

# 771-797 Mamre Road, Kemps Creek

## Vegetation Management Plan

GPT Group Pty Ltd

21 February 2024


Final



## Report No. 21130RP1

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.

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# Glossary

| Abbreviation / Term | Definition  |
|---------------------|---|
| BAM                 | Biodiversity Assessment Method  |
| BC Act              | NSW <i>Biodiversity Conservation Act 2016</i>   |
| Biosecurity Act     | NSW <i>Biosecurity Act 2015</i>   |
| CBD                 | Central Business District   |
| CEEC                | Critically Endangered Ecological Community  |
| Council             | Penrith City Council  |
| DBH                 | Diameter at Breast Height   |
| DCP                 | Development Control Plan  |
| EEC                 | Endangered Ecological Community   |
| EP&A Act            | <i>Environmental Planning and Assessment Act 1979</i>   |
| EPBC Act            | <i>Environment Protection and Biodiversity Conservation Act 1999</i>  |
| MNES                | Matters of National Environmental Significance  |
| NSW                 | New South Wales   |
| PCT                 | Plant Community Types   |
| Subject land        | The area subject to the Stage 1 development application within 771-797 Mamre Road, Kemps Creek NSW (part Lot 23 and Lot 24 DP 258414) |
| TBDC                | Threatened Biodiversity Data Collection   |
| TEC                 | Threatened Ecological Communities   |
| The Minister        | Australian Government Minister for the Environment  |
| VMP                 | Vegetation Management Plan  |
| VMP area            | Area of land subject to this VMP  |
| WEMP                | Weed Eradication and Management Plan  |
| WM Act              | <i>Water Management Act 2000</i>  |
| WoNS                | Weeds of National Significance  |

# 1. Introduction

This Vegetation Management Plan (VMP) has been prepared by Cumberland Ecology on behalf of the GPT Group Pty Ltd (the 'client') to support the proposed Stage 1 development located at 771-797 Mamre Road, Kemps Creek, New South Wales (NSW), comprising part Lot 23 and Lot 24 DP 258414 (hereafter referred to as the 'subject land', shown in **Figure 1**). This VMP has also been prepared in consideration of future development within subject land and therefore the area subject to this VMP includes the entirety of Lot 23 and Lot 24 DP 258414, and is referred to hereafter as the 'VMP area' (**Figure 1**).

This VMP will form part of the documentation to support an application for Development Consent under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

This VMP also includes a Weed Eradication and Management Plan (WEMP) (**Chapter 6**) in accordance with the *Mamre Road Precinct Development Control Plan 2021* (DCP).

It is noted that the proposed watercourse and associated riparian corridor as well as proposed sediment basins identified within the VMP area will be subject to modification for future development. However, a riparian corridor will be established within the VMP area in accordance with the guidelines for controlled activities on waterfront land and the management measures identified in this VMP will be applicable to any future realignment of the watercourse and associated riparian corridor. As such, this VMP should be considered a working document which is to be updated in light of future development within the VMP area once final footprints are identified.

## 1.1. Purpose

The purpose of this VMP is to provide guidelines for the conservation, management and revegetation of the subject land and VMP area (**Figure 1**), in particular for the re-establishment of a vegetated riparian zone along the existing watercourse.

The aims of the plan 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 communities pre-existing in the VMP area, specifically within the proposed riparian corridor and sediment basins;
- To establish and enhance habitat for local fauna species with the potential to occur or known to occur at the VMP area; and
- To eradicate and manage weeds within the VMP area and prevent the future establishment of weeds.

## 1.2. Background

### 1.2.1. Site Description and Location

The VMP area is located at 771-797 Mamre Road, Kemps Creek, and comprises Lot 23 and 24 of DP 258414. The VMP area is located within the Western Sydney Employment Area, approximately 40 km west of the Sydney Central Business District (CBD) and 12 km southeast of the Penrith CBD. It is also located within the Western

Sydney Aerotropolis, approximately 6 km northeast of the Aerotropolis Core Precinct. The VMP area is located entirely within the Penrith Local Government Area and covers an area of approximately 38.57 ha

The subject land and wider VMP area has been partially rezoned under the *State Environmental Planning Policy (Western Sydney Employment Area) 2009* (which has since changed to *State Environmental Planning Policy (Industry and Employment) 2021*) rezoning part of the site to IN1 – General Industrial and a small strip of SP2 Infrastructure. The remainder of the subject land is zoned as RE1 – Public Recreation and ENZ Environment and Recreation. The land zoning aligns with the land that has been biodiversity certified (bio-certified) under the Cumberland Plain Conservation Plan, with IN1 zoned land mapped as ‘Certified – Urban Capable’ and RE1 zoned land mapped as ‘Avoided Land’. The remainder of the VMP area is comprised of land zoned as RE1 – Public Recreation, ENZ – Environment and Recreation and E2 – Environmental Conservation.

The watercourse and the associated 40m riparian corridor, and the sediment basins are proposed to be revegetated and managed as described in **Chapter 7**. Areas to the west of the VMP area that are not within the proposed riparian corridor or sediment basins, consist predominantly of exotic-dominated grassland and will be subject to weed management (see **Section 6.3**).

It is noted that development within the subject land forms Stage 1 of the development with future development located predominantly within areas currently zoned IN1 General Industrial. As part of the Stage 1 development and future development stages, the watercourse, riparian corridor and associated land zoning are proposed to be realigned to better service the industrial land zoning of the site. Therefore, the VMP area identified within this report and the mitigation and management measures that have been identified will apply to all stages of development, with specific focus on the revegetation of the riparian corridor and establishment of sediment basins.

### 1.2.2. Project Description

The project comprises the development of the land and includes the following:

- Site preparation works including estate-wide clearing of vegetation, including ~0.06ha of native vegetation and ~15.29 ha exotic;
- Dewatering of existing dams/pools of water proposed for removal or reconstruction;
- Bulk earthworks;
- Construction of retaining walls;
- Reconstruction and revegetation of the riparian corridor;
- Construction of an industrial collector road;
- Provision of site servicing infrastructure to allow the operation of the industrial unit for warehouse and distribution and/or other manufacturing industries;
- Construction and use of Warehouse 1 and 2 for the purpose of other manufacturing industries and/or warehouse and distribution centres and associated access roads; and

- Associated carparking and landscaping.

### 1.3. Relevant Legislation

Legislation relevant to this VMP includes:

#### 1.3.1. 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 NSW *Biodiversity Conservation Act 2016* (BC Act) and *Fisheries Management Act 1994*.

#### 1.3.2. 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.

#### 1.3.3. NSW Biodiversity Conservation Act 2016

The 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*.

#### 1.3.4. 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 2021).

##### 1.3.4.1. 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.

### 1.3.5. Pesticides Act 1999

The *Pesticides Act 1999* controls the use of herbicides within NSW. 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.

### 1.3.6. 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.

The watercourse mapped within the subject land and wider VMP area is mapped as a 2<sup>nd</sup> order stream, and will require a vegetated riparian zone that is a minimum of 40m wide (20m either side of the watercourse). As such, establishment of a minimum 40m riparian corridor will be required in accordance with the guidelines for controlled activities on waterfront land (DPE 2022b).

## 2. Methodology

### 2.1. Desktop Assessment

The preparation of this VMP involved a literature review that included review of previously prepared ecological reports, government mapping and guidelines for the preparation of VMPs. The literature review also identified the most up to date methods of weed control for exotic species that are present in the subject land and included a review of government fact sheets and websites. Cumberland Ecology staff with expertise in bushland regeneration were also consulted on current best practice methods and techniques. To prepare species planting lists for revegetation, and determine revegetation strategies, relevant documents were reviewed in conjunction with a review of findings of a site inspection.

The literature review included, but was not limited to the following:

- Species data that is held in the BioNet Atlas (DPE 2022a);
- Final Determinations for Threatened Ecological Communities (TECs) prepared by the NSW Scientific Committee;
- The NSW BioNet VIS Classification Database (EHG 2022a);
- Guidelines for vegetation management plans on waterfront land (DPI 2012); and
- Guidelines for riparian corridors on waterfront land (DPE 2022b).

### 2.2. Flora Surveys

Flora surveys were undertaken by Cumberland Ecology within the subject land and wider areas zoned IN1 – General Industrial, on 20 May 2021 and again on 20 October 2022. Surveys included vegetation mapping, plot-based vegetation survey and threatened flora surveys. The survey design consisted of random meander searches, parallel transects and plot-based surveys, and was guided by the following:

- NSW Government (2020a) Biodiversity Assessment Method (BAM); and
- NSW Government (2020b): Surveying threatened plants and their habitats: NSW survey guide for the Biodiversity Assessment Method.

The area covered by flora surveys, including parallel traverses and the location of plots is shown in **Figure 3**.

It should be noted that Cumberland Ecology has not performed in-depth flora surveys or ground-truthed the VMP area beyond that shown in **Figure 3**, therefore some sections of this VMP, in particular **Section 3**, refer to the results recorded in the subject land and immediately adjacent areas only. It has been determined through desktop analysis and aerial photography that the VMP area has similar vegetation to that of the subject land, and is predominantly made up of exotic dominated/cleared grassland. There is also a small area of remnant native vegetation at the far west of the VMP area, in the area zoned E2, located within the riparian corridor of South Creek, however these areas will not be impacted by the project and will be subject to management as outlined in **Chapter 4**. As such, further ground truthing surveys are not considered to be warranted.

### 2.2.1. 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 and mark-up of aerial photographs. The data collected was analysed and the resultant information was synthesised using a Geographic Information System to create a spatial database to produce a vegetation map of the subject land.

### 2.2.2. 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 2022).

### 2.2.3. Threatened Flora Species Searches

Targeted threatened flora surveys were undertaken in conjunction with the collection of floristic plot data as well as vegetation mapping surveys. Surveys were targeted towards threatened species known to occur in the locality of the subject land.

## 2.2.4. Data Analysis

### 2.2.4.1. 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 surveys. The data collected during surveys of the subject land was analysed in conjunction with a review of the PCTs held within the BioNet VIS (EHG 2022a). 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.

### 2.2.4.2. 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 Commonwealth Department of Climate Change, Energy, the Environment and Water Species Profile and Threats Database and any associated documentation, such as listing advice and policy statements.

## 2.3. Habitat Assessment

A habitat assessment was carried out on 20 May 2021 throughout the subject land. This survey specifically focused on assessing the fauna habitat value of the vegetation present within the subject land. 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, such as hollow-bearing trees and nests.

Furthermore, a visual observation of all trees within the subject land was completed throughout the survey period and any nests present were recorded. The presence of other notable habitat features such as logs and rocks was also recorded.

# 3. Description of the Existing Environment

## 3.1. Topography, Geology and Soils

The subject land occurs falls within the South Creek and Blacktown soil landscapes (DPE 2022c). South Creek soil landscapes are characterised by floodplains, valley flats and drainage depressions on the channels on the Cumberland Plain. Blacktown soil landscapes are characterised by gently undulating rises on Wianamatta Group shales (DPE 2022c).

### 3.1.1.1. Hydrology

The subject land contains one unnamed watercourse which is mapped as a 2<sup>nd</sup> order stream, as per the Strahler System of ordering watercourses, as well as and three small farm dams, of which one is located along the watercourse. The location of the watercourse is shown in **Figure 1**.

## 3.2. Vegetation Communities

Approximately 0.06 ha of the VMP area contains native vegetation. remaining land within the VMP area comprises exotic dominated vegetation and cleared land, including buildings and driveways.

