

# Moriah College

## Vegetation Management Plan

Moriah College

23 September 2020

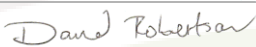
Final



## Report No. 19139RP2

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

Version	Date Issued	Amended by	Details
v1	11/6/2020	JL/MW/TP	Draft
v2	24/6/2020	JL/MW/TP	Final
v3	23/9/2020	JL/CEP	Final following EES comments

<b>Approved by:</b>	<b>Dr David Robertson</b>
<b>Position:</b>	Director
<b>Signed:</b>	
<b>Date:</b>	23 September, 2020

# Table of Contents

1.	Introduction	1
1.1.	Introduction	1
1.2.	Purpose	2
1.3.	Description of the Subject Land and VMP Area	3
1.4.	Relevant Legislation	3
2.	Methodology	6
2.1.	Literature Review	6
3.	Existing Biodiversity Values	7
3.1.	Vegetation Communities of the Subject Land and VMP Area	7
3.2.	Flora Species	10
3.3.	Fauna Habitat	11
4.	Vegetation Management	12
4.1.	Management Zones	12
5.	Vegetation Clearing Plan	14
5.1.	Hygiene Protocols	14
5.2.	Ecological Inductions	14
5.3.	Marking Limits of Vegetation Clearing	14
5.4.	Vegetation Protection Buffer Zone	15
5.5.	Weed Management	15
5.6.	Pre-clearance Surveys	16
5.7.	Fauna Relocation and Clearing Protocols	16
5.8.	Erosion Control	17
6.	Weed Management Plan	18
6.1.	Introduction	18
6.2.	Weed Management in the VMP Area	21
7.	Revegetation Plan	24
7.1.	Introduction	24
7.2.	Objectives	24
7.3.	Recommended Revegetation Techniques	24
7.4.	Maintenance of Plantings	26
7.5.	Protective Fencing	26
8.	Monitoring and Reporting	27
8.1.	Monitoring Program	27
8.2.	Reporting	28
9.	Timing and Responsibilities	29
10.	References	32

## Table of Tables

Table 1 Priority Weeds.....	11
Table 2 Locations of Six Monthly Monitoring Plots .....	27
Table 3 Timing and Responsibilities.....	29
Table 4 List of Flora Species Within Subject Land .....	A.2
Table 5 Weed Control Treatment Methods .....	B.7
Table 6 ESBS Plant List.....	C.15

## Table of Photographs

Photograph 1 Structure of the Eastern Suburbs Banksia Scrub within Banksia Reserve .....	8
Photograph 2 Large <i>Ficus benjamina</i> (Weeping Fig) within the Urban Native/Exotic Vegetation (proposed for removal) .....	9
Photograph 3 <i>Pinus radiata</i> (Monterey Pine) within the Urban Native/Exotic Vegetation.....	10

## Table of Appendices

APPENDIX A : Flora Survey Data
APPENDIX B : Weed Control Methods
APPENDIX C : ESBS Planting List

## Table of Figures

Figure 1 Location of subject land, development site and VMP area
Figure 2 Location of management zones and monitoring plots

# 1. Introduction

## 1.1. Introduction

Cumberland Ecology has been commissioned by Moriah College (the 'client') to prepare a Vegetation Management Plan (VMP) to support the proposed infill State Significant Development (SSD) application for Moriah College Queens Park Campus (hereafter referred to as the 'project'). The project is located within the Queens Park Campus (Lot 22 DP 879582, Lot 1 DP 701512, Lot 3 DP 701512), and is hereafter referred to as the 'subject land'. The area within the subject land that will be disturbed by the development is referred to as the 'development site' (see **Figure 1**).

This VMP has been prepared with particular reference to areas within and immediately adjoining the development site hereafter referred to as the 'VMP Area' (**Figure 1**). The VMP Area has been set aside for conservation of the ecological community Eastern Suburbs Banksia Scrub in the Sydney Basin Bioregion (ESBS), which is listed as a Critically Endangered Ecological Community (CEEC) under the NSW *Biodiversity Conservation Act 2016* (BC Act) and as an Endangered Ecological Community (EEC) under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Cumberland Ecology understands that a VMP already exists for the native vegetation immediately to the south-west of the subject land in Banksia Reserve (Lot 23 DP879582). This VMP was prepared by the Centennial Park and Moore Park Trust in 2018 (CPaMPT, (2018)) (the 'CPaMPT VMP') for the remnant patches of Eastern Suburbs Banksia Scrub within Centennial Park, Queens Park and York Road. The CPaMPT VMP aims to direct best practise restoration works over a ten-year period (2018-2028).

This VMP has been written with the objective to link to, be consistent with and complement measures for the management of the Eastern Suburbs Banksia Scrub that have been prescribed in the CPaMPT VMP, due to the proximity of the VMP Area to already managed Eastern Suburbs Banksia Scrub in Banksia Reserve.

