Clover	*	
Gentianaceae	*Centaurium tenuiflorum*	Branched Centaury, Slender centaury	*	
Geraniaceae	*Pelargonium* x *hortorum*		*	
Haloragaceae	*Haloragis aspera*	Rough Raspwort		
Iridaceae	*Dietes grandiflora*		*	
Iridaceae	*Sisyrinchium micranthum*	Scourweed	*	
Juncaceae	*Juncus usitatus*	Common Rush		
Lamiaceae	*Stachys arvensis*	Stagger Weed	*	
Lauraceae	*Cinnamomum camphora*	Camphor Laurel	*	OWRC
Lythraceae	*Lagerstroemia indica*	Crepe Myrtle	*	
Malaceae	*Cotoneaster glaucophyllus*		*	
Malvaceae	*Malva parviflora*	Small-flowered Mallow	*	
Malvaceae	*Modiola caroliniana*	Red-flowered Mallow	*	
Malvaceae	*Sida rhombifolia*	Paddy's Lucerne	*	
Melastomataceae	*Tibouchina urvilleana*	Lasiandra	*	
Moraceae	*Ficus benjamina*	Weeping Fig	*	
Myrtaceae	*Callistemon citrinus*	Crimson Bottlebrush		

Family	Scientific Name	Common Name	Exotic	Weed Status
Myrtaceae	*Callistemon viminalis*	Weeping Bottlebrush		
Myrtaceae	*Eucalyptus amplifolia*	Cabbage Gum		
Myrtaceae	*Eucalyptus robusta*	Swamp Mahogany		
Myrtaceae	*Eucalyptus tereticornis*	Forest Red Gum		
Myrtaceae	*Lophostemon confertus*	Brush Box		
Myrtaceae	*Metrosideros excelsa*	New Zealand Christmas Bush	*	
Myrtaceae	*Syzygium australe*	Brush Cherry		
Nandinaceae	*Nandina domestica*	Japanese Sacred Bamboo	*	
Oleaceae	*Fraxinus angustifolia*	Desert Ash	*	
Oleaceae	*Olea europaea*	Common Olive	*	
Oleaceae	*Olea europaea* subsp. *cuspidata*	African Olive	*	RP
Oxalidaceae	*Oxalis corniculata*	Creeping Oxalis	*	
Oxalidaceae	*Oxalis latifolia*		*	
Oxalidaceae	*Oxalis perennans*			
Phyllanthaceae	*Phyllanthus tenellus*	Hen and Chicken	*	
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	*	
Platanaceae	*Platanus orientalis*		*	
Platanaceae	*Platanus x acerifolia*	Hybrid Plane	*	
Poaceae	*Axonopus fissifolius*	Narrow-leafed Carpet Grass	*	
Poaceae	*Bothriochloa macra*	Red Grass		
Poaceae	*Bromus catharticus*	Praire Grass	*	
Poaceae	*Cenchrus clandestinus*	Kikuyu Grass	*	OWRC
Poaceae	*Chloris gayana*	Rhodes Grass	*	OWRC
Poaceae	*Chloris truncata*	Windmill Grass		
Poaceae	*Cynodon dactylon*	Common Couch		
Poaceae	*Echinochloa crus-galli*	Barnyard Grass	*	
Poaceae	*Ehrharta erecta*	Panic Veldtgrass	*	
Poaceae	*Eleusine indica*	Crowsfoot Grass	*	
Poaceae	*Eragrostis cilianensis*	Stinkgrass	*	
Poaceae	*Eragrostis curvula*	African Lovegrass	*	OWRC
Poaceae	*Lachnagrostis filiformis*	Blown Grass		
Poaceae	*Microlaena stipoides*	Weeping Grass		