The native vegetation community occurring within the VMP area is River-flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions. This community is listed as an Endangered Ecological Community (EEC) under the BC Act and a Critically Endangered Ecological Community (CEEC) under the EPBC Act. Within the VMP area, the occurrence of the community meets the listing of a TEC under the BC Act, however does not meet the listing criteria under the EPBC Act as it is a small patch less than 0.5 ha and the perennial understorey vegetative cover present is not made up of 30% or more of native species as outlined in Table 4 of the EPBC Act Listing Advice (DAWE 2020).

The vegetation communities identified by Cumberland Ecology within the subject land and their corresponding PCT and listing status are shown in **Table 1**, and a summary of each community is provided in subsequent sections. A map of the vegetation communities occurring within the subject land and VMP area is shown in **Figure 4**.

**Table 1 Vegetation communities and their listing status under the BC Act and EPBC Act within the VMP area**

| Vegetation Community  | PCT                              | BC Act Status | EPBC Act Status | VMP Area (ha) |
|---|----------------------------------|---------------|-----------------|---------------|
| River-flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions | 835: Cumberland Riverflat Forest | EEC           | -               | 0.06          |
| *Exotic Dominated Vegetation/Cleared Land   | -                                | -             | -               | 38.51         |

*\*This includes the small area of native/exotic vegetation along South Creek which has not been ground-truthed.*

### 3.2.1. PCT 835: Cumberland Riverflat Forest

Cumberland Riverflat Forest is an open eucalypt forest situated on broad alluvial flats of the Hawkesbury and Nepean river systems. 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). *Casuarina glauca* (Swamp Oak) frequently occurs within Cumberland Riverflat Forest. The understorey within Cumberland Riverflat Forest is characterised by an occasional sparse to open small tree stratum of *Melaleuca* spp. (Paperbark) and *Acacia* spp. (Wattles). A sparse lower shrub layer features *Bursaria spinosa* (Native Blackthorn). The ground layer is characterised by an abundant cover of grasses with small herbs and ferns. Cumberland Riverflat Forest occurs at altitudes between one and 160 metres above sea level and with a mean annual rainfall of 750-1000 millimetres (NSW Scientific Committee 2011).

Within the VMP area Cumberland Riverflat Forest occurs as five small patches within a small area at lower elevations in the south-east of the site adjacent to Mamre Road. The canopy includes *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus amplifolia* (Cabbage Gum). The sub-canopy includes *Eucalyptus tereticornis* (Forest Red Gum) as well as *Casuarina glauca* (Swamp Oak). There is no intact native shrub layer. The shrub stratum includes the exotic species *Solanum sisymbriifolium*, *Lycium ferocissimum* (African Boxthorn) and *Rubus fruticosus* spp. agg. (Blackberry). The understorey is dominated by exotic grasses such as *Cenchrus clandestinus* (Kikuyu) and *Chloris gayana* (Rhodes Grass).

**Photograph 1 Small patch of Cumberland Riverflat Forest comprising a native canopy and an exotic dominated understorey**



### 3.3. Exotic Dominated Vegetation / Cleared Land

Exotic dominated vegetation/ cleared land (15.29 ha) occurs throughout the subject land. Exotic dominated vegetation consists of predominantly exotic dominated grassland (14.68 ha) with small patches of exotic dominated woody vegetation (0.08 ha). Small areas of cleared land are also present which include existing driveways and dwellings (0.53 ha). The VMP area comprises approximately 38.51 ha of exotic dominated vegetation/cleared land, as determined through digital mapping. This includes all areas within the subject land that have not been assigned to a PCT.

Exotic dominated grassland is dominated by the grass species *Chloris gayana* (Rhodes Grass), *Paspalum dilatatum* (Paspalum), *Cenchrus clandestinus* (Kikuyu Grass), *Cynodon dactylon* (Couch) and in some areas *Eragrostis curvula* (African Lovegrass). Native species present include *Juncus usitatus*, *Sporobolus creber* (Slender Rat's Tail Grass) and *Rytidosperma* sp. (Wallaby Grass). Other exotic species present include *Rumex crispus* (Curly Dock). An example of exotic dominated grassland within the subject site is shown in **Photograph 2**.

The exotic dominated woody vegetation is found surrounding the dwellings on the subject site. The exotic species present include *Pinus radiata* (Radiata Pine), *Ficus carica* (Fig), *Pyrus communis* (Pear), *Rubus fruticosus* spp. agg. (Blackberry). Other exotic species present include *Solanum sisymbriifolium*, *Senecio madagascariensis* (Fireweed), *Cenchrus clandestinus* (Kikuyu) and *Hypochaeris radicata* (Catsear). A few non-endemic native trees and shrubs have been planted in one location primarily within garden areas around the dwelling in the east of the subject site including, *Grevillea robusta* (Silky Oak), *Callistemon viminalis* (Weeping Bottlebrush) and *Acacia* spp. An example of exotic dominated woody vegetation is shown in **Photograph 3**.

Furthermore, the native *Typha orientalis* (Bulrush) is associated with the drainage lines on the subject site. Three small patches are found surrounded by exotic grassland in the north east of the subject site. The vegetation is dominated by *Typha orientalis* (Bulrush) and *Cynodon dactylon* (Couch). Other species present include *Chloris gayana* (Rhodes grass) and *Rumex crispus* (Curly Dock). An example of the *Typha orientalis* within the drainage line is shown in **Photograph 4**. Although these areas comprise a few native species, they were considered too small to be mapped separately as a native vegetation community.

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

**Photograph 2 Exotic dominated grassland within the subject land**



**Photograph 3 Exotic dominated woody vegetation within the subject land**



**Photograph 4 Small patch of *Typha orientalis* (Bulrush) within the subject land**



### 3.4. Flora Species

A total of 93 flora species were recorded within the subject land during field surveys, including 15 native species and 78 exotic species. Of the exotic species, 16 are listed as High Threat Exotics under the BAM. A full list of flora species recorded within the subject land is presented in **Appendix A**.

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.

The floral assemblage across the subject land is a reflection of previous clearing for semi-rural 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.

### 3.5. Priority Weeds

The Biosecurity Act and regulations provide specific legal requirements for State Level Priority Weeds. Under the Biosecurity Act all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.

Specific legal requirements apply to State determined priorities under the *Greater Sydney Regional Strategic Weed Management Plan 2023-2027* (LLS: Greater Sydney 2022). Weeds listed as 'other weeds of regional concern' under the plan warrant resources for local control or management programs and are a priority to

keep out of the region. Inclusion in this list may assist Local Control Authorities and/or land managers to prioritise action in certain circumstances where it can be demonstrated the weed poses a threat to the environment, human health, agriculture etc. Appendix 1 of the *Greater Sydney Regional Strategic Weed Management Plan 2023-2027 (LLS: Greater Sydney 2022)* should be referred to for a summary of the legislative requirements, recommended regional management objectives, and regional strategic responses pertaining to these weed species.

Thirty-two WoNS have been identified by Australian governments based on their invasiveness, potential for spread and environmental, social, and economic impacts. All 32 WoNS are now included under the Biosecurity Act as State Level Priority Weeds, and therefore all have specific legislative requirements for management.

Of the weeds identified during the field survey, three have been listed as state level priority weeds, and 11 others listed as other weeds of regional concern. The priority weeds recorded from the subject land, their priority listing under the Biosecurity Act, and whether they are WoNS, are presented below in **Table 2**.

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

| Scientific Name                      | Common Name            | Priority Listing               | WoNS |
|--------------------------------------|------------------------|--------------------------------|------|
| <i>Ailanthus altissima</i>           | Tree of Heaven         | Other Weed of Regional Concern | -    |
| <i>Andropogon virginicus</i>         | Whisky Grass           | Other Weed of Regional Concern | -    |
| <i>Araujia sericifera</i>            | Moth Vine              | Other Weed of Regional Concern | -    |
| <i>Cenchrus clandestinus</i>         | Kikuyu                 | Other Weed of Regional Concern | -    |
| <i>Chloris gayana</i>                | Rhodes Grass           | Other Weed of Regional Concern | -    |
| <i>Eragrostis curvula</i>            | African Lovegrass      | Other Weed of Regional Concern | -    |
| <i>Ligustrum lucidum</i>             | Large-leaved Privet    | Other Weed of Regional Concern | -    |
| <i>Olea europaea subsp. europaea</i> | European Olive         | Other Weed of Regional Concern | -    |
| <i>Opuntia stricta</i>               | Common Prickly Pear    | State Priority                 | Yes  |
| <i>Pinus radiata</i>                 | Radiata Pine           | Other Weed of Regional Concern | -    |
| <i>Rubus fruticosus</i>              | Blackberry             | State Priority                 | Yes  |
| <i>Senecio madagascariensis</i>      | Fireweed               | State Priority                 | Yes  |
| <i>Sporobolus fertilis</i>           | Giant Parramatta Grass | Other Weed of Regional Concern | -    |
| <i>Zantedeschia aethiopica</i>       | Arum Lily              | Other Weed of Regional Concern | -    |

### 3.6. Fauna Habitat

The majority of the subject land is comprised of cleared land, dominated by exotic grassland vegetation which has limited value for native fauna. The small, isolated patches of vegetation provide some habitat for native fauna species however, no hollow-bearing trees or nests were recorded. As such, the vegetation within the subject land is considered to only comprise foraging habitat for native fauna species, although the habitat value of these patches is limited due to the lack of understorey and shrub vegetation.

There is one creek line, and three small farm dams present within the subject land that may provide habitat for a range of species including fish, amphibians and water birds. Furthermore, terrestrial fauna species may also utilise these dams as a water source.

Due to the general lack of habitat in the subject land and the lack of nearby large patches of bushland, the habitat within the subject land is considered to provide highly limited "stepping stone" habitat.

Under this VMP, all vegetation within the VMP area will be revegetated and managed by the future landowners which will improve foraging and shelter resources for fauna in the future.

# 4. Vegetation Management Zones

Under this VMP, all vegetation within the VMP area will be revegetated and managed by the future landowners for weed invasion, monitored and revegetated with endemic plant species. The VMP area will be managed as two separate management zones, as shown in **Figure 5**. These vegetation zones have been determined based on the existing land zoning and location of the existing second order stream.

## 4.1. Management Zone 1

Management Zone 1 covers all areas in the VMP area zoned IN1 and SP2 which will be subject to future development. These areas will be subject to landscape plantings in accordance with the Landscape Plan prepared by Site Image Landscape Architects (2022), and where possible are to include local native plant species consistent with River Flat Eucalypt Forest. Introduced species should not be used in landscaping, due to the potential for species to escape and become environmental weeds within the VMP area. Maintenance weeding within Management Zone 1 should be undertaken as detailed in **Chapter 6** of this VMP.

### 4.1.1.1. Management Zone Objectives

Objectives for this management zone are:

- Maintenance of landscape plantings; and
- To control exotic weeds species and minimise their spread.

## 4.2. Management Zone 2

Management Zone 2 covers all areas within the VMP area zoned RE1, ENZ and E2. Areas zoned E2 will not be impacted by the proposed development, however will be subject to weed management. Areas zoned RE1 and ENZ comprise a second order stream and associated riparian corridor as well as sediment basins. These areas be subject to stream channel re-alignment, re-created stream banks, revegetation of the riparian corridor and sediment basins. Note that any modifications to the location of the watercourse and associated riparian corridor as well as sediment basins will be subject to management in accordance with Management Zone 2.

### 4.2.1.1. Management Zone Objectives

Objectives for this management zone are:

- Recreation of stable stream banks;
- Revegetation of the riparian zone with local native species;
- To minimise sediment and nutrient inputs into the second order stream; and
- To control exotic weeds species and minimise their spread.