### 1.1.1. Background

A Biodiversity Development Assessment Report (BDAR) was prepared by Cumberland Ecology (ref. 19139RP1) to support a Development Application (DA) for the project in February 2020. Following the submission of the BDAR, a VMP is also required to specify the management of the retained native vegetation within the VMP Area to the satisfaction of Waverley Council (Council). The key points required by Council to be addressed within this VMP are:

- A VMP has been previously prepared for this area by Urban Bushland Management Consultants, in 2002, however, requires updating;
- The VMP needs to specify how ESBS vegetation will be protected from development, weed invasion and other damage, and how it will be rehabilitated from its current state to one of greater health; and
- The VMP needs to demonstrate how this will be undertaken on an ongoing basis (into perpetuity), including the type of work to be undertaken, timeframes, and how the site's response to this work will be monitored and evaluated.

Additional consent conditions exist for the subject land following a development application in 2002 (LD 282/00) which are summarized below:

- Rehabilitation of ESBS (either on Lot 23 or an “area of equivalent size and condition”), governed by an approved vegetation management plan, which has been amended and prepared by CPaMPT (2018);
- Provision in Lot 22 along the boundary with Lot 23 of a vegetated buffer zone and that was of no lesser width than 3 metres in any part, which is to be re-established as part of the Project;
- Measures to prevent grass from landscaped other parts of Lot 22 entering the buffer zone;
- Fencing along the common boundary of Lots 23 and 22, the construction of which was to avoid impact on ESBS mature tree and shrub species (other than *Leptospermum laevigatum*) on Lot 23; and
- No structures to be erected on Lot 22 that will cast shadow onto Lot 23.

This VMP has been prepared for the additional area of ESBS within the Moriah College campus grounds as well as a small buffer area to be re-established as ESBS within land that currently comprises cleared land and playing fields (**Figure 1**), collectively referred to as the VMP Area. The areas of existing ESBS within the VMP Area are not currently managed by the CPaMPT VMP for York Road and as such, this VMP aims to satisfy the remainder of the relevant consent criteria listed above.

## 1.2. Purpose

The purpose of this VMP is to provide guidelines for the revegetation, regeneration and management of vegetation associated with the project, within the VMP Area. Specifically, the VMP provides guidelines in order to:

- Revegetate and regenerate areas of the VMP Area within the newly re-established buffer area using appropriate bushland regeneration techniques and weed control techniques;
- Manage the clearing of vegetation associated with the development in order to minimise indirect impacts on the VMP Area; and
- Manage other indirect impacts on retained native vegetation associated with the project, as identified in the BDAR (Cumberland Ecology 2020, 19139RP1).

The aims of the VMP are as follows:

- To improve the biodiversity values of the VMP Area;
- To re-establish native vegetation that is representative of ESBS in the VMP Area;
- To establish and enhance habitat for local fauna species with the potential to occur or known to occur within the VMP Area;
- To enhance the ecological character of the VMP Area by removal and routine control of weed and exotic species present; and
- Minimise indirect impacts of the development on the VMP Area.

In order to accomplish the aims of the VMP, three separate management plans have been developed that apply to different areas of the subject land depending on the works to be undertaken. The three separate management plans and the areas they apply to are as follows:

- Vegetation Clearing Plan – applies to all areas of the subject land to be cleared for development (see **Chapter 5**);
- Weed Management Plan – applies to the VMP Area (see **Chapter 6**); and
- Revegetation Plan – applies to all areas to be replanted with ESBS species within the VMP Area (see **Chapter 4 and Chapter 7**).

### 1.3. Description of the Subject Land and VMP Area

The subject land is wholly located within the Waverley Local Government Area (LGA); approximately 5 km from the Sydney Central Business District (CBD).

Moriah College is an independent Jewish School established in 1943. The Moriah College campus is bound by Queens Park Road to the north, Baronga Avenue to the east, and York Road to the south and west. Moriah College Queens Park Campus includes the following addresses (See **Figure 1**):

- 101 York Road, Queens Park/Lot 22 DP 879582 - approximate area of 4,830m<sup>2</sup>. The lot contains the ELC buildings and car parking.
- 1 Queens Park Road, Queens Park/Lot 1 DP 701512 - approximate area of 1.45 hectares. The lot comprises the junior school campus
- 3 Queens Park Road, Queens Park/Lot 3 DP 701512 - approximate area of 2.6 hectares. The lot comprises the senior school campus.

The development site comprises the area of land directly impacted by the project as shown in **Figure 1**. Areas of vegetation within the development site will be cleared of vegetation.