Family	Scientific Name	Common Name	Exotic	Weed Status
Poaceae	*Panicum effusum*	Hairy Panic		
Poaceae	*Panicum simile*	Two-colour Panic		
Poaceae	*Paspalum dilatatum*	Paspalum	*	
Poaceae	*Paspalum distichum*	Water Couch		
Poaceae	*Paspalum urvillei*	Vasey Grass	*	
Poaceae	*Poa annua*	Winter Grass	*	
Poaceae	*Saccharum officinarum*	Sugarcane	*	
Poaceae	*Setaria parviflora*		*	
Poaceae	*Sporobolus creber*	Slender Rat's Tail Grass		
Poaceae	*Stenotaphrum secundatum*	Buffalo Grass	*	
Poaceae	*Zea mays*	Maize	*	
Polygonaceae	*Persicaria decipiens*	Slender Knotweed		
Polygonaceae	*Rumex brownii*	Swamp Dock		
Polygonaceae	*Rumex crispus*	Curled Dock	*	
Portulacaceae	*Portulaca oleracea*	Pigweed		
Portulacaceae	*Portulacaria afra*		*	
Primulaceae	*Lysimachia arvensis*	Scarlet Pimpernel	*	
Proteaceae	*Grevillea robusta*	Silky Oak		
Rosaceae	*Prunus persica*	Peach	*	
Rosaceae	*Prunus* spp.		*	
Rosaceae	*Rosa* spp.	Rose	*	
Rosaceae	*Rubus fruticosus* spp. agg.	Blackberry Complex	*	SP, OWRC
Rubiaceae	*Galium aparine*	Goosegrass	*	
Rubiaceae	*Gardenia jasminoides*	Gardenia	*	
Rutaceae	*Citrus x sinensis*	Orange	*	
Rutaceae	*Murraya paniculata*	Mock Orange	*	OWRC
Salicaceae	*Populus alba*	White Poplar	*	
Salicaceae	*Salix babylonica*	Weeping Willow	*	
Salviniaceae	*Salvinia* spp.	Salvinia	*	SP, WoNS
Solanaceae	*Solanum lycopersicum*	Tomato	*	
Solanaceae	*Solanum nigrum*	Black-berry Nightshade	*	
Solanaceae	*Solanum pseudocapsicum*	Madeira Winter Cherry	*	
Solanaceae	*Solanum sisymbriifolium*		*	
Stackhousiaceae	*Stackhousia viminea*	Slender Stackhousia		
Strelitziaceae	*Strelitzia reginae*		*	

Family	Scientific Name	Common Name	Exotic	Weed Status
Urticaceae	*Urtica dioica*	Giant Nettle	*	
Verbenaceae	*Duranta erecta*	Sky Flower	*	
Verbenaceae	*Lantana camara*	Lantana	*	SP, WoNS
Verbenaceae	*Verbena bonariensis*	Purpletop	*	
Verbenaceae	*Verbena officinalis*	Common Verbena	*	
Vitaceae	*Vitis vinifera*	Grape Vine	*	

Key: SP = State Priority, RP = Regional Priority, WoNS = Weed of National Significance, OWRC = Other Weed of Regional Concern

APPENDIX B :
Species Planting List

Table 9 RFEF species planting list

Growth Form	Scientific Name	Common Name
Trees	*Acacia decurrens*	Black Wattle
	Acacia parramattensis	Parramatta Wattle
	Angophora floribunda	Rough-barked Apple
	Angophora subvelutina	Broad-leaved Apple
	Casuarina glauca	Swamp Oak
	Eucalyptus amplifolia subsp. *amplifolia**	Cabbage Gum
	Eucalyptus eugenioides	Thin-leaved Stringybark
	Eucalyptus moluccana	Grey Box
	*Eucalyptus tereticornis**	Forest Red Gum
	Melaleuca decora	
	Melaleuca linariifolia	Flax-leaved Paperbark
	Melaleuca styphelioides	Prickly-leaved Tea Tree
Shrubs	*Acacia falcata*	
	Acacia fimbriata	Fringed Wattle
	Acacia floribunda	White Sally
	Acacia implexa	Hickory Wattle
	Bursaria spinosa	Native Blackthorn
	Callistemon salignus	Willow Bottlebrush
	Eremophila debilis	Amulla
	Indigofera australis	Australian Indigo
	Kunzea ambigua	Tick Bush
	Melaleuca thymifolia	Thyme Honey-myrtle
	Ozothamnus diosmifolius	White Dogwood
	Pittosporum revolutum	Rough Fruit Pittosporum
	Trema tomentosa var. *aspera*	Native Peach
Grasses	*Aristida vagans*	Threeawn Grass
	Cymbopogon refractus	Barbwire Grass
	Dichelachne micrantha	
	Echinopogon caespitosus	Bushy Hedgehog-grass
	Echinopogon ovatus	
	Entolasia stricta	Wiry Panic
	Entolasia marginata	Bordered Panic
	Eragrostis brownii	Brown's Lovegrass
	Eragrostis leptostachya	