## 4.3. Management Period

### 4.3.1. Management Zone 1

Landscaping and weed maintenance will commence once construction of Stage 1 of the project is completed.

### **4.3.2. Management Zone 2**

Revegetation works within Management Zone 2 will likely be undertaken in stages. Areas within the subject land and immediately adjacent areas along the watercourse (minimum 15m beyond the subject land) will be revegetated once construction of Stage 1 of the project is complete. Additional revegetation works associated within Management Zone 2 that are subject to disturbance are to be undertaken once earthworks have been completed and the final landform established.

### **4.3.3. Overall VMP Period**

This VMP will commence on approval of the DA and remain in force during clearing, construction and revegetation works. The VMP will then cover over a five-year maintenance period following the completion of revegetation works within VMP area. The long-term strategy for ongoing maintenance of the vegetation will be dependent on the condition of the vegetation at the end of this five-year period and should be developed based on vegetation conditions towards the end of the life of this VMP.

# 5. Vegetation Clearing and Construction Plan

This chapter outlines the protocols to be followed during clearing to minimise the impacts on native flora and fauna and the watercourse, and during clearing and construction, and should be applied to the entire VMP area.

## 5.1. Hygiene Protocols

To avoid the spread of *Phytophthora cinnamomi* (Root rot Fungus), *Austropuccinia psidii* (Myrtle Rust) and Chytrid fungus, 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), as well as the Hygiene Guidelines: Protocols to Protect Priority Biodiversity Areas in NSW from *Phytophthora cinnamomi* and Myrtle Rust (DPIE 2020) 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 subject land. Clothing should be laundered every day using detergent and warm machine wash to kill residual spores.

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 car interior);
- Sodium Hypochlorite 1%, which is effective, but can damage clothing and degrades rapidly in light; and
- Chloramine and chlorhexadine- based products including Halamid®, Halasept® and Hexifoam® which can be used to disinfect hands, footwear, and equipment.

Additionally, a simple hygiene kit should be kept in each field vehicle to allow staff to implement hygiene measures as required. At a minimum, hygiene kits should contain a stiff brush (for removing soil from boots, bags, etc.), a spray bottle and a container of disinfectant solution (with enough volume for several refills of the spray bottle).

## 5.2. Weed Management during Clearing

As vegetation will be cleared in close proximity to a watercourse there is potential for erosion and the spread of weeds propagules 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 weeds.

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), to prevent the spread of propagules to uncleared areas of native vegetation, both on- and off-site.

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.

More detailed weed control measures for implementation in the VMP area are presented in **Section 6.3**.

### 5.3. Pre-clearance Surveys

Prior to the commencement of any vegetation clearing, a pre-clearance survey must be undertaken by a fauna ecologist within one week of any clearing activities. During the survey native fauna and habitat that have the potential to be disturbed during clearing will be identified, and any habitat features marked with flagging tape and/or spray paint.

### 5.4. Clearance Supervision

The need for clearance supervision for the removal of vegetation and habitat will be determined and documented in the pre-clearance report. If deemed necessary, the fauna ecologist will be present while clearing to rescue animals injured during the clearance operation. Furthermore, a fauna ecologist is to be present during dam decommissioning to ensure the safe capture and relocation of aquatic fauna species.

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.

### 5.5. Habitat Salvage

If and where present, fauna habitat features including hollow-bearing trees, hollow-bearing logs, other woody material will be salvaged from the development footprint during clearing and stockpiled for future use in restoration of the VMP area. The placement of salvaged items in the VMP area will increase habitat complexity as such items are used by a variety of invertebrate and vertebrate species as microhabitat. Any salvaged items are to be placed in the VMP area in a manner that does not disturb/destroy native vegetation.

### 5.6. 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. Control measures are required to prevent sediment entering the watercourse. This will prevent nutrient enrichment and weed spread within and downstream of the VMP area. Clearing should not take place during periods of heavy rain in order to minimise erosion and sediment run-off.

Sediment fences will be established around the perimeter of the development area to prevent the impacts of sedimentation on the adjoining vegetation. During construction, precautions will be taken to ensure that no pollution, such as petrochemical substances or water containing suspended solids, escapes the construction site. Pollution traps and efficient removal of pollution to an off-site location would help to minimise pollution impacts.

# 6. Weed Eradication and Management Plan

## 6.1. Introduction

This chapter details how weeds within the VMP area will be managed and controlled.

## 6.2. Weed Control Objectives

The objective of weed management is to eradicate existing weeds recorded within the VMP area, control the spread of weeds during the construction phase of the project and prevent the establishment of weed species within the recreated vegetated riparian zone. This will, in particular, focus on preventing the establishment of Priority Weeds listed under the Biosecurity Act. Weeds identified within the subject land are listed with their respective control measures in **Appendix B**, which form the basis of this Weed Eradication and Management Plan (WEMP). Priority weeds for the Greater Sydney Region recorded on the subject land are listed in **Table 2**.

Additionally, the Mamre Road Precinct DCP states that the WEMP is to include specific measures to manage the spread of weeds on known populations of several threatened flora species. **Table 3** identifies the threatened species that are listed in the Mamre Road Precinct DCP as well as the weed threats as listed in the Threatened Biodiversity Data Collection (TBDC) (EHG 2022b). Of note is the species *Eragrostis curvula* (African Lovegrass) which was recorded within the subject land and is directly associated with a several threatened species listed in **Table 3**. Although none of these threatened flora species are present, or considered likely to occur within the VMP area, the control of weeds within the VMP area is required to prevent the spread of weeds to adjacent land within the locality which may support threatened flora species.

**Table 3 Threatened flora species identified in the Mamre Road Precinct DCP and associated weed threat listed in the TBDC**

| Scientific Name                                      | Common Name              | Weed Threat (TBDC)  |
|--|--------------------------|---|
| <i>Acacia bynoeana</i>                               | Bynoe's Wattle           | Weeds can invade the species' habitat.  |
| <i>Cynanchum elegans</i>                             | White-flowered Wax Plant | Competition and habitat degradation resulting from weed invasion.   |
| <i>Dillwynia tenuifolia</i>                          |                          | Invasive grasses - particularly African Lovegrass and Coolatai Grass - can alter the ground-cover density and both out-compete the species (particularly during dry times and when young) or increase the temperature of burns as more leafy matter is available as fuel. |
| <i>Genoplesium baueri</i>                            | Bauer's Midge Orchid     | Weed invasions resulting in loss of habitat pose a threat to some populations around Ku-ring-gai.   |
| <i>Grevillea juniperina</i> subsp. <i>juniperina</i> | Juniper-leaved Grevillea | Invasion from exotic perennial grasses, particularly African Lovegrass ( <i>Eragrostis curvula</i> ).   |
| <i>Grevillea parviflora</i> subsp. <i>parviflora</i> | Small-flower Grevillea   | Competition from increasing weed densities and further invasion.  |
| <i>Persoonia nutans</i>                              | Nooding Geebung          | Primarily affected by <i>Acacia baileyana</i> that has naturalized in the area, but also by other non-native and native woody weed species.   |

| Scientific Name             | Common Name | Weed Threat (TBDC)   |
|-----------------------------|-------------|--|
| <i>Pultenaea parviflora</i> |             | African Lovegrass and other invasive grasses, these increase biomass which fuels fires, as well as resulting in competition and shading. |

## 6.3. Weed Control Measures

Weed control is to be implemented across the VMP area, and also where relevant during clearing within other parts of the subject land. Weed control works within the subject land will be undertaken 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 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 watercourse. 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 B** 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. Stages of Weed Control

Typically, within areas of vegetation that are to be managed and revegetated, weed control involves a primary weeding phase in order to reduce weed cover prior to planting, followed by maintenance weeding. However,

for the VMP area, no existing vegetation is to be managed, and revegetation will take place following the removal of all existing vegetation and the re-alignment of a watercourse. As such, other than clearing of weeds prior to construction, the only stage of weed control will be maintenance weeding.

#### 6.4.1. Maintenance Weeding

Weed suppression methods such as jute 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. A list of effective methods for control of weeds on site is found in **Appendix B**. Undertaking a spray-prep by firsthand-weeding around natives and de-seeding exotics prior to spraying also removes the need for tree guards.

Follow-up weeding should be undertaken in within Management Zone 1 that have received past primary weeding treatments in the following months, to treat any regrowth of weeds. Ongoing maintenance of the revegetation and natural regeneration areas should occur for a five-year period by the contracted bushland regeneration company, and each area should be covered in its entirety once every month, to diminish the soil seed bank of exotic weed species present on site. In order to eliminate the occurrence of these species they need to be controlled before they have a chance to set seed.

It is important during site visits for ongoing weed maintenance that as many weeds as possible are controlled so individuals are not able to achieve maturity and set seed between site visits. Some weed species are prolific seeders, and many exotic plants can have seed that remains viable in the soil for long periods of time. In order to effectively diminish the soil seed bank occurrences of exotic species it is important that individuals are not allowed to set seed.

During site visits for weed control, Priority Weeds, other weeds of regional concern, and WoNS (**Table 2**) should be prioritised for control. Individual plants of these species on site should not be allowed to achieve a reproductive stage in their life cycles.

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

Follow-up weeding should be implemented under this VMP for a minimum period of five continuous years, after revegetation works have been completed. After the initial two-year revegetation and weed management has been implemented, resources required for ongoing maintenance weeding should be reviewed and identified on an annual basis from year 3 – 5 based on the annual assessment of site conditions and response to prior works completed.

# 7. Revegetation Plan

## 7.1. Introduction

This Revegetation Plan applies to the riparian corridor and sediment basins that will be established within Management Zone 2. It provides specifications for site preparation, plant sourcing and details of planting techniques and maintenance requirements.

## 7.2. Plant Sourcing

### 7.2.1. Target Communities

The majority of vegetation along the watercourse has been cleared, however is likely to have been River-flat Eucalypt Forest, which is located within the wider subject land and also present further upstream of the subject land. As the watercourse within the VMP area is highly degraded and comprises very few native species, the planting list includes additional sedges, rushes and other aquatic plant species that are tolerant of inundation.

### 7.2.2. Genetic Provenance

Plants used for revegetation are to be sourced from local provenance (within the local government area). Plants may be sourced from seed collections or cuttings from within the existing remnant vegetation within the subject land or from commercially attainable tube stock.

A qualified and experienced bushland regenerator is to be engaged for any native plant propagation works required. Appropriate permissions for any collections undertaken and appropriate licensing under the BC Act will need to be obtained for any seed collected from offsite areas; this will be the responsibility of the bushland regenerator engaged to undertake the works.

### 7.2.3. Final Plant Selection

It is recommended that a mix of local native trees, shrubs, and ground layer plants are replanted in the riparian corridor at the densities specified in **Section 7.4** below. Species selected for planting should be those that are characteristic of River-flat Eucalypt Forest. Characteristic species for this community are identified in **Table 7** in **Appendix C**.

Management Zone 2 will also consist of several sediment basins as shown in **(Figure 2)**. These should also be revegetated using species characteristic of RFEF found in **Table 7**, and according to the densities outlined in **Section 7.4**.

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. Site Preparation

Site preparation is to take place following primary weed control in Management Zone 2 to remove exotic grasses and other weeds.

Following weed removal and topsoil spreading within the riparian corridor, Management Zone 2 is to be mulched prior to planting with a well-decomposed wood chip or native leaf litter type mulch. Mulch should be applied to a depth of at least 75 mm. Mulch is only to be used within Management Zone 2 adjacent to the re-aligned watercourse and it not to be spread below the top of banks on either side of the channel to reduce the risk of mulch being washed downstream during heavy rainfall.