A conservation area (Banksia Reserve) is located immediately south-west of the subject land and adjacent to the development footprint, comprising Lot 23 DP879582. This conservation area contains an intact stand of ESBS that will not be directly impacted by the project.

The VMP Area is situated along the south western boundary of the subject land and includes the extant ESBS vegetation that will be retained within the subject land and the buffer zone that will be re-established along the boundary to Banksia Reserve (**Figure 1**). The VMP Area will be managed for an initial period of 5 years according to the specifications outlined in this VMP, with the requirement to re-assess the VMP Area following the final inspection prescribed in this VMP and prepare an updated VMP to be implemented in perpetuity.

### 1.4. Relevant Legislation

Legislation relevant to this VMP includes:

- *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);

- *NSW Environmental Planning and Assessment Act 1979 (EP&A Act);*
- *NSW Biosecurity Act 2015 (Biosecurity Act);*
- *NSW Pesticides Act 1999; and*
- *NSW Biodiversity Conservation Act 2016 (BC Act).*

### **1.4.1. State and Local Government Planning Instruments**

Planning Instruments that relate to the development include:

- State Environmental Planning Policy 19 – Bushland in Urban Areas (SEPP 19); and
- Waverly Development Control Plan (2012).

#### **1.4.1.1. SEPP 19 – Bushland in Urban Areas**

SEPP 19 is designed to protect bushland in public open space zones and reservations, and to ensure that bush preservation is given a high priority when local environmental plans for urban development are prepared. SEPP 19 applies to several areas or part areas, including Waverly Local Government Area (LGA) (listed in Schedule 1 as Waverly).

#### **1.4.1.2. Waverly Development Control Plan 2012**

Waverly DCP 2012 Part B, Section 3.2.1 - development in or near areas of biodiversity significance applies to the project as the VMP Area as has been mapped as 'Biodiversity' on the Terrestrial Biodiversity Map in the Waverly LEP 2012 2012 (Bio\_001).

Part B, Section 3.2.1 of the Waverly DCP 2012 has the overall objectives:

- *to retain, protect and enhance remnant native vegetation for local wildlife and benefits to the community; and*
- *to protect and promote the recovery of threatened species, populations, and endangered ecological communities.*

The following controls are included:

- A minimum of 90% of the proposed plantings (not including turfed areas) are to be indigenous or local native plants listed in Annexure B2 – 1 of Waverly DCP (2012).*
- All noxious weeds on the property at the time of development are to be removed by a suitably qualified person.*
- Trees with hollows are to be retained for habitat wherever possible to provide habitat for arboreal fauna. Consideration must be given to the potential risk of damage to public or private property as determined by a suitably qualified arborist.*



- d. *Sites that are undeveloped should be protected to encourage regeneration from the seed bank. Sunshine Wattle has a persistent soil seed bank which may last for up to 50 years.*
- e. *Council may require additional supporting information for an application including the following:*
  - i. *Vegetation management/protection plan; and*
  - ii. *Flora or fauna impact assessment.*
- f. *Remnant vegetation is to be protected unless:*
  - i. *Trees and vegetation are removed/trimmed in accordance with the Roads Act 1993;*
  - ii. *The work needs to be carried out by Council, the State Emergency Services, the Rural Fire Service of NSW, or a public authority in response to an emergency;*
  - iii. *Works are carried out by State or Federal Government Departments or Authorities under current legislative requirements; or*
  - iv. *The tree or vegetation is a recognised noxious weed (Noxious Weeds Act 1993). The applicant must first seek advice from Council and Council must be notified in writing seven (7) days prior to the commencement of removal work.*

## 2. Methodology

### 2.1. Literature Review

The preparation of the VMP involved a literature review to determine the most up to date methods of weed control for exotic species that are present in the subject land. This literature review involved a variety of sources including government fact sheets and websites. Personal experience of a Cumberland Ecology botanist formerly employed in bushland restoration was also utilised.

The field data and vegetation descriptions utilised in the BDAR (Ref. 19139RP1) were utilised for the preparation of this VMP. A detailed methodology of the flora surveys undertaken is provided in the BDAR (Cumberland Ecology, 2020).

In order to prepare a species planting list, and revegetation strategies for ESBS to be planted within the VMP Area, survey data collected for BDAR was reviewed, along with the description of the vegetation community under broad scale mapping for the locality (5 km radius of the subject land) (OEH 2016). The species list prepared for revegetation within the VMP Area includes species listed as diagnostic for the ESBS vegetation community.

# 3. Existing Biodiversity Values

This chapter presents the results of previous surveys and describes the flora of the subject land and VMP Area (Cumberland Ecology 2020).