Growth Form	Scientific Name	Common Name
	Imperata cylindrica	Blady Grass
	Microlaena stipoides var. *stipoides*	Weeping Grass
	Oplismenus aemulus	
	Oplismenus imbecillis	
	Panicum effusum	Hairy Panic
	Paspalidium distans	
	Poa labillardierei	Tussock
Herbs	*Centella asiatica*	Indian Pennywort
	*Commelina cyanea**	Native Wandering Jew
	Desmodium gunnii	
	Desmodium varians	Slender Tick-trefoil
	*Dichondra repens**	Kidney Weed
	*Eclipta platyglossa**	
	*Einadia nutans**	Climbing Saltbush
	Galium leiocarpum	
	Geranium solanderi	
	Hydrocotyle laxiflora	Stinking Pennywort
	Lobelia purpurascens	Whiteroot
	Opercularia diphylla	
	*Oxalis perennans**	
	Plectranthus parviflorus	Cockspur Flower
	*Rumex brownii**	Swamp Dock
	Sigesbeckia orientalis	Indian Weed
	Solanum prinophyllum	Forest Nightshade
	Veronica plebeia	Trailing Speedwell
	Wahlenbergia gracilis	Native Bluebell
Sedges	*Dianella longifolia*	Blueberry Lily
	Dianella revoluta	Blueberry Lily
	Lepidosperma laterale	Variable Sword-sedge
	Lomandra longifolia	Spiny-headed Mat-rush
	Lomandra multiflora subsp. *multiflora*	Many-flowered Mat-rush
Vine	*Clematis glycinoides* var. *glycinoides*	Headache Vine
	Geitonoplesium cymosum	Scrambling Lily
	Glycine clandestina	
	Glycine microphylla	

Growth Form	Scientific Name	Common Name
	*Glycine tabacina**	
	Hardenbergia violacea	False Sarsaparilla
	Polymeria calycina	
Aquatic	*Juncus subsecundus*	
	*Juncus usitatus**	Yellow Rush
	Persicaria decipiens	Slender Knotweed
	Phragmites australis	Common Reed
	Typha domingensis	Narrow-leaved Cumbungi
	Typha orientalis	Broadleaf Cumbungi

* These species found on site and are to be retained where possible.

This planting list was composed by referencing the Council VMP Guideline (Blacktown City Council 2021 booklet and BioNet Vegetation Classification – Plant Community Type (PCT) profile 835, the description of Alluvial Woodland by Tozer (2003) (Tozer 2003) and the Final Determination for River-flat Eucalypt Forest (NSW Scientific Committee 2004).

APPENDIX C :
Weed Control Methods

Table 10 Weed control measures

Family	Species	Common Name	Status	Treatment Methods
Alliaceae	*Agapanthus praecox*	Agapanthus	OWRC	- Dig deep tap root out with hand tools - Care must be taken to bag and remove all vegetative material from the plant as it will regrow from fragments - Spot spray plant before flowering with Glyphosate 10mL/1L
Amaranthaceae	*Alternanthera pungens*	Khaki Weed	-	- Dig deep tap root out with hand tools - Care must be taken to bag and remove all vegetative material from the plant as it will regrow from fragments - Spot spray plant before flowering with Glyphosate 10mL/1L
Apiaceae	*Cyclospermum leptophyllum*	Slender Celery	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Araceae	*Monstera deliciosa*	Fruit Salad Plant	-	- Saw trunk back to ground level and apply undiluted glyphosate - Cut any regrowth foliage off in subsequent months with loppers and apply undiluted glyphosate - Bag and remove vegetative material from site to prevent