Supplementary erosion and sediment controls are to be installed where necessary. This will mitigate erosion of the exposed topsoil. Weed removal prior to planting is to be undertaken in a manner which does not cause excessive disturbance to the existing topsoil.

Temporary silt sediment fencing will be installed around the area to be revegetated, to prevent soil loss during rainfall.

### 7.4. Planting Densities

Typically, planting is undertaken at a low density for canopy trees, with higher densities for understorey shrubs and groundcovers. Planting of trees and shrubs will be limited to higher areas on the bank of the re-aligned stream to recreate riparian vegetation. In these areas. grasses should be planted in clumps with other groundcover species interspaced between the clumps.

As the VMP area includes the stream channel, planting will include higher densities of aquatic plants, sedges and rushes tolerant of waterlogging. These should be planted into all suitable gaps in the stream channel substrate.

An indicative planting density for the riparian corridor and sediment basins is provided in **Table 4**.

**Table 4 Indicative planting densities**

| Species                           | Planting Density                     | Suitable area                   |
|-----------------------------------|--------------------------------------|---------------------------------|
| Canopy trees                      | 1 unit per 10m <sup>2</sup>          | Higher bank areas               |
| Subcanopy trees/large shrubs      | 4 units per 10m <sup>2</sup>         | Higher bank areas               |
| Shrub layer                       | 5 units per 10m <sup>2</sup>         | Higher bank areas               |
| Sedges, rushes and aquatic plants | 5 units per m <sup>2</sup>           | Stream channel, sediment basins |
| Ground layer (grasses and forbs)  | 2 units per m <sup>2</sup> in clumps | Higher bank areas               |

### 7.5. Planting Technique

Planting of Hiko tubes for trees and shrub species and Hiko or Viro cells for grasses and other groundcover species is the preferred method. Planting should be done via a low impact method such as hand digging or

hand auger. The holes dug for each plant should be at least 1.5x the width and 2x the depth of the root ball. Fertiliser should be added to each hole dug as per the label specifications. Water crystals or wetting agents should be added to each plant hole. This will increase the water holding capacity of the soil and reduce watering schedules. Initial irrigation of the plantings is essential to ensure that the soil forms around the root ball and air pockets are removed. This will be required unless sufficient rainfall (approx. 10mm) occurs on the day of planting.

Tree guards will need to be installed on each tree or shrub to protect seedlings from extreme weather (frosts and heat), herbivorous grazing and herbicide drift during maintenance works. Bio-degradable tree guards are recommended to protect the seedlings. Following the revegetation works, irrigation needs to be undertaken for at least 8 weeks following planting to ensure the establishment of the plants. The level of irrigation will be determined by rainfall and temperature experienced at the planting site.

Mulch can be derived from vegetation removed from the development area, if available. Alternately, mulch should be comprised of un-composted wood (preferably wood waste), with a particle size of 15 mm to 40 mm, with no fines, and good air-filled porosity. Mulch should not contain any weed seeds, nor be derived from diseased trees or from any part of the tree lower than 1 m above the ground. Mulch, where required, should be installed to a depth of 100 mm.

Jute matting is to be installed in any areas of potential erosion i.e. steep creek banks. Jute matting, where required, must be comprised of 100% biodegradable jute fibres with a minimum weight of 680g/m<sup>2</sup> (~6 mm thickness). Jute must be pegged with at least 3 x 150 mm pins per m<sup>2</sup> and each roll overlapped by 100 mm.

## 7.6. Maintenance

After planting works have been completed, treated areas should be maintained by appropriately qualified personnel, selectively spot spraying and hand weeding around native plants, watering plants and replacing dead plants as needed. Maintenance work will also include actions to encourage native regeneration where it is not occurring naturally such as soil disturbance, niche seeding and transplanting. It is anticipated that maintenance of plantings will take place every three months together with the weed maintenance (see **Section 6.4.1**) for the duration of the VMP (5 years).

Provision should be made to irrigate areas, as required, in the first 3 months after installation, (on at least 4-5 occasions, depending on rainfall conditions, more watering if required). Note that a permit from the NSW Office of Water may be required to use water for watering-in newly installed plants.

Re-growing environmental weeds such as vines, woody trees and shrubs, broadleaf annuals and naturalised grasses should be closely monitored and controlled using ecologically sensitive bushland regeneration hand weeding and spot-spraying methods, to ensure adequate weed control and native plant establishment (refer to **Section 6.3**). Weeding inside each planting bag by hand or selective herbicides will be required, as well as in an approximate 50 cm radius around the outside of each plant and tree guard.

Plants that have died due to drought or pest and disease damage should be replaced as required. Plants that are observed to have died should be replaced by the bushland maintenance team with a planting of the same form.

# 8. Monitoring and Reporting

## 8.1. Responsibilities

It is recommended that a project manager/supervisor with the Bushland Regeneration Contractor be assigned to coordinate, supervise, and manage all works and correspondence with respect to the management of the VMP area. The consultant will be responsible for ensuring the measures outlined in this VMP are implemented and that plant stock is replaced, as needed. The project manager will become familiar with the VMP area and surrounds, and progress of all aspects of works undertaken.

The project manager will be responsible for allocation of maintenance tasks to personnel in response to ongoing monitoring results as well as reporting. Regular monitoring and feedback from personnel will assist in the allocation of labour relative to available funds.

## 8.2. Monitoring

A qualified bushland management or ecological consultant will carry out a program of regular monitoring of the implementation of the VMP. The monitoring program will be carried out for the duration of the VMP and a monitoring survey will be completed every six months for the five-year management period of the VMP.

General observations of the nature and condition of the VMP area along with the collection of quantitative data will be taken during each monitoring event. **Figure 6** identifies four indicative monitoring locations that should be marked with a star-picket or wooden stake. At each monitoring site the following data should be collected during each monitoring event:

- Photo reference points will be established at the northeast corner of the fixed monitoring site in the VMP area (**Figure 6**). A photograph shall be taken in all directions (north, east, south, west) at each photo reference point for a visual assessment of site progress;
- Estimates of the success rate of plantings and natural regeneration, and assessment of plant replacement requirements;
- Weed abundance and locations of significant weed infestations in the VMP area;
- Exotic to native understorey ratio; and
- Recommendations for corrective measures and/or vegetation management.

## 8.3. Reporting

A concise annual report will be prepared annually based on the findings of the two monitoring visits per year. The report will be prepared by the ecological consultant or bushland management consultant and forwarded to Penrith City Council (Council) for approval at the end of each yearly period for the duration of the VMP maintenance period (five years). A final report must be submitted to Council for approval at the end of the five-year period and will certify completion of the works.

Each annual report should:

- Describe the revegetation works undertaken;

- State the findings of the monitoring surveys;
- Discuss any problems encountered in implementing the VMP; and
- Recommend any adaptations or additions to the VMP.

The report will contain site photographs, as well as a short description of weeds in the VMP area and a short comparison to the photographs of previous years. Any other notable occurrences of weeds will also be reported. The report will also recommend and prioritise areas where weed control or revegetation should be targeted for the following maintenance period.

## 8.4. VMP Review

This VMP will be reviewed following the completion of each development stage and again after five years from completion of development works within the VMP area. The review is to be undertaken by an ecologist, and include a review of the effectiveness of the specified management measures. If the performance criteria (see **Table 5**) are not met within five years, the monitoring and maintenance works phases are to be extended until the performance targets are achieved. Alternate management actions for implementation are to be identified and implemented where relevant to the success of this VMP, in consultation with Council.

## 8.5. Timing and Responsibilities

This VMP covers work to be carried out on site over a five-year period, following the final stage of development for the project. The VMP area is to be managed in a series of phases as follows:

- Phase 1 – Site establishment and construction of proposed development;
- Phase 2 – Revegetation and weeding;
- Phase 3 – Maintenance; and
- Phase 4 – Monitoring and reporting.

These phases are detailed further in **Table 5** below.

Timing and responsibilities at each phase of management within the VMP area are shown within **Table 5** overleaf. This table identified the performance criteria for management activity and assigns each activity within each phase to those responsible.

**Table 5 Actions, responsibilities, performance criteria and timings of the VMP**

| Management                         | Action                                    | Responsibility      | Performance Criteria                          | Timing                                   |
|------------------------------------|---|---------------------|---|--|
| <b>Phase 1: Site Establishment</b> |   |                     |   |  |
| Extent of clearing boundary        | Installation of sediment/erosion controls | Site superintendent | Sediment/erosion controls have been installed | Prior to commencement of clearing works. |

| Management                               | Action   | Responsibility               | Performance Criteria   | Timing  |
|--|--|------------------------------|--|---|
| Extent of clearing boundary              | Delineation of clearing boundary   | Construction Contractor      | Temporary fencing has been installed around the perimeters of all clearance works.   | Prior to commencement of clearing works.                        |
| Extent of clearing boundary              | Vegetation Clearance   | Construction Contractor      | Vegetation removed following completion of pre-clearance surveys. Any habitat features salvaged have been placed within the VMP area.        | During construction works                                       |
| <b>Phase 2: Revegetation and Weeding</b> |  |                              |  |   |
| VMP area                                 | Primary weeding conducted across VMP Area  | Bush Regeneration Contractor | All woody weeds have been removed from VMP Area and all other weeds have been treated.   | First two months of works.                                      |
| VMP area                                 | Revegetation within Management Zone 2  | Bush Regeneration Contractor | Open spaces in Management Zone 2 have been planted to the specifications outlined in <b>Chapter 7</b> .                                      | Within first two months after initial weed treatment            |
| VMP Area                                 | Installation of permanent fencing and signage                                      | Construction Subcontractor   | Permanent fencing and signage has been installed around the boundaries of the VMP Area.  | Immediately upon establishment of VMP Area – within first month |
| VMP Area                                 | Fixed Point Monitoring   | Bush Regeneration Contractor | Photographs (4 total) of two (4) fixed monitoring sites to compare the survival and retention of plantings.                                  | Every 6 months for five-year maintenance period under the VMP   |
| VMP Area                                 | Carry out secondary weeding  | Bush Regeneration Contractor | No reproductively mature individuals present of priority weeds or woody weeds.<br>No priority weeds or woody weeds present > 10cm in height. | Following primary weeding, site visits quarterly                |
| <b>Phase 3: Maintenance</b>              |  |                              |  |   |
| VMP Area                                 | Carry out maintenance weeding (control of all weed species including annual weeds) | Bush Regeneration Contractor | Weed coverage targets (all weed species) achieved: less than 30% at end of first year; less than 20% at end of second year;                  | Quarterly for duration of maintenance period under BMP          |

| Management                               | Action                       | Responsibility                            | Performance Criteria   | Timing  |
|--|------------------------------|---|--|---|
|  | throughout management zones. |   | less than 15% at end of third year;<br>less than 10% at end of fourth year; and<br>less than 5% at end of fifth year.<br>No new weed species or infestations at end of each visit  |   |
| VMP Area                                 | Maintenance of plantings.    | Bush Regeneration Contractor              | No dead plantings remaining (each replaced with new planting)<br>Plants watered when drought stressed.<br>Additional plantings where required due to observed gaps in any strata.<br>Densities for each stratum will be as outlined in <b>Section 7.4.</b> | Quarterly for duration of maintenance period under VMP. |
| VMP area                                 | Rubbish removal              | Bush Regeneration Contractor              | All rubbish removed  | Quarterly for the 5-year maintenance period of the VMP. |
| <b>Phase 4: Monitoring and Reporting</b> |                              |   |  |   |
| VMP area                                 | Biannual inspection of site  | Bush Regeneration Contractor or Ecologist | Site inspection completed as outlined in <b>Chapter 8.</b>   | Biannually for the 5 year maintenance period            |
| VMP area                                 | Progress report preparation  | Bush Regeneration Contractor or Ecologist | Annual Report prepared on progress of VMP.   | Annually for the 5 year maintenance period              |