## 3.1. Vegetation Communities of the Subject Land and VMP Area

Approximately 0.63 ha of native vegetation is present on the subject land representing approximately 14% of the subject land. The majority of the native vegetation within the subject land is scattered throughout the Urban Native/Exotic Vegetation outside of the VMP area. The remaining native vegetation is represented by the small patch of ESBS on the western boundary of the subject land.

Aside from the VMP Area in the south west corner, the native vegetation within the subject land is entirely of planted origin, often comprising monospecific stands of trees and a large portion of non-endemic species, and as a result is not considered to comprise a naturally occurring community. Nevertheless, recent advice provided from DPIE regarding how to assess native vegetation that is not generally considered to conform to a vegetation community, is to still nominate a Plant Community Type (PCT) based on the native species present and surrounding naturally occurring PCTs. A description of the vegetation communities identified within the subject land is provided below.

### 3.1.1. Eastern Suburbs Banksia Scrub in the Sydney Basin Bioregion (ESBS)

**NSW Plant Community Type:** 1061 – Old-man Banksia, She-oak, Red Bloodwood Heathland on Coastal Sands

**BC Act Status:** Critically Endangered

**EPBC Act Status:** Endangered

Old-man Banksia, She-oak, Red Bloodwood Heathland on Coastal Sands is an open to dense shrubland community found on large, deep Pleistocene sand dunes along the New South Wales coast. This plant community type in the Botany and Woollahra area is included as a component of Eastern Suburbs Banksia Scrub (ESBS) and has been listed as an Endangered Ecological Community (EEC) under both the BC Act and the EPBC Act.

A patch of moderate condition ESBS, covering approximately 0.12 ha, is present in the VMP Area. The area is entirely fenced and separated from the school land and is maintained in a natural state with no construction or infrastructure. The canopy is represented by small trees (3-4m) and the dominant species observed were *Leptospermum laevigatum* (Coast Teatree) and *Acacia longifolia* subsp. *sophorae* (Coastal Wattle). Common species within the shrub stratum (1-2m) include *Acacia suaveolens* (Sweet Wattle), *Acacia ulicifolia* (Prickly Moses), *Monotoca elliptica* (Tree Broom-heath), *Kunzea ambigua* (Tickbush) and *Bossiaea heterophylla* (Variable Bossiaea). Less frequent shrub species recorded include *Astroloma pinifolium* (Pine Heath), *Xanthosia pilosa* (Woolly Xanthosia) and *Persoonia lanceolata* (Lance Leaf Geebung). The ground cover (<1m) was sparse but was dominated by grasses, mat-rushes and flax-lillies. The common species recorded included *Lomandra longifolia* (Spiny-headed mat-rush), *Dianella caerulea* subsp. *producta* (Blue Flax-Lilly), *D. revoluta* (Blue Flax-Lilly), *Dichelachne crinita* (Longhair Plumegrass) and *Austrostipa pubescens*.

The lack of fire and isolation from similar vegetation accounts for the limited diversity and moderate condition of this patch of vegetation.

Due to the small size of the patch of ESBS within the subject land, representative plot and random meander data was collected in Banksia Reserve. Random meander surveys were conducted throughout the ESBS within the subject land. The main structural features of this community were therefore collected immediately adjacent the subject land and are shown in **Photograph 1**.

**Photograph 1 Structure of the Eastern Suburbs Banksia Scrub within Banksia Reserve**



### 3.1.2. Urban Native/Exotic Vegetation – Degraded Condition

**NSW Plant Community Type:** 1778: Smooth-barked Apple - Coast Banksia / Cheese Tree open forest on sandstone slopes on the foreshores of the drowned river valleys of Sydney

**BC Act Status:** Not Listed

**EPBC Act Status:** Not Listed

The Urban Native/Exotic vegetation within the subject land is comprised of garden beds and rows of trees of primarily planted origin. Common native canopy tree species planted throughout the areas mapped as Urban Native/Exotic vegetation include *Eucalyptus robusta* (Swamp Mahogany), *Eucalyptus scoparia* (Wallangara White Gum), *Ficus rubiginosa* (Port Jackson Fig), *Melaleuca quinquenervia* (Broad-leaved Paperbark), *Melia azedarach* (White Cedar), and *Tristanopsis laurina* (Water Gum). Native shrubs and small trees present throughout this area of vegetation include *Acacia longifolia* (Golden Wattle), *Acacia suaveolens* (Sweet Wattle), *Banksia ericifolia* (Heath-leaved Banksia), *Pittosporum undulatum* (Sweet Pittosporum) and *Westringia fruticosa* (Coastal Rosemary). Native groundcover species present within this area of vegetation include *Cynodon dactylon* (Common Couch), *Lomandra hystrix* (Green Mat-rush) and *Lomandra longifolia* (Spiny-head Mat-rush).