Family	Species	Common Name	Status	Treatment Methods
				resprouting from trunk segments
Arecaceae	*Phoenix canariensis*	Phoenix palm, Canary Island date palm	OWRC	- Large trees require an arborist to safely remove - PPE including thick leather gloves and eye protection should be used when handling small individuals due to dangerous spines at leaf bases - Cut all leaves off at base with long handles loppers - Remove leaves from site for safety of other site users (handle with caution due to spines) - Cut tree below crown and leave stump to rot - Use hand tools such as a trowel or knife to dig up seedlings
Arecaceae	*Syagrus romanzoffiana*	Cocos palm	OWRC	- Hand Weed - Spot Spray - Glyphosate 50% v/v for spot treatment into drill holes. Undiluted for cut stump treatments.
Asteraceae	*Aster subulatus*	Wild Aster	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Asteraceae	*Bidens pilosa*	Cobbler's Pegs	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L

Family	Species	Common Name	Status	Treatment Methods
Asteraceae	*Cirsium vulgare*	Spear Thistle	-	- Hand Weed juveniles - Spot Spray - Glyphosate 10mL/1L
Asteraceae	*Conyza bonariensis*	Flaxleaf Fleabane	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Asteraceae	*Conyza sumatrensis*	Tall Fleabane	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L - On-going grubbing (all year)
Asteraceae	*Gamochaeta americana*	Cudweed	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Asteraceae	*Gamochaeta pensylvanica*	Cudweed	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Asteraceae	*Gazania linearis*	Treasure Flower	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Asteraceae	*Lactuca serriola*	Prickly Lettuce	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Asteraceae	*Sonchus asper*	Sow Thistle	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Asteraceae	*Sonchus oleraceus*	Milk Thistle	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L

Family	Species	Common Name	Status	Treatment Methods
Asteraceae	*Senecio madagascariensis*	Fireweed	SP	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Bignoniaceae	*Jacaranda mimosifolia*	Jacaranda	-	- Hand weed seedlings or spray with glyphosate 10mL/1L - Cut larger individuals/trees to ground level with hand saw or chainsaw and apply undiluted glyphosate to cut stump - Large trees need to be felled by an arborist
Brassicaceae	*Brassica fruticulosa*	Twiggy Turnip	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Cactaceae	*Opuntia stricta*	Common Prickly Pear	SP/WoNS	- This weed is difficult to treat with chemicals, and chemicals such as arsenic that do kill the plant are highly toxic to other plants and animals so should not be used in bushland - Due to the introduction of the Cactoblastis moth in 1926, which preys on the species, mature individuals of the plant occur only sporadically and are easily manually removed - As the plant reproduces vegetatively the entirety of the plant must be bagged

Family	Species	Common Name	Status	Treatment Methods
				and removed from the site, including as much root material as possible. As the plant is soft the above ground areas of the plant are easily cut into pieces with a hand saw, and after removal of the upper areas of the plant the root material should be dug out with a hand mattock.
Caprifoliaceae	*Lonicera japonica*	Japanese honeysuckle	OWRC	- Cut and scrape vine stems with undiluted glyphosate - Hand weed seedlings - Spray low lying foliage, regrowth foliage, and seedlings with 20mL/1L Glyphosate & metsulfuron methyl(e.g. Brush-Off) 10.5g/10L + non-ionic surfactant - Roots of plant can be dug up with mattock or shovel
Caryophyllaceae	*Paronychia brasiliana*	Chilean Whitlow Wort	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Caryophyllaceae	*Paronychia brasiliana*	Chilean Whitlow Wort	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Chenopodiaceae	*Chenopodium album*	Fat Hen	-	- Hand weed after elongation and before seeding in summer - Fat