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# APPENDIX A :

## Flora Species List

**Table 6. All flora recorded during surveys**

| Scientific Name                  | Common Name                | Family                 | Origin |
|----------------------------------|----------------------------|------------------------|--------|
| <i>Acacia parramattensis</i>     | Parramatta Wattle          | Fabaceae (Mimosoideae) | Native |
| <i>Ailanthus altissima</i>       | Tree of Heaven             | Simaroubaceae          | Exotic |
| <i>Andropogon virginicus</i>     | Whisky Grass               | Poaceae                | Exotic |
| <i>Araujia sericifera</i>        | Moth Vine                  | Apocynaceae            | Exotic |
| <i>Arctotheca calendula</i>      | Capeweed                   | Asteraceae             | Exotic |
| <i>Artemisia absinthium</i>      | Wormwood                   | Asteraceae             | Exotic |
| <i>Aster subulatus</i>           | Wild Aster                 | Asteraceae             | Exotic |
| <i>Aster subulatus</i>           | Wild Aster                 | Asteraceae             | Exotic |
| <i>Avena barbata</i>             | Bearded Oats               | Poaceae                | Exotic |
| <i>Axonopus fissifolius</i>      | Narrow-leaved Carpet Grass | Poaceae                | Exotic |
| <i>Brassica fruticulosa</i>      | Twiggy Turnip              | Brassicaceae           | Exotic |
| <i>Briza subaristata</i>         |                            | Poaceae                | Exotic |
| <i>Bromus catharticus</i>        | Prairie Grass              | Poaceae                | Exotic |
| <i>Callistemon viminalis</i>     | Weeping Bottlebrush        | Myrtaceae              | Native |
| <i>Carex inversa</i>             | Knob Sedge                 | Cyperaceae             | Native |
| <i>Casuarina glauca</i>          | Swamp Oak                  | Casuarinaceae          | Native |
| <i>Cenchrus clandestinus</i>     | Kikuyu Grass               | Poaceae                | Exotic |
| <i>Cerastium glomeratum</i>      | Mouse-ear Chickweed        | Caryophyllaceae        | Exotic |
| <i>Chenopodium album</i>         | Fat Hen                    | Chenopodiaceae         | Exotic |
| <i>Chloris gayana</i>            | Rhodes Grass               | Poaceae                | Exotic |
| <i>Cirsium vulgare</i>           | Spear Thistle              | Asteraceae             | Exotic |
| <i>Citrus sinensis</i>           | Sour Orange                | Rutaceae               | Exotic |
| <i>Conyza bonariensis</i>        | Flaxleaf Fleabane          | Asteraceae             | Exotic |
| <i>Conyza sumatrensis</i>        | Tall fleabane              | Asteraceae             | Exotic |
| <i>Cotula coronopifolia</i>      | Water Buttons              | Asteraceae             | Exotic |
| <i>Cupressus macrocarpa</i>      | Monterey Cypress           | Cupressaceae           | Exotic |
| <i>Cyclospermum leptophyllum</i> | Slender Celery             | Apiaceae               | Exotic |
| <i>Cynodon dactylon</i>          | Common Couch               | Poaceae                | Native |
| <i>Ehrharta erecta</i>           | Panic Veldtgrass           | Poaceae                | Exotic |
| <i>Eragrostis curvula</i>        | African Lovegrass          | Poaceae                | Exotic |
| <i>Eucalyptus amplifolia</i>     | Cabbage Gum                | Myrtaceae              | Native |
| <i>Ficus carica</i>              | Common Fig                 | Moraceae               | Exotic |
| <i>Foeniculum vulgare</i>        | Fennel                     | Apiaceae               | Exotic |
| <i>Galium aparine</i>            | Goosegrass                 | Rubiaceae              | Exotic |

| Scientific Name                      | Common Name                             | Family               | Origin |
|--------------------------------------|---|----------------------|--------|
| <i>Gamochaeta americana</i>          | Purple Cudweed                          | Asteraceae           | Exotic |
| <i>Grevillea robusta</i>             | Silky Oak                               | Proteaceae           | Native |
| <i>Hypochaeris albiflora</i>         | White Flatweed                          | Asteraceae           | Exotic |
| <i>Hypochaeris radicata</i>          | Catsear                                 | Asteraceae           | Exotic |
| <i>Juncus bufonius</i>               | Toad Rush                               | Juncaceae            | Exotic |
| <i>Juncus usitatus</i>               | Common Rush                             | Juncaceae            | Native |
| <i>Lachnagrostis filiformis</i>      | Blown Grass                             | Poaceae              | Native |
| <i>Lactuca serriola</i>              | Prickly Lettuce                         | Asteraceae           | Exotic |
| <i>Lepidium bonariense</i>           | Argentine Peppergrass                   | Brassicaceae         | Exotic |
| <i>Ligustrum lucidum</i>             | Large-leaved Privet                     | Oleaceae             | Exotic |
| <i>Lolium perenne</i>                | Perennial Ryegrass                      | Poaceae              | Exotic |
| <i>Lolium rigidum</i>                | Wimmera Ryegrass                        | Poaceae              | Exotic |
| <i>Lotus uliginosus</i>              | Birds-foot Trefoil                      | Fabaceae (Faboideae) | Exotic |
| <i>Lysimachia arvensis</i>           | Scarlet Pimpernel                       | Primulaceae          | Exotic |
| <i>Lythrum hyssopifolia</i>          | Hyssop Loosestrife                      | Lythraceae           | Native |
| <i>Medicago polymorpha</i>           | Burr Medic                              | Fabaceae (Faboideae) | Exotic |
| <i>Megathyrsus maximus</i>           |   | Poaceae              | Exotic |
| <i>Mentha spicata</i>                | Spearmint                               | Lamiaceae            | Exotic |
| <i>Modiola caroliniana</i>           | Red-flowered Mallow                     | Malvaceae            | Exotic |
| <i>Morus alba</i>                    | White Mulberry                          | Moraceae             | Exotic |
| <i>Nothoscordum gracile</i>          | Onion Weed                              | Alliaceae            | Exotic |
| <i>Olea europaea subsp. europaea</i> | Olive                                   | Oleaceae             | Exotic |
| <i>Opuntia stricta</i>               | Common Prickly Pear                     | Cactaceae            | Exotic |
| <i>Oxalis corniculata</i>            | Creeping Oxalis                         | Oxalidaceae          | Exotic |
| <i>Oxalis perennans</i>              |   | Oxalidaceae          | Native |
| <i>Paronychia brasiliensis</i>       | Chilean Whitlow Wort, Brazilian Whitlow | Caryophyllaceae      | Exotic |
| <i>Paspalum dilatatum</i>            | Paspalum                                | Poaceae              | Exotic |
| <i>Persicaria decipiens</i>          | Slender Knotweed                        | Polygonaceae         | Native |
| <i>Pinus radiata</i>                 | Radiata Pine                            | Pinaceae             | Exotic |
| <i>Plantago lanceolata</i>           | Lamb's Tongues                          | Plantaginaceae       | Exotic |
| <i>Plantago myosuroides</i>          |   | Plantaginaceae       | Exotic |
| <i>Platanus x acerifolia</i>         | Hybrid Plane                            | Platanaceae          | Exotic |
| <i>Poa annua</i>                     | Winter Grass                            | Poaceae              | Exotic |
| <i>Polycarpon tetraphyllum</i>       | Four-leaved Allseed                     | Caryophyllaceae      | Exotic |
| <i>Polygonum aviculare</i>           | Wireweed                                | Polygonaceae         | Exotic |

| Scientific Name                   | Common Name            | Family               | Origin |
|-----------------------------------|------------------------|----------------------|--------|
| <i>Prunus persica</i>             |                        | Rosaceae             | Exotic |
| <i>Ranunculus sceleratus</i>      | Celery Buttercup       | Ranunculaceae        | Exotic |
| <i>Rubus fruticosus</i> spp. agg. | Blackberry complex     | Rosaceae             | Exotic |
| <i>Rumex brownii</i>              | Swamp Dock             | Polygonaceae         | Native |
| <i>Rumex crispus</i>              | Curled Dock            | Polygonaceae         | Exotic |
| <i>Senecio madagascariensis</i>   | Fireweed               | Asteraceae           | Exotic |
| <i>Sida rhombifolia</i>           | Paddy's Lucerne        | Malvaceae            | Exotic |
| <i>Solanum sisymbriifolium</i>    | Sticky Nightshade      | Solanaceae           | Exotic |
| <i>Sonchus asper</i>              | Prickly Sowthistle     | Asteraceae           | Exotic |
| <i>Sonchus oleraceus</i>          | Common Sowthistle      | Asteraceae           | Exotic |
| <i>Spergularia rubra</i>          | Sandspurry             | Caryophyllaceae      | Exotic |
| <i>Sporobolus fertilis</i>        | Giant Parramatta Grass | Poaceae              | Exotic |
| <i>Stachys arvensis</i>           | Stagger Weed           | Lamiaceae            | Exotic |
| <i>Taraxacum officinale</i>       | Dandelion              | Asteraceae           | Exotic |
| <i>Tragopogon porrifolius</i>     | Salsify                | Asteraceae           | Exotic |
| <i>Trifolium repens</i>           | White Clover           | Fabaceae (Faboideae) | Exotic |
| <i>Typha orientalis</i>           | Broad-leaved Cumbungi  | Typhaceae            | Native |
| <i>Verbena bonariensis</i>        | Purpletop              | Verbenaceae          | Exotic |
| <i>Veronica persica</i>           | Creeping Speedwell     | Plantaginaceae       | Exotic |
| <i>Vicia sativa</i>               | Common vetch           | Fabaceae (Faboideae) | Exotic |
| <i>Vitis vinifera</i>             | Grape Vine             | Vitaceae             | Exotic |
| <i>Wahlenbergia gracilentia</i>   | Annual Bluebell        | Campanulaceae        | Native |
| <i>Zantedeschia aethiopica</i>    | Arum Lily              | Araceae              | Exotic |

# APPENDIX B :

## Weed Control Measures



## B.1. Weed Control

Weed control involves a combination of mechanical, physical and chemical techniques to remove weeds and prevent regrowth. Weed control will be undertaken across the entire VMP area. The best suited weed control methods depends on a number of factors including:

- The species or combination of weeds being targeted;
- The density of the weeds;
- Resources available (time, labour, equipment and finances); and
- Weather conditions of the day

## B.2. Weed Control Techniques

General management techniques for different types of weeds that may occur within the VMP area are provided below and specific control techniques for commonly occurring weeds are provided in **Table 6**.

### B.2.1. Annual Grasses

Annual grasses should be hand removed or spot sprayed where isolated or in low concentrations. Larger patches of annual grasses may be slashed/brush cut in late spring to early summer, after flowering, but prior to seed set. For most species, slashing/brush cutting prior to late spring through to early summer will promote vigorous growth and should not occur. However, some annual grasses can grow and produce seed at any time of the year dependent on climatic conditions such as high rainfall and warm temperatures. Monitoring of annual species should be undertaken and if new growth occurs, the same treatment will be applied to the new growth to prevent seed production. Individual plants should be hand removed, bagged and disposed of appropriately offsite.