Planted exotics species feature heavily throughout these plantings with trees such as *Olea europaea* ssp. *europaea* (Common Olive), *Pinus radiata* (Monterey Pine), *Ficus benjamina* (Weeping Fig), *Fraxinus* spp. (Ash), *Jacaranda mimosifolia* (Jacaranda), *Platanus x acerifolia* (London Planetree) and *Schinus mole* var. *areira* (Pepper



Tree). Common exotic shrubs and shrubby weeds throughout this area of vegetation include *Murraya paniculata* (False Orange) hedges, *Rhododendron* spp. (Azaleas), *Lantana camara* (Lantana) and *Cestrum parqui* (Green Cestrum). Common ground layer planted exotic species and weeds include *Agapanthus praecox* subsp. *orientalis* (Agapanthus), *Asparagus aethiopicus* (Asparagus Fern), *Bidens pilosa* (Cobbler's Pegs), *Buxus microphylla* (Japanese Boxwood), *Conyza sumatriensis* (Tall Fleabane), *Ehrharta erecta* (Panic Veldtgrass), *Lolium perenne* (Perennial Ryegrass), *Ophiopogon japonicus* (Dwarf Lilyturf), *Lysimachia arvensis* (Scarlet Pimpernel), *Poa annua* (Winter Grass), *Acetosa sagittata* (Turkey Rhubarb) and *Romulea rosea* (Onion Weed). Representative photographs of planted exotic species are provided as **Photograph 2** and **Photograph 3** below.

The vegetation is likely to originally have been ESBS prior to clearing. The remnant *Leptospermum laevigatum* (Coast Teatree) individuals have been retained during the original construction of the retaining wall. Since then the area has become infested with exotics. The lack of fire and weed control accounts for the degraded condition of this patch of vegetation and it currently does not conform to ESBS.

Vegetation and trees within these areas are proposed to be removed as part of the project.

**Photograph 2 Large *Ficus benjamina* (Weeping Fig) within the Urban Native/Exotic Vegetation (proposed for removal)**



**Photograph 3 *Pinus radiata* (Monterey Pine) within the Urban Native/Exotic Vegetation**



## 3.2. Flora Species

### 3.2.1. General Species

A total of 98 flora species were recorded during surveys of the subject land, and 22 flora species were recorded within the VMP Area. Of the total flora species, 44 species are native either to the locality or non-endemic natives and 54 are exotic species. A total species list collected from Cumberland Ecology flora surveys is provided in **Appendix A**.

### 3.2.2. Threatened Species

No threatened flora species known from within the locality were recorded during surveys of the subject land.

### 3.2.3. Priority Weeds and Weeds of National Significance

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

Thirty-two Weeds of National Significance (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.

A list of Priority Weeds recorded during the surveys undertaken by Cumberland Ecology (2020) is provided in **Table 1**. Appendix 1 of the Greater Sydney Regional Strategic Weed Management Plan (LLS: Greater Sydney 2017) should be referred to for a summary of the legislative requirements, recommended regional management objectives, and regional strategic responses pertaining to these weed species. Additional species identified as being of regional concern under that plan are identified in Appendix B of the plan.

**Table 1 Priority Weeds**

Scientific Name	Common Name	Status
<i>Acetosa sagittata</i>	Rambling Dock	OWRC
<i>Agapanthus praecox subsp. orientalis</i>		OWRC
<i>Asparagus aethiopicus</i>	Asparagus Fern	SP, WONS
<i>Celtis sinensis</i>	Japanese Hackberry	OWRC
<i>Cenchrus clandestinus</i>	Kikuyu Grass	OWRC
<i>Cenchrus setaceus</i>	Fountain Grass	OWRC
<i>Cestrum parqui</i>	Green Cestrum	RP
<i>Cinnamomum camphora</i>	Camphor Laurel	OWRC
<i>Erythrina x sykesii</i>	Coral tree	OWRC
<i>Lantana camara</i>	Lantana	SP, WONS
<i>Olea europaea</i>	Common Olive	RP
<i>Parietaria judaica</i>	Pellitory	OWRC
<i>Phoenix canariensis</i>	Canary Island Date Palm	OWRC
<i>Pinus radiata</i>	Radiata Pine	OWRC
<i>Prunus spp.</i>		OWRC

Status: RP = Regional Priority Weed, SP = State Priority Weed; WONS = Weed of National Significance

### 3.3. Fauna Habitat

The vegetation within the VMP Area of the subject land is expected to currently provide poor to moderate quality habitat for fauna. The VMP Area represents a small area of remnant ESBS vegetation in moderate condition, with only a few exotic flora species. The vegetated portion of the VMP Area is likely to provide potential roosting, nesting and foraging habitat for a variety of native fauna including birds, mammals, gastropods and reptiles.