Family	Species	Common Name	Status	Treatment Methods
				Hen is relatively tolerant to normal rates of glyphosate - For small areas use 2 L/ha Spray.Seed® plus 2 kg/ha simazine(900g/kg) plus 1% spray oil in early summer for control of existing plants and residual control of seedlings for the season - Wear protective clothing if hand spraying this mix - In bushland areas, use 4 L/ha 2,4-DB(400g/L) or 80 mL 2,4-DB plus 25 mL wetting agent in 10 litres of water in early summer on young actively growing plants for reasonably selective control - In areas where hormone herbicides are restricted, use 25 g/ha Broadstrike® plus 0.5% Uptake® or 0.5 g Broadstrike® plus 50 mL Uptake® in 10 L water on young plants - A repeat application may be required in years where summer rains induce late germinations - Grazing or mowing normally provides control - Fat Hen often flourishes in areas that have recently been fenced

Family	Species	Common Name	Status	Treatment Methods
				off – Biological controls have been reported
Convolvulaceae	*Ipomoea indica*	Blue morning glory	OWRC	- Hand pull taking care to remove root system and stem - plant will resprout from stem segments not removed from site - Cut vine at 1m or less above ground height and pull remaining plant out of the ground at the roots - Spray any ground hugging vines with glyphosate 10mL/1L (will require follow up spraying of regrowth over several months as plant will resprout)
Cyperaceae	*Cyperus brevifolius*	Mullumbimby Couch	-	- Hand Weed - Remove strong network of rhizomes from which individual plants can regenerate - Spot Spray - Glyphosate 10mL/1L
Cyperaceae	*Cyperus eragrostis*	Umbrella Sedge	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Euphorbiaceae	*Euphorbia peplus*	Petty Spurge	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Fabaceae (Caesalpinioideae)	*Senna pendula*	Cassia, Senna	OWRC	- Hand Weed or use Glyphosate 75% v/v for

Family	Species	Common Name	Status	Treatment Methods
				stem injections. Undiluted for cut stump treatments.
Fabaceae (Faboideae)	*Erythrina crista-galli*	Cockspur coral tree	OWRC	- Cut and paint mature individuals with undiluted glyphosate (will require an arborist for removal of large trees) - Inject stem with undiluted glyphosate - All vegetative material from removed tree/shrub needs to be contained and disposed of carefully (burnt or taken to landfill); the species will regrow vegetatively from twigs, branches, logs, and on occasion, woodchipped material
Fabaceae (Faboideae)	*Medicago polymorpha*	Burr Medic	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Fabaceae (Faboideae)	*Robinia pseudoacacia*	Black locust	OWRC	- Cut and paint mature individuals with undiluted glyphosate (will require an arborist for removal of large trees) - Inject stem with undiluted glyphosate - all seeds and pods from the removed shrub needs to be contained and disposed of carefully

Family	Species	Common Name	Status	Treatment Methods
Fabaceae (Faboideae)	*Trifolium repens*	White Clover	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Gentianaceae	*Centaurium tenuiflorum*		-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Lamiaceae	*Stachys arvensis*	Stagger Weed	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Lauraceae	*Cinnamomum camphora*	Camphor laurel	OWRC	- Hand weed seedlings - Spray seedlings and coppice regrowth with glyphosate 10mL/1L - Drill and inject stem with, or chisel and apply, undiluted glyphosate - Cut and paint stump with undiluted glyphosate (will require an arborist for large trees) - Cut and grind stump of large trees (arborist)
Malvaceae	*Malva parviflora*	Small Flowered Mallow	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Malvaceae	*Modiola caroliniana*	Red-flowered Mallow	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Malvaceae	*Sida rhombifolia*	Paddy's Lucerne	-	- Hand weed - Spray with glyphosate 10mL/1L