### B.2.2. Perennial Grasses

Perennial grasses, such as *Cynodon dactylon* (Common Couch), *Paspalum dilatatum* (Paspalum), and *Cenchrus clandestinum* (Kikuyu Grass) will be hand removed where isolated or in low concentrations. Larger patches may be slashed prior to seed production in spring or summer (depending on the growth cycle of the species) and the regrowth spot-sprayed 2-3 weeks later when it is actively growing and approximately 10 cm in length. Monitoring of these species will occur and if new seed production occurs, the same treatment will be applied again as required. However, slashing will not reduce the presence of exotic grasses on its own and must always be combined with targeted removal to reduce densities and allow for native regeneration. Individual plants should be hand removed, bagged and disposed of appropriately offsite.

### B.2.3. Woody Weeds

Follow up treatment of woody weeds will be by the cut and paint or drill and fill method using a non-selective herbicide. The most appropriate method to be used depends on the size of the individual to be removed and will be determined by the bush regeneration contractor. Primary weed control should use techniques that will not encourage flushes of secondary weed growth. All seedlings of woody weeds will be hand pulled or spot-sprayed with a non-selective herbicide.

## B.2.4. Creepers and Climbers

The control of vines, creepers and climbers, varies depending on the species. For the most part, seedlings will be hand pulled, while mature plants can be controlled by the stem-scrape method or spot spraying using a non-selective herbicide. The precise method to be used will be determined by the bush regeneration contractor depending on the species, size and reproductive status of the individual. All vegetative material removed should be bagged, removed from site and disposed of appropriately.

## B.2.5. Herbaceous Weeds

Where individual plants of herbaceous weeds, such as *Senecio madagascariensis* (Fireweed), *Solanum* sp. and *Bidens pilosa* (Cobbler's Peg) are found, they will be hand pulled prior to flowering. Where large swaths of these species occur, they will be sprayed using a non-selective herbicide. If high densities of mature stands occur, weeds may be slashed first using a brush cutter and any subsequent regrowth sprayed. Regular monitoring of these species will be required to prevent seed production. *Cirsium vulgare* (Spear Thistle) will not be hand-pulled due to its thorns and instead will be treated using cut and paint methods or spot sprayed for larger infestations using a non-selective herbicide. All vegetative material that is pulled out and has the potential to regrow if deposited on ground will be bagged and removed from site.

**Table 6 Weed control measures**

| Scientific Name              | Common Name     | Family        | Treatment Methods  |
|------------------------------|-----------------|---------------|--|
| <i>Ailanthus altissima</i>   | Tree of Heaven  | Simaroubaceae | - Mildly poisonous, wear protective clothing<br>- Hand weed seedlings or spray with glyphosate 10mL/1L<br>- Cut larger individuals/trees to ground level with hand saw or chainsaw and apply undiluted glyphosate to cut stump                             |
| <i>Andropogon virginicus</i> | Whisky Grass    | Poaceae       | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Araujia sericifera</i>    | Moth Vine       | Apocynaceae   | - Hand Weed Juveniles<br>- Spray juveniles with glyphosate 10mL/1L<br>- Skirt mature vines (cut through plant close to root) and then pull root manually or apply undiluted glyphosate to cut surface<br>- Scrape and paint vine with undiluted glyphosate |
| <i>Arctotheca calendula</i>  | Cape Weed       | Asteraceae    | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Artemisia absinthium</i>  | Common Wormwood | Asteraceae    | - Hand Weed  |
| <i>Aster subulatus</i>       | Wild Aster      | Asteraceae    | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |

| Scientific Name              | Common Name           | Family          | Treatment Methods  |
|------------------------------|-----------------------|-----------------|--|
| <i>Avena barbata</i>         | Bearded Oats          | Poaceae         | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Axonopus fissifolius</i>  | Carpet Grass          | Poaceae         | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Brassica fruticulosa</i>  | Twiggy Turnip         | Brassicaceae    | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Briza subaristata</i>     | Chilean Quaking Grass | Poaceae         | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Bromus catharticus</i>    | Brome Grass           | Poaceae         | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Cenchrus clandestinus</i> | Kikuyu                | Poaceae         | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Cerastium glomeratum</i>  | Mouse-ear Chickweed   | Caryophyllaceae | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Chenopodium album</i>     | Fat Hen               | Chenopodiaceae  | - Hand weed after elongation and before seeding in summer - Fat 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 off – Biological controls have been reported |

| Scientific Name                  | Common Name       | Family       | Treatment Methods   |
|----------------------------------|-------------------|--------------|---|
| <i>Chloris gayana</i>            | Rhodes Grass      | Poaceae      | <ul style="list-style-type: none"> <li>- Hand weed juveniles</li> <li>- Remove carefully with secateurs and bag seed plumes of mature plants</li> <li>- Dig mature plants out of the ground with a mattock; or</li> <li>- Brushcut mature plants to near ground level and spray with glyphosate 10mL/1L - During subsequent site visits spray regrowth foliage with glyphosate 10mL/1L</li> </ul>   |
| <i>Cirsium vulgare</i>           | Spear Thistle     | Asteraceae   | <ul style="list-style-type: none"> <li>- Hand Weed juveniles - Spot Spray - Glyphosate 10mL/1L</li> </ul>   |
| <i>Citrus sinensis</i>           | Sweet Orange      | Rutaceae     | <ul style="list-style-type: none"> <li>- Hand Weed</li> </ul>   |
| <i>Conyza bonariensis</i>        | Flaxleaf Fleabane | Asteraceae   | <ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>  |
| <i>Conyza sumatrensis</i>        | Tall Fleabane     | Asteraceae   | <ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L - On-going grubbing (all year)</li> </ul>   |
| <i>Cotula coronopifolia</i>      | Water Buttons     | Asteraceae   | <ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>  |
| <i>Cupressus macrocarpa</i>      | Monterey cypress  | Cupressaceae | <ul style="list-style-type: none"> <li>- Hand Weed</li> </ul>   |
| <i>Cyclospermum leptophyllum</i> | Slender Celery    | Apiaceae     | <ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>  |
| <i>Ehrharta erecta</i>           | Panic Veldtgrass  | Poaceae      | <ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>  |
| <i>Eragrostis curvula</i>        | African Lovegrass | Poaceae      | <ul style="list-style-type: none"> <li>- Any seed heads present on mature individuals should be cut from plants with secateurs and bagged and removed from site</li> <li>- Dig large individuals out with a mattock</li> <li>- Juvenile individuals can be dug out using hand tools or spot sprayed using glyphosate 10mL/1L</li> <li>- 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</li> <li>- Spot spraying the herbicide Flupropanate (745g/L formulation) at 3mL/1L concentration (as per label) is effective at eradicating African Lovegrass and will kill</li> </ul> |

| Scientific Name     | Common Name | Family   | Treatment Methods  |
|---------------------|-------------|----------|--|
|                     |             |          | <p>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 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 <i>Microlaena stipoides</i> and <i>Themeda australis</i> 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 (&gt; 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 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).</p> |
| <i>Ficus carica</i> | Fig         | Moraceae | - Hand Weed  |

| Scientific Name              | Common Name         | Family       | Treatment Methods   |
|------------------------------|---------------------|--------------|---|
| <i>Foeniculum vulgare</i>    | Fennel              | Apiaceae     | <ul style="list-style-type: none"> <li>- Hand weed or spot spray juveniles with glyphosate 15mL/L or metsulfuron methyl 7 g/100 L + non-ionic surfactant</li> <li>- Tall, mature individuals can be removed with a mattock, with care taken to sever the tap root as deep below ground as possible</li> <li>- Spot spray mature individuals and regrowth with glyphosate 15mL/L or metsulfuron methyl 7 g/100 L + non-ionic surfactant</li> <li>- Care needs to be taken to prevent damage to native vegetation when spraying tall individuals</li> </ul>                         |
| <i>Galium aparine</i>        | Goosegrass          | Rubiaceae    | <ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>  |
| <i>Gamochaeta americana</i>  | Cudweed             | Asteraceae   | <ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>  |
| <i>Hypochaeris albiflora</i> | White Flatweed      | Asteraceae   | <ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>  |
| <i>Hypochaeris radicata</i>  | Catsear             | Asteraceae   | <ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>  |
| <i>Juncus bufonius</i>       |                     | Juncaceae    | <ul style="list-style-type: none"> <li>- Hand Weed</li> </ul>   |
| <i>Lactuca serriola</i>      | Prickly Lettuce     | Asteraceae   | <ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>  |
| <i>Lepidium bonariense</i>   |                     | Brassicaceae | <ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>  |
| <i>Ligustrum lucidum</i>     | Large-leaved Privet | Oleaceae     | <ul style="list-style-type: none"> <li>- Hand weed juveniles</li> <li>- Drill holes with power drill with thick drill bit into mature trees, around base of trunk and fill holes with undiluted glyphosate. Once glyphosate has been absorbed refill holes with undiluted glyphosate several times.</li> <li>- Cut shrub and mature individuals as close to ground as possible with loppers or hand saw (or chainsaw) and treat stump with undiluted glyphosate</li> <li>- Spray juveniles and regrowth foliage of cut and painted individuals with glyphosate 10mL/1L</li> </ul> |
| <i>Lolium perenne</i>        | Perennial Ryegrass  | Poaceae      | <ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>  |
| <i>Lolium rigidum</i>        | Wimmera Grass       | Poaceae      | <ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>  |

| Scientific Name             | Common Name                 | Family               | Treatment Methods   |
|-----------------------------|-----------------------------|----------------------|---|
| <i>Lotus uliginosus</i>     | Greater Bird's Foot Trefoil | Fabaceae (Faboideae) | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L  |
| <i>Lysimachia arvensis</i>  | Scarlet Pimpernel           | Primulaceae          | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L  |
| <i>Medicago polymorpha</i>  | Burr Medic                  | Fabaceae (Faboideae) | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L  |
| <i>Megathyrus maximus</i>   | Guinea Grass                | Poaceae              | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L  |
| <i>Mentha spicata</i>       | Spearmint                   | Lamiaceae            | - Hand Weed   |
| <i>Modiola caroliniana</i>  | Red-flowered Mallow         | Malvaceae            | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L  |
| <i>Morus alba</i>           | White Mulberry              | Moraceae             | - Hand weed seedlings or spray with glyphosate 10mL/1L<br>- Cut larger individuals/trees to ground level with hand saw or chainsaw and apply undiluted glyphosate to cut stump  |
| <i>Nothoscordum gracile</i> | Onion Weed                  | Alliaceae            | - Can be extremely difficult to control due to numerous bulbils sprouting from main bulb which break off underground and form new plants<br>- The plant can be dug out carefully with hand tools; an effort must be made to carefully remove and bag all bulbils formed around the main bulb.<br>- Follow up hand weeding for many months is required to remove juvenile plants; control is easier if juvenile plants are carefully dug out, taking care to bag and remove bulbs, before bulbils have formed<br>- Spray with 10mL/1L glyphosate every month; adult plants may take several months to die back. Repeat monthly to control sprouting juvenile plants.<br>- Wipe leaves of plants with undiluted glyphosate monthly, without missing juvenile sprouting plants. This can be nearly as time consuming as hand digging plants out<br>- Any flowering stem should be cut and bagged, along with any head with seed. |

| Scientific Name                             | Common Name          | Family           | Treatment Methods   |
|---|----------------------|------------------|---|
| <i>Olea europaea</i> subsp. <i>europaea</i> | European Olive       | Oleaceae         | <ul style="list-style-type: none"> <li>- Spray juveniles with glyphosate 10mL/1L</li> <li>- 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)</li> <li>- 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 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</li> </ul>  |
| <i>Opuntia stricta</i>                      | Common Prickly Pear  | Cactaceae        | <ul style="list-style-type: none"> <li>- 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</li> <li>- 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</li> <li>- As the plant reproduces vegetatively the entirety of the plant must be bagged 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.</li> </ul> |
| <i>Oxalis corniculata</i>                   | Yellow Sorrel        | Wood Oxalidaceae | <ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>  |
| <i>Paronychia brasiliiana</i>               | Chilean Whitlow Wort | Caryophyllaceae  | <ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>  |
| <i>Paspalum dilatatum</i>                   | Dallisgrass          | Poaceae          | <ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>  |