The remainder of the vegetation within the subject land has been heavily modified by historical and current landuses. These areas are dominated by planted, managed, gardens comprising native and exotic species and thus provide sub-optimal habitat for native fauna. The microhabitats within these small remaining areas of potential habitat within the subject land were found to be degraded (Cumberland Ecology 2020) and no significant habitat features, e.g. tree hollows, nests, large fallen logs or rock piles, were recorded during surveys (Cumberland Ecology 2020). However, this sub-optimal habitat is likely to provide nesting and foraging space for mobile, urban adapted species.



## 4. Vegetation Management

The VMP Area comprises areas of remnant ESBS and currently cleared lands that will be managed to improve the current condition. Works within the VMP Area should commence immediately following approval of the DA. A detailed timing of management actions to be undertaken is provided in **Chapter 9**.

It is expected that the intensive actions detailed in the VMP will be undertaken over an initial five-year period to mitigate development risks and improve the health of the ESBS vegetation, and that there will be an ongoing maintenance program, including monitoring, general weed maintenance and plant failure replacement activities that will be undertaken into perpetuity to sustain the health of the ESBS community within the VMP Area, under an updated VMP. .

### 4.1. Management Zones

The VMP Area is comprised of areas containing ESBS that are to be retained by the development and currently cleared lands to be re-established as a buffer area containing ESBS species. These areas will be rehabilitated by means of regeneration through weed management and revegetation with ESBS species through bushland regeneration techniques.

The specific objectives and actions to be undertaken in the VMP Area will be undertaken in two separate management zones including:

- Zone 1 – Remnant ESBS; and
- Zone 2 – Buffer area.

#### 4.1.1. Zone 1 Objectives

Management Zone 1 is representative of the existing patch of ESBS within the subject land. Management objectives for Zone 1 are:

- Removal of all exotic vegetation;
- Control exotic weed species; and
- Promote natural regeneration.

##### 4.1.1.1. Actions

Initial actions within Zone 1 will be the removal of all exotic vegetation. In particular, the removal of *Conyza bonariensis*, *Gamochaeta pensylvanica* and *Taraxacum officinale*. These are three weed species identified within the VMP Area during flora surveys (Cumberland Ecology 2020) and their removal will facilitate the natural regeneration of native species present. Following completion of the removal of all (or most) exotic vegetation as identified above, rehabilitation actions will be undertaken that will support enhanced diversity of the remnant ESBS including periodic weeding practises and promotion of natural regeneration. No re-vegetation practises are proposed to occur within Zone 1.

#### 4.1.2. Zone 2 Objectives

Management Zone 2 is representative of the 3-10 m buffer zone dictated by the LD 282/00 commonwealth approval. Management objectives for the Zone 2 are:



- Replanting an array of native understorey, shrub and ground layer species characteristic of ESBS to replace cleared lands;
- Protect revegetated area;
- Removal of all exotic vegetation;
- Control exotic weed species; and
- Promote natural regeneration.

#### **4.1.2.1. Actions**

Initial actions within Zone 2 will be to prepare the buffer area for revegetation and rehabilitation. Actions include but are not limited to removal of hardstand areas and demarcation of the buffer area in accordance with the boundary for Zone 2 (**Figure 2**). Following preparation of the buffer area, revegetation and rehabilitation practises will be undertaken with local provenance species indicative of ESBS. The selection of species to be planted in Zone 2 has been prepared to be consistent with the ESBS which occurs naturally within the surrounding areas, particularly in Banksia Reserve. Species selected are species known to occur in the locality and naturally occur in the community within the Sydney Basin.

#### **4.1.3. Timing of Actions**

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

- All exotic groundcover and understorey will be removed; and
- Native groundcover, shrubs, understorey and canopy will be planted.

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

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

Additionally, educational signage will be installed along the perimeter of the VMP Area to improve local knowledge of the ESBS present and the fauna species that utilise it.

# 5. Vegetation Clearing Plan

This chapter outlines the protocols to be followed during clearing and construction phases to minimise the impacts on native flora and fauna and to avoid indirect impacts on the retained native vegetation in the VMP Area.

## 5.1. Hygiene Protocols

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

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

Recommended disinfectant products include:

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

## 5.2. Ecological Inductions

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

## 5.3. Marking Limits of Vegetation Clearing

### 5.3.1. Protection of Vegetation during Clearing and Construction Phases

Vegetation clearing will take place in areas in close proximity to the VMP Area, so appropriate measures are needed to delineate clearing areas and protect retained vegetation with the VMP Area. At present, there is an existing fence around the VMP Area that is likely to provide adequate delineation of clearing limits. This fencing is to remain in place until all works are completed in adjoining areas. No vehicles or machinery will be permitted to enter the VMP Area.

To avoid unnecessary damage to vegetation or inadvertent habitat removal, disturbance is to be restricted to the delineated area. No stockpiling of equipment, soils, or machinery is to take place within the delineated VMP Area.