Family	Species	Common Name	Status	Treatment Methods
				- Cut large, firmly rooted individuals at the base with secateurs and paint with undiluted glyphosate
Nandinaceae	*Nandina domestica*	Heavenly Bamboo	-	- Bag and remove and fruit from site - Cut stems near base with secateurs and paint with undiluted glyphosate - Treat any new stems growing from roots over consecutive months
Oleaceae	*Olea europaea* subsp. *cuspidata*	African olive	RP	- Spray juveniles with glyphosate 10mL/1L - Cut mature individuals with saw or loppers near ground level and paint stump with undiluted glyphosate or Triclopyr (600g/L formulation)/diesel at 4L/60L concentration (as per Garlon 600 label) - Use a power drill (9mm drill bit with dowelling tip) to drill holes less than 20 mm apart throughout lignotuber of mature trees and fill holes with glyphosate a 1:5 mixture with water. After all holes have been filled with herbicide mixture refill holes

Family	Species	Common Name	Status	Treatment Methods
				with herbicide mixture a second time (plant will have absorbed herbicide by this time). Check trees monthly for regrowth and repeat treatment if resprouting foliage is observed
Oxalidaceae	*Oxalis corniculata*	Yellow Wood Sorrel	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Oxalidaceae	*Oxalis latifolia*		-	- Dig out with hand tools taking care to carefully remove and bag underground corms
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	*Axonopus fissifolius*	Carpet Grass	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	*Bromus catharticus*	Brome Grass	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	*Cenchrus clandestinus*	Kikuyu	OWRC	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	*Chloris gayana*	Rhodes grass	OWRC	- Hand weed juveniles - Remove carefully with secateurs and bag seed plumes of mature plants - Dig mature plants out of

Family	Species	Common Name	Status	Treatment Methods
				the ground with a mattock; or - Brushcut mature plants to near ground level and spray with glyphosate 10mL/1L - During subsequent site visits spray regrowth foliage with glyphosate 10mL/1L
Poaceae	*Echinochloa crus-galli*	Barnyard Grass	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	*Ehrharta erecta*	Panic Veldtgrass	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	*Eleusine indica*	Crow's Foot	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	*Eragrostis cilianensis*	Stinkgrass	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	*Eragrostis curvula*	African lovegrass	OWRC	- Any seed heads present on mature individuals should be cut from plants with secateurs and bagged and removed from site - Dig large individuals out with a mattock - Juvenile individuals can be dug out using hand tools or spot sprayed using glyphosate 10mL/1L

Family	Species	Common Name	Status	Treatment Methods
				- Spot spraying with glyphosate 10mL/1L is effective during the growth period during Spring and Summer - During this period large individuals can be mown or brushcut to the ground level and regrowth foliage sprayed with glyphosate - Spot spraying the herbicide Fluproponate (745g/L formulation) at 3mL/1L concentration (as per label) is effective at eradicating African Lovegrass and will kill any seedling regrowth for up to 4 years as the herbicide may remain active in the soil for this time period. This time period exceeds the length of time African Love Grass seed remains viable in the soil so will eradicate the grass in areas where it is sprayed. The herbicide is taken up through the roots of the plants following rain and it may take up to 3 months for plants to yellow, and 18 months for them to die back. As the herbicide will

Family	Species	Common Name	Status	Treatment Methods
				inhibit regrowth of native grasses for up to 4 years and may harm other native plants through ground water movement it is not recommended for use in bushland remnant or revegetation areas, though is the most effective herbicide for controlling African Love Grass in nearby flat areas from which the weed may spread into bushland areas. Many native grasses such as Microlaena stipoides and Themeda australis are extremely sensitive to this herbicide. If applied before heavy rain the herbicide may be removed from the area of soil around the root zone of targeted weeds before uptake through plant roots, and may harm nearby native grasses. This herbicide should not be used on slopes (> than 10 degrees) as it is transported through groundwater and may accumulate at the base of slopes. It should not be used in close proximity to water