| Scientific Name                   | Common Name  | Family          | Treatment Methods  |
|-----------------------------------|--|-----------------|--|
| <i>Pinus radiata</i>              | Radiata Pine   | Pinaceae        | - Drill and inject medium and small trees with herbicide - Hand weed seedlings or spray with glyphosate 10mL/1L - Glyphosate 75% v/v for stem injections. Undiluted for cut stump treatments.<br>- 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 |
| <i>Plantago lanceolata</i>        | Lamb's Tongues   | Plantaginaceae  | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Plantago myosuros</i>          |  | Plantaginaceae  | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Platanus x acerifolia</i>      | London Plane   | Plantaginaceae  | - Hand Weed  |
| <i>Poa annua</i>                  | Winter Grass   | Poaceae         | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Polycarpon tetraphyllum</i>    | Four-leaved Allseed  | Caryophyllaceae | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Polygonum aviculare</i>        | Wireweed   | Polygonaceae    | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Prunus persica</i>             | Peach  | Rosaceae        | - Hand Weed  |
| <i>Ranunculus sceleratus</i>      | Celery-leaved buttercup  | Ranunculaceae   | - Hand Weed  |
| <i>Rubus fruticosus</i> spp. agg. | Blackberry - Blackberry except the varietals Chester Thornless, Dirksen Thornless, Loch Ness, Silvan, Black Satin, Murrindindi, Smooth Stem, Thornfree and Chehalem. | Rosaceae        | - It is possible to spray with 10mL/1L glyphosate however it will leave dangerous thorned stems<br>- Wearing thick clothing and leather glove uses loppers to cut close to base and apply undiluted glyphosate to cut stems (remove cut foliage and stems cautiously)<br>- Spray regrowth foliage with glyphosate 10mL/1L  |
| <i>Rumex crispus</i>              | Curled Dock  | Polygonaceae    | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Senecio madagascariensis</i>   | Fireweed   | Asteraceae      | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |

| Scientific Name                | Common Name            | Family               | Treatment Methods  |
|--------------------------------|------------------------|----------------------|--|
| <i>Sida rhombifolia</i>        | Paddy's Lucerne        | Malvaceae            | - Hand weed<br>- Spray with glyphosate 10mL/1L<br>- Cut large, firmly rooted individuals at the base with secateurs and paint with undiluted glyphosate                      |
| <i>Solanum sisymbriifolium</i> | Sticky Nightshade      | Solanaceae           | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L - Remove all fruit and seeds  |
| <i>Sonchus asper</i>           | Sow Thistle            | Asteraceae           | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Sonchus oleraceus</i>       | Milk Thistle           | Asteraceae           | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Spergularia rubra</i>       | Sandspurry             | Caryophyllaceae      | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Sporobolus fertilis</i>     | Giant Parramatta Grass | Poaceae              | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Stachys arvensis</i>        | Stagger Weed           | Lamiaceae            | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Taraxacum officinale</i>    | Dandelion              | Asteraceae           | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Tragopogon porrifolius</i>  | Salsify                | Asteraceae           | - Hand Weed  |
| <i>Trifolium repens</i>        | White Clover           | Fabaceae (Faboideae) | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Verbena bonariensis</i>     | Purple Top             | Verbenaceae          | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Veronica persica</i>        | Persian Speedwell      | Plantaginaceae       | - Hand Weed  |
| <i>Vicia sativa</i>            | Common Vetch           | Fabaceae (Faboideae) | - Hand Weed<br>- Spot Spray - Glyphosate 10mL/1L   |
| <i>Vitis vinifera</i>          | Common Grape Vine      | Vitaceae             | - Hand Weed  |
| <i>Zantedeschia aethiopica</i> | Arum Lily              | Araceae              | - Hand weed - Spray regrowth seedlings with glyphosate 10mL/1L - Dig out with hand tools - Care needs to be taken to remove the established root system in established plant |

### B.3. Management of Weed Waste

All weed propagules, especially priority weeds, will be bagged and disposed of as directed by legislation at facility licensed to receive green waste. All weed waste without propagules will be composted onsite.

### B.4. Herbicide Use

The use of herbicide to control weeds should be carefully considered. Herbicide must only be used for the purpose described on the product label, as per the NSW *Pesticides Act 1999*. Herbicide use should assess potential long-term impacts of the technique, including whether the proposed works address the source of the weed infestation. However, herbicide application forms an important and useful component of an integrated weed management approach and can be the most appropriate method for the control and eventual eradications of some weed species.

Herbicide use should occur during the active growing season for plants to encourage the chemical uptake into the plant. The selection of herbicides should also consider the type of weed and the location. Where non-selective herbicides are required for use, glyphosate is the most suitable. A glyphosate-based herbicide, formulated for use near waterways, will be used if works require herbicide application near waterways, a (e.g. Roundup Biactive®).

Broad-leaf selective herbicide may be used as per the NSW Weed Control Handbook (DPI 2018). However, this type of herbicide is extremely toxic to aquatic life and must not be used in, or adjacent to, waterways.

Registration and records must be kept in accordance with the NSW *Pesticides Regulation 2017*.

# APPENDIX C :

## Species Planting List

## C.1. River-Flat Eucalypt Forest Species Planting List

As identified in the Final Determination for the community (NSW Scientific Committee 2011), River-flat Eucalypt Forest is characterised by the assemblage of species listed below in **Table 7**. The species selected for revegetation of the VMP area should be selected from this table.

**Table 7 River-flat Eucalypt Forest species planting list**

| Scientific Name                           | Common Name                 | Family                    | Growth Form |
|---|-----------------------------|---------------------------|-------------|
| <i>Casuarina glauca</i>                   | Swamp Oak                   | Casuarinaceae             | Tree        |
| <i>Acacia decurrens</i>                   | Black Wattle                | Fabaceae<br>(Mimosoideae) | Tree        |
| <i>Angophora floribunda</i>               | Rough-barked Apple          | Myrtaceae                 | Tree        |
| <i>Eucalyptus amplifolia</i>              | Cabbage Gum                 | Myrtaceae                 | Tree        |
| <i>Eucalyptus baueriana</i>               | Blue Box                    | Myrtaceae                 | Tree        |
| <i>Eucalyptus crebra</i>                  | Narrow-leaved Ironbark      | Myrtaceae                 | Tree        |
| <i>Eucalyptus moluccana</i>               | Grey Box                    | Myrtaceae                 | Tree        |
| <i>Eucalyptus saligna</i>                 | Sydney Blue Gum             | Myrtaceae                 | Tree        |
| <i>Eucalyptus tereticornis</i>            | Forest Red Gum              | Myrtaceae                 | Tree        |
| <i>Notelaea longifolia</i>                | Large Mock-olive            | Oleaceae                  | Tree        |
| <i>Polyscias sambucifolia</i>             | Elderberry Panax            | Araliaceae                | Shrub       |
| <i>Calotis dentex</i>                     | Burr-daisy                  | Asteraceae                | Shrub       |
| <i>Ozothamnus diosmifolius</i>            | White Dogwood               | Asteraceae                | Shrub       |
| <i>Maytenus silvestris</i>                | Narrow-leaved<br>Orangebark | Celastraceae              | Shrub       |
| <i>Hibbertia diffusa</i>                  | Wedge Guinea Flower         | Dilleniaceae              | Shrub       |
| <i>Leucopogon juniperinus</i>             | Prickly Beard-heath         | Ericaceae                 | Shrub       |
| <i>Jacksonia scoparia</i>                 | Dogwood                     | Fabaceae (Faboideae)      | Shrub       |
| <i>Melaleuca decora</i>                   |                             | Myrtaceae                 | Shrub       |
| <i>Melaleuca nodosa</i>                   |                             | Myrtaceae                 | Shrub       |
| <i>Melaleuca styphelioides</i>            | Prickly-leaved Tea Tree     | Myrtaceae                 | Shrub       |
| <i>Breynia oblongifolia</i>               | Coffee Bush                 | Phyllanthaceae            | Shrub       |
| <i>Bursaria spinosa</i>                   | Native Blackthorn           | Pittosporaceae            | Shrub       |
| <i>Pittosporum undulatum</i>              | Sweet Pittosporum           | Pittosporaceae            | Shrub       |
| <i>Persoonia linearis</i>                 | Narrow-leaved Geebung       | Proteaceae                | Shrub       |
| <i>Exocarpos cupressiformis</i>           | Cherry Ballart              | Santalaceae               | Shrub       |
| <i>Trema tomentosa</i> var. <i>aspera</i> | Native Peach                | Ulmaceae                  | Shrub       |
| <i>Tylophora barbata</i>                  | Bearded Tylophora           | Apocynaceae               | Other       |

| Scientific Name                                   | Common Name                 | Family               | Growth Form       |
|---|-----------------------------|----------------------|-------------------|
| <i>Desmodium varians</i>                          | Slender Tick-trefoil        | Fabaceae (Faboideae) | Other             |
| <i>Glycine clandestina</i>                        | Twining glycine             | Fabaceae (Faboideae) | Other             |
| <i>Glycine microphylla</i>                        | Small-leaf Glycine          | Fabaceae (Faboideae) | Other             |
| <i>Glycine tabacina</i>                           | Variable Glycine            | Fabaceae (Faboideae) | Other             |
| <i>Cassytha pubescens</i>                         | Downy Dodder-laurel         | Lauraceae            | Other             |
| <i>Billardiera scandens</i>                       | Hairy Apple Berry           | Pittosporaceae       | Other             |
| <i>Clematis glycinoides</i>                       | Headache Vine               | Ranunculaceae        | Other             |
| <i>Cayratia clematidea</i>                        | Native Grape                | Vitaceae             | Other             |
| <i>Cyperus laevigatus</i>                         |                             | Cyperaceae           | Grass & Grasslike |
| <i>Gahnia aspera</i>                              | Rough Saw-sedge             | Cyperaceae           | Grass & Grasslike |
| <i>Juncus usitatus</i>                            |                             | Juncaceae            | Grass & Grasslike |
| <i>Lomandra longifolia</i>                        | Spiny-headed Mat-rush       | Lomandraceae         | Grass & Grasslike |
| <i>Lomandra multiflora</i>                        | Many-flowered Mat-rush      | Lomandraceae         | Grass & Grasslike |
| <i>Cymbopogon refractus</i>                       | Barbed Wire Grass           | Poaceae              | Grass & Grasslike |
| <i>Dichelachne micrantha</i>                      | Shorthair Plumegrass        | Poaceae              | Grass & Grasslike |
| <i>Digitaria parviflora</i>                       | Small-flowered Finger Grass | Poaceae              | Grass & Grasslike |
| <i>Echinopogon ovatus</i>                         | Forest Hedgehog Grass       | Poaceae              | Grass & Grasslike |
| <i>Entolasia marginata</i>                        | Bordered Panic              | Poaceae              | Grass & Grasslike |
| <i>Eragrostis leptocarpa</i>                      | Drooping Lovegrass          | Poaceae              | Grass & Grasslike |
| <i>Imperata cylindrica</i> var. <i>major</i>      | Blady Grass                 | Poaceae              | Grass & Grasslike |
| <i>Microlaena stipoides</i> var. <i>stipoides</i> | Weeping Grass               | Poaceae              | Grass & Grasslike |
| <i>Oplismenus aemulus</i>                         |                             | Poaceae              | Grass & Grasslike |
| <i>Paspalidium distans</i>                        |                             | Poaceae              | Grass & Grasslike |