The person responsible for the clearance and/or construction activities will be responsible for ensuring that the fencing is maintained for the duration of the construction period.

Sediment control measures should be installed to prevent run-off of soil, weed propagules, excess nutrients, and pollutants into adjacent vegetated areas. Sediment fencing should be installed along the eastern and northern boundary of the VMP Area to protect all retained vegetation. Additional sediment fencing is also likely to be required to prevent offsite soil runoff. Clearing should not take place during periods of heavy rain in order to minimise erosion and sediment run-off.

### 5.3.2. Signage

Signs will be placed on the fencing around the VMP Area at a spacing such that a sign is always visible to personnel working in any adjacent area within the subject land. The sign will detail the presence of ESBS vegetation and that the vegetation is protected and not to be impacted upon. Example text for the signs is *"WARNING – This is a protected Eastern Suburbs Banksia Scrub area. No encroachment or access within this area."*

## 5.4. Vegetation Protection Buffer Zone

In undertaking previous DAs, Moriah College has been subjected to a number of consent conditions in relation the ongoing protection of the ESBS in Banksia Reserve south west of the subject land. One specific measure is the establishment of a zone within Lot 22 to buffer the ESBS on Lot 23. Consistent with the previous VMP (Urban Bushland Management Consultant 2002), a buffer area varying in width between 3-10 metres on the boundary of Lot 22 and Lot 23 is to be re-established to prevent development occurring in close proximity to the ESBS in the VMP Area (**Figure 2**). The buffer zone will assist with mitigation of indirect impacts arising from development, including:

- Overshading by buildings;
- Invasion by weeds; and
- Surface runoff and sediment movement.

## 5.5. Weed Management

As vegetation will be cleared in close proximity to the VMP Area, erosion and the spread of weeds propagules can take place if appropriate mitigation measures are not implemented. In order to minimise the spread of weeds throughout the subject land and into the adjoining VMP Area, appropriate weed control activities will be undertaken. Prior to construction, weeds present within the extent of the development will be identified and controlled if necessary to prevent spread. The amount of bare soil exposed at any one time will be minimised, and sediment fencing will be installed along the boundary of the VMP Area, and downslope of any activities involving earthworks to prevent the spread of weeds from the development site.

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

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

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

## 5.6. Pre-clearance Surveys

Consistent with the BDAR (Cumberland Ecology 2020), prior to the commencement of any vegetation clearing, a pre-clearance survey needs to be undertaken by a licensed 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 habitat marked out with flagging tape and/or spray paint. Pre-clearing surveys are to be undertaken by a suitably qualified ecologist. Pre-clearing surveys will include:

- Demarcation of key habitat features, such as hollow-bearing trees, fallen logs (>10cm diameter) and bushrock;
- Checking trees for the presence of bird nests and arboreal mammals, such as possums, and bats, prior to felling;
- Animals found to be occupying trees and habitat will be safely removed before the clearing of trees and relocated into areas to be retained; and
- Provision of a report following the completion of a pre-clearing survey, detailing the location and type of each habitat feature as well as location of where salvaged bushrock can be stockpiled until placed within retained vegetation (all stockpile areas must be within the development (i.e. outside of the VMP Area)).

## 5.7. Fauna Relocation and Clearing Protocols

Consistent with the BDAR (Cumberland Ecology 2020), to minimise impacts to native fauna species, clearing should be undertaken in the following two-stage process under the supervision of a suitably qualified ecologist:

- The initial phase of clearing will involve clearing around identified habitat features and leaving the features overnight; and
- The second stage will involve clearing of the habitat features left overnight followed by an inspection.
- An ecologist should investigate all fallen trees for the presence of hollows not detected prior to clearing. Inspections should be undertaken of these hollows for native fauna.

A fauna ecologist will be present while clearing to rescue animals injured during the clearance operation. Provisions will be made to protect any native fauna during clearing activities by the following means:

- All staff working on the vegetation clearing will be briefed about the possible fauna present and should avoid injuring any present;

- Animals disturbed or dislodged during the clearance but not injured will be assisted to move to the adjacent bushland or other specified locations; and
- If animals are injured during the vegetation clearance, appropriate steps will be taken to humanely treat the animal (either taken to the nearest veterinary clinic for treatment, or if the animal is unlikely to survive, it will be humanely euthanized).

## 5.8. Erosion Control

Construction activities will be undertaken in accordance with Managing Urban Stormwater - Soils and Construction Volume 1 known as "The Blue Book" (Landcom 2004). During construction works adequate erosion control measures, such as silt fencing, are to be used to prevent movement of weed seeds, and, nutrient-enriched soils during rain events. This will prevent nutrient enrichment, and weed spread, within on-site revegetation areas, and potentially within local offsite bushland areas. Erosion controls will be implemented along all perimeters of the VMP Area that are downslope of clearing/construction works. This include implementation of the following measures:

- Installation of sediment control fences, e.g. silt fencing;
- Covering soil stockpiles; and
- Avoiding soil disturbance prior to heavy rainfall.