Family	Species	Common Name	Status	Treatment Methods
				bodies of any kind. The herbicide remains in clay soils such as the shale soils on the Cumberland Plain for longer time periods than in well-drained soils (for a period of up to 800 mm of accumulated rain fall).
Poaceae	*Paspalum dilatatum*	Dallisgrass	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	*Paspalum urvillei*	Vasey Grass	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	*Poa annua*	Winter Grass	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	*Setaria parviflora*	Pigeon Grass	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	*Stenotaphrum secundatum*	Buffalo Grass	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Polygonaceae	*Rumex crispus*	Curled Dock	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Primulaceae	*Lysimachia arvensis*	Scarlet Pimpernel	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L

Family	Species	Common Name	Status	Treatment Methods
Rubiaceae	*Galium aparine*	Goosegrass	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Rutaceae	*Murraya paniculata*	Orange jessamine, Mock Orange	OWRC	- Hand weed juveniles or spray with 10mL/1L glyphosate - Cut mature plants close to the ground with a hand saw and apply undiluted glyphosate to cut stump surface - Spray any regrowth foliage from cut stumps with glyphosate 10mL/1L
Solanaceae	*Solanum nigrum*	Blackberry Nightshade	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L - Remove all fruit and seeds
Solanaceae	*Solanum pseudocapsicum*	Jerusalem Cherry	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L - Remove all fruit and seeds
Solanaceae	*Solanum sisymbriifolium*	Sticky Nightshade	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L - Remove all fruit and seeds
Strelitziaceae	*Strelitzia reginae*	Bird of Paradise	-	- Saw plant off at base and apply undiluted glyphosate to the cut stump. Glyphosate should be applied to the stump

Family	Species	Common Name	Status	Treatment Methods
				immediately after cutting - To improve efficacy of herbicide application, dig around the base to expose roots which can be pierced with a knife or trowel and glyphosate applied - The plant may reshoot from the centre. The new shoot should be sawn off and glyphosate applied to freshly cut surface monthly until the plant is dead
Verbenaceae	*Verbena bonariensis*	Purple Top	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Verbenaceae	*Verbena officinalis*	Common Verbena	-	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Verbenaceae	*Lantana camara*	Lantana	SP/WoNS	- Hand weed juveniles and regrowth from small pieces - Spot spray with glyphosate 10mL/1L - Slash using brushcutter, or hand cut with loppers, and spray regrowth foliage with glyphosate 10mL/1L - Cut near ground level and paint with undiluted glyphosate - Some individuals will have stumps which will still regrow

Family	Species	Common Name	Status	Treatment Methods
				foliage, spray regrowth foliage with glyphosate 10mL/1L

Key: SP = State Priority, RP = Regional Priority, WoNS = Weed of National Significance, OWRC = Other Weed of Regional Concern

FIGURES

Legend

- VMP Area
- Subject Land
- Watercourse

Image Source:
Image © Nearmap (2021)
Dated: 24/01/2021

Coordinate System: MGA Zone 56 (GDA 94)

cumberland ecology

0 25 50 75 100 m

I:\...\21008\Figures\RP2\20210209\Figure 1. Location_Subject Land

Figure 1. Location of the Subject Land and VMP Area

Legend

- VMP Area
- Project Footprint
- Subject Land

Image Source:
Image © Nearmap (2021)
Dated: 24/01/2021

Coordinate System: MGA Zone 56 (GDA 94)

cumberland ecology

0 10 20 30 40 m

I:\...\21008\Figures\RP2\20210317\Figure 2. Development Footprint_Subject Land

Figure 2. Extent of Project Footprint on Subject Land

Legend

VMP Area

Subject Land

Vegetation Community

- Cumberland Plain Woodland (Scattered Trees)
- River-flat Eucalypt Forest (Scattered Trees)
- River-flat Eucalypt Forest (Degraded)
- Non-endemic Native
- Typha orientalis
- Exotic Vegetation
- Coral Tree
- Blackberry
- Exotic Grassland
- Cleared Land
- Dam

Image Source:
Image © Nearmap (2021)
Dated: 24/01/2021

Coordinate System: MGA Zone 56 (GDA 94)