| Scientific Name                  | Common Name          | Family         | Growth Form       |
|----------------------------------|----------------------|----------------|-------------------|
| <i>Rytidosperma tenuius</i>      |                      | Poaceae        | Grass & Grasslike |
| <i>Brunoniella australis</i>     | Blue Trumpet         | Acanthaceae    | Forb              |
| <i>Pseuderanthemum variabile</i> | Pastel Flower        | Acanthaceae    | Forb              |
| <i>Arthropodium milleflorum</i>  | Pale Vanilla-lily    | Anthericaceae  | Forb              |
| <i>Centella asiatica</i>         | Indian Pennywort     | Apiaceae       | Forb              |
| <i>Hydrocotyle peduncularis</i>  |                      | Apiaceae       | Forb              |
| <i>Pratia purpurascens</i>       | Whiteroot            | Campanulaceae  | Forb              |
| <i>Wahlenbergia gracilis</i>     | Sprawling Bluebell   | Campanulaceae  | Forb              |
| <i>Einadia hastata</i>           | Berry Saltbush       | Chenopodiaceae | Forb              |
| <i>Einadia trigonos</i>          | Fishweed             | Chenopodiaceae | Forb              |
| <i>Hypericum gramineum</i>       | Small St John's Wort | Clusiaceae     | Forb              |
| <i>Commelina cyanea</i>          | Native Wandering Jew | Commelinaceae  | Forb              |
| <i>Dichondra repens</i>          | Kidney Weed          | Convolvulaceae | Forb              |
| <i>Plectranthus parviflorus</i>  |                      | Lamiaceae      | Forb              |
| <i>Oxalis exilis</i>             |                      | Oxalidaceae    | Forb              |
| <i>Oxalis perennans</i>          |                      | Oxalidaceae    | Forb              |
| <i>Dianella longifolia</i>       | Blueberry Lily       | Phormiaceae    | Forb              |
| <i>Dianella revoluta</i>         | Blueberry Lily       | Phormiaceae    | Forb              |
| <i>Poranthera microphylla</i>    | Small Poranthera     | Phyllanthaceae | Forb              |
| <i>Veronica plebeia</i>          | Trailing Speedwell   | Plantaginaceae | Forb              |
| <i>Galium propinquum</i>         | Maori Bedstraw       | Rubiaceae      | Forb              |
| <i>Solanum prinophyllum</i>      | Forest Nightshade    | Solanaceae     | Forb              |
| <i>Adiantum aethiopicum</i>      | Common Maidenhair    | Pteridaceae    | Fern              |
| <i>Cheilanthes sieberi</i>       | Rock Fern            | Pteridaceae    | Fern              |

# FIGURES



- Legend**
- VMP Area
  - Subject Land
  - Watercourse**
  - 2nd Order Stream

Image Source:  
Image © Nearmap (2024)  
Dated: 25/1/2024



Coordinate System: MGA Zone 56 (GDA 94)

cumberland  
ecology

0 50 100 150 m

Figure 1. Location of the subject land and VMP area





Figure 3. Field survey effort



# Legend

 VMP Area

 Subject Land

## Plant Community Type

 PCT 835: River-flat Eucalypt Forest

Image Source:  
Image © Nearmap (2024)  
Dated: 25/1/2024

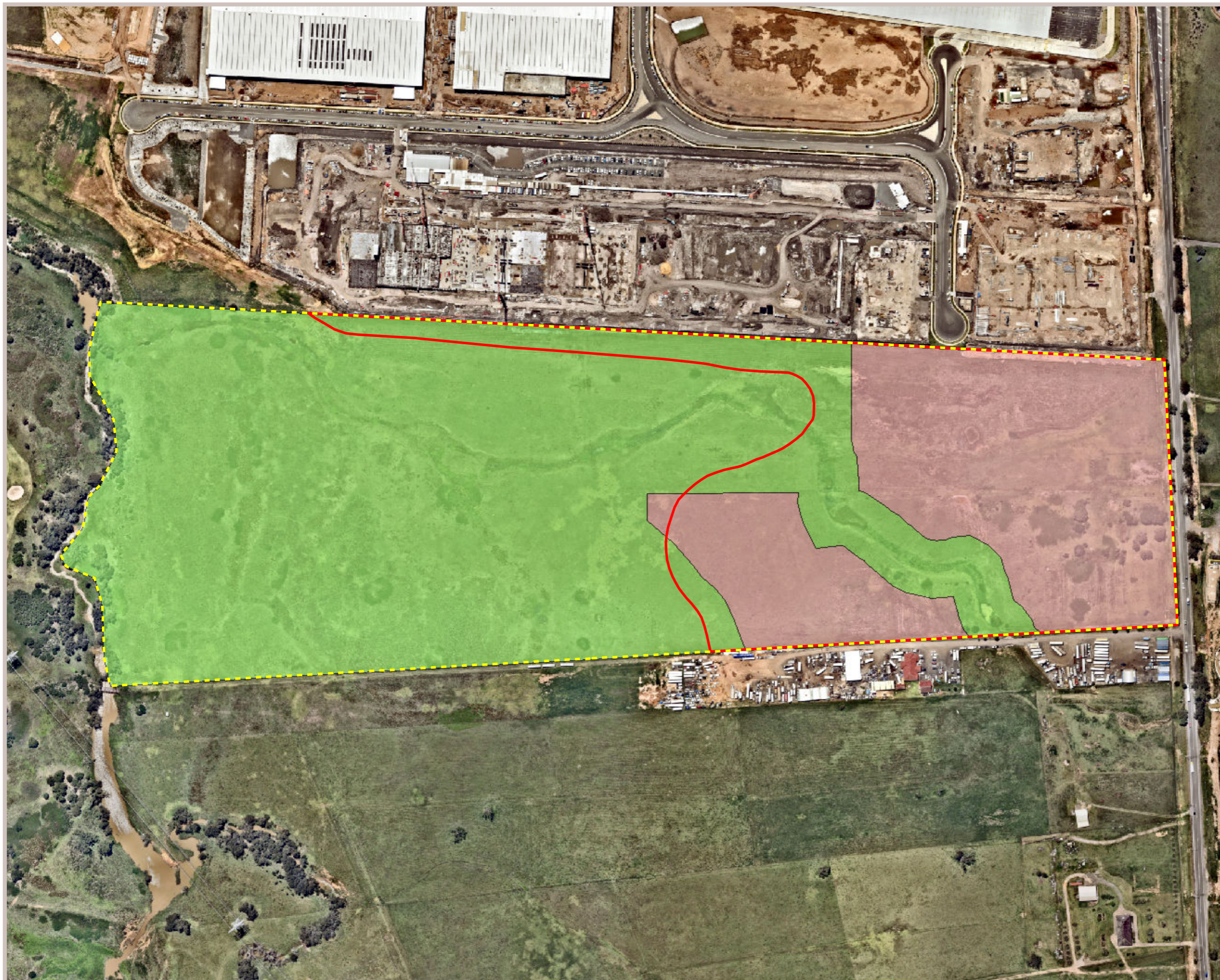


Coordinate System: MGA Zone 56 (GDA 94)

cumberland  
ecology

0 50 100 150 m

Figure 4. Plant community types



# Legend

- VMP Area
- Subject Land
- Management Zone**
  - Zone 1
  - Zone 2

Image Source:  
Image © Nearmap (2024)  
Dated: 25/1/2024



Coordinate System: MGA Zone 56 (GDA 94)

cumberland  
ecology

0 50 100 150 m

Figure 5. Management zones

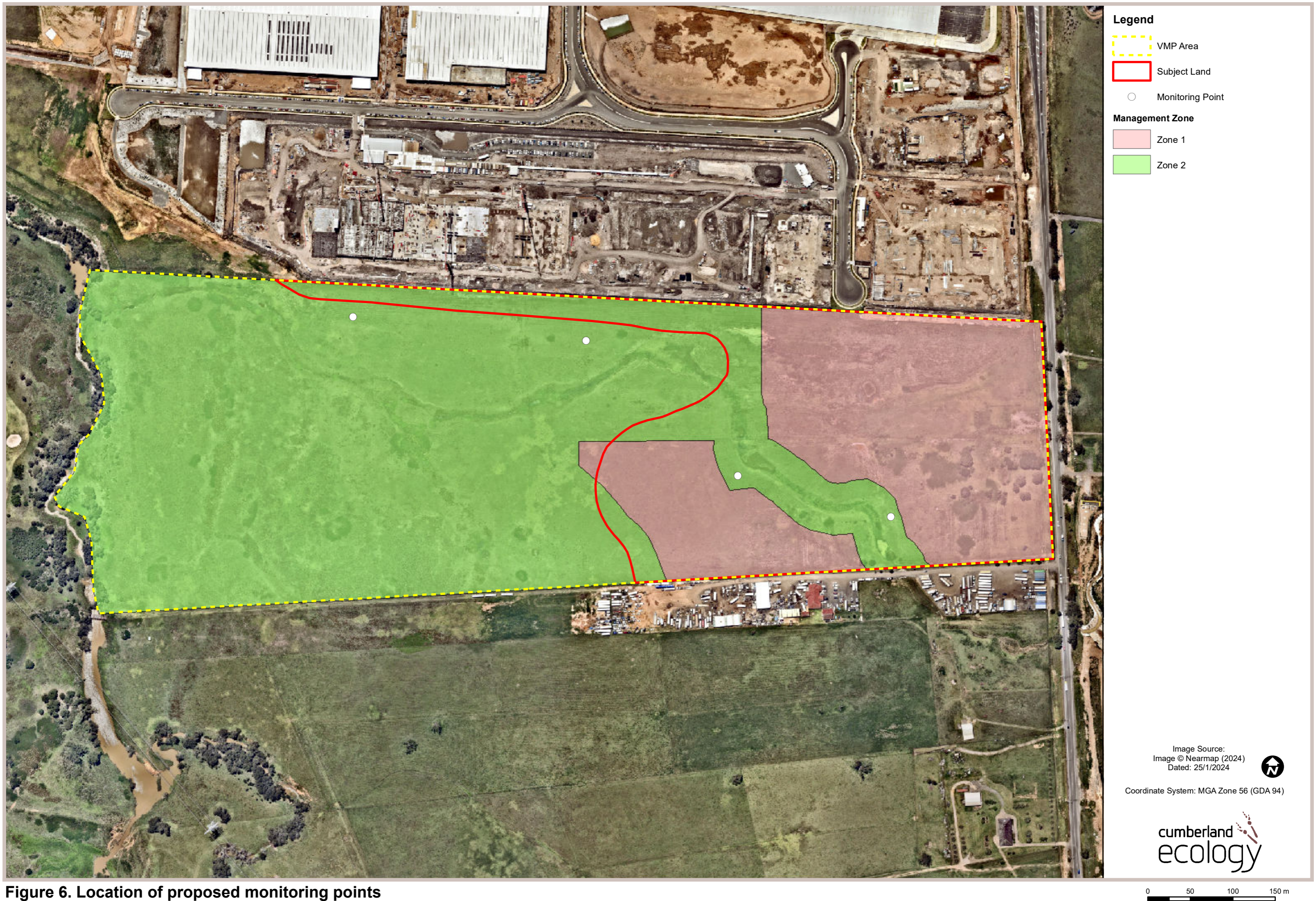


Figure 6. Location of proposed monitoring points