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0 10 20 30 40 m

I:\...\21008\Figures\RP2\20210212\Figure 3. Vegetation Communities_Subject Land

Figure 3. Vegetation communities within the Subject Land

Figure 4. Vegetation management zones

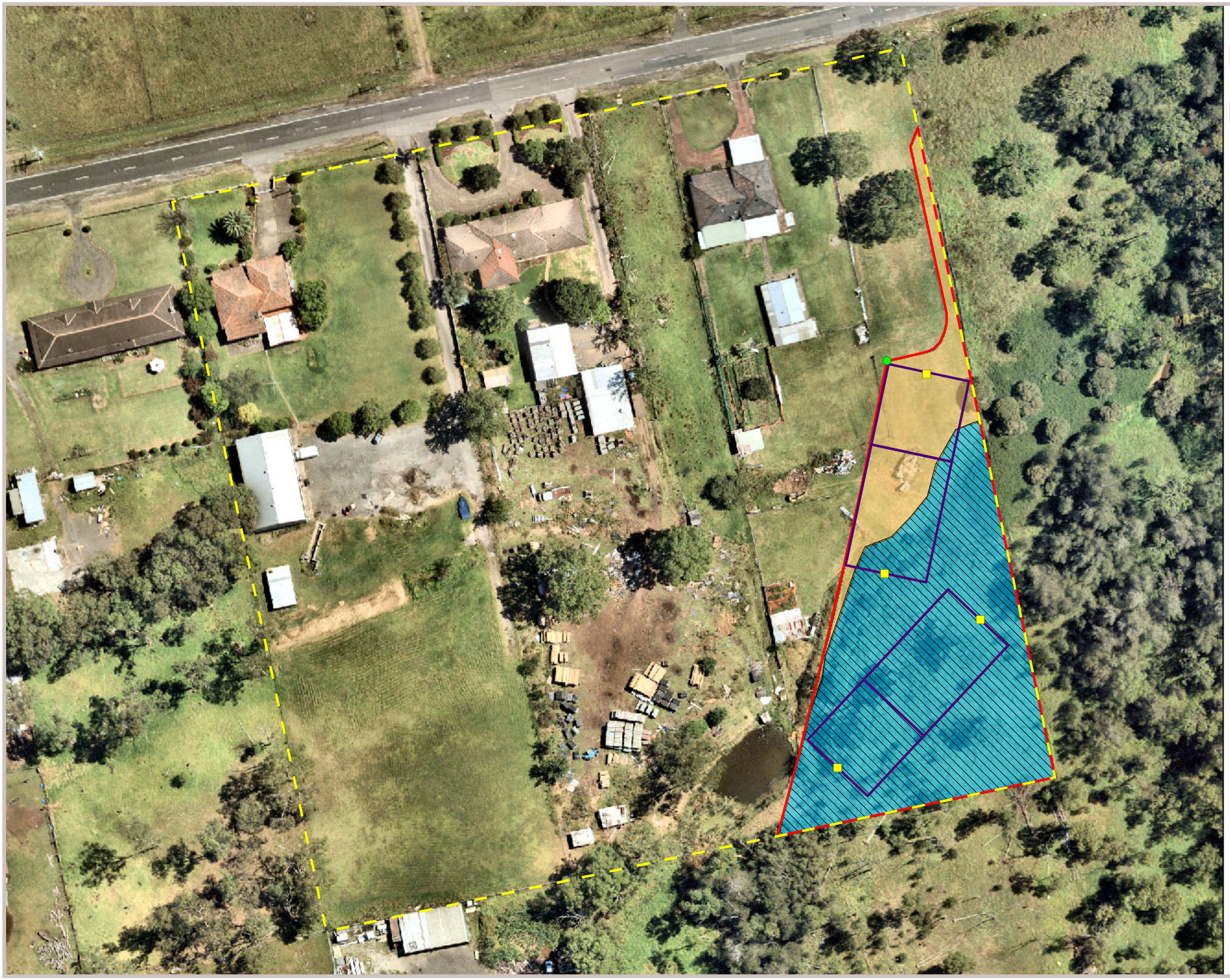

Figure 5. Monitoring plots and signage within the VMP area