# 6. Weed Management Plan

## 6.1. Introduction

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

The VMP Area is comprised of remnant and regrowth vegetation that has scattered exotic weeds, as well as cleared areas.

Due to the condition of the vegetation within zone 1, regeneration strategies are required in order to improve the condition of the ESBS. However, consistent with the CPaMPT VMP, no re-vegetation practises are proposed within the existing ESBS of the VMP Area. Re-vegetation practises are proposed only for Zone 2 with species consistent with ESBS, and weed control activities will be carried out to assist regeneration of native plantings.

### 6.1.2. Relevant Legislation

Under the Biosecurity Act all weeds are required to be controlled by all persons under a “General Biosecurity Duty”. The General Biosecurity Duty means that all public and private land owners or managers and all other people who deal with weed species (biosecurity matters) must use the most appropriate approach to prevent, eliminate, or minimise the negative impact (biosecurity risk) of those weeds (DPI 2017). The power for enforcement of penalties relating to compliance with the legislation is given to Local Control Authorities (i.e. Local Governments).

State-wide management of weeds under the Biosecurity Act is directed by the NSW Invasive Species Plan (LLS: Greater Sydney 2017). This assigns weed responses to four categories:

- Prevention of new weeds establishing;
- Eradication of small and localised infestations where feasible;
- Containment of larger infestation to stop wider spread; and
- Protection of key assets, such as threatened plants and agricultural land, to prevent their damage or degradation by weed invasion.

Under the Biosecurity Act some weed species have been prioritised for management by specific regulations and controls under the act. These are known as State Level Priority Weeds. Specific legal requirements exist for how these weeds are managed.

The state has been divided into 11 regions (each covering a number of LGAs) under the Biosecurity Act, with each region managed by a Regional Weeds Committee. Management actions for weeds within a region are detailed within a Regional Strategic Weed Management Plan. Within each region, additional weed species have been prioritised for management to the State Level Priority Weeds. These species are known as Regional Priority Weeds.

The Regional Strategic Weed Management Plans identify the Regional Priority Weeds, and for these weeds, detail recommended management objectives to achieve “outcomes to demonstrate compliance with the

General Biosecurity Duty". For these weeds "strategic responses in the region" are also detailed to achieve the relevant management objective (i.e. Prevention, Eradication, Containment or Asset Protection).

A further set of weeds are identified within the Regional Strategic Weed Management Plans as being "other weeds of regional concern". The Biosecurity Act provides powers to Local Control Authorities to take action in relation to these weeds in particular circumstances, for example where a weed threatens a high value asset, and prevention, elimination or reduction of the risk is feasible and reasonable. Examples of high values assets include the Environment, Human Health, and Agriculture.

The subject land is located within the Greater Sydney Local Land Services region, and weed management within the region is be undertaken under the direction of the Greater Sydney Regional Strategic Weed Management Plan (LLS: Greater Sydney 2017). Appendix 1 of the plan outlines the State Listed Priority Weeds, Regional Priority Weeds, and other weeds of regional concern.

### 6.1.3. Species Lists

Weeds identified by Cumberland Ecology (2020) within the subject land (see **Appendix A**) make up the weed species lists used for the basis of this Weed Management Plan. A list of control methods for specific weeds recorded on the subject land is provided in **Appendix B**.

Priority weeds for the Greater Sydney Region recorded on the subject land are listed in **Table 1**.

### 6.1.4. Best Management Practice

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

- The main principles of the Bradley Method of bush regeneration, i.e. not over-clearing (remove only targeted species), employment of minimal disturbance techniques to avoid soil and surrounding vegetation disturbance, and replacement of disturbed mulch/leaf-litter;
- Removal of fruiting/seeding parts of weeds carefully, when present, to minimise spread of plant propagules;
- Use of chemicals and sprays only during suitable weather conditions (i.e. not during wet or windy conditions), and only during appropriate seasons;
- All equipment should be thoroughly cleaned prior to entering the site to minimise contamination;
- Proximity to watercourses and swampy areas; and
- Presence of native fauna or nesting/breeding sites.

### 6.1.5. Weed Control Methods

Weed control is to be implemented across the VMP Area. Weed control works should be approached using the strategies outlined below.

#### 6.1.5.1. 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.

#### 6.1.5.2. Use of Herbicides

All herbicides should be used according to recommendations on the herbicide label. Appropriate Personal Protective Equipment (PPE) should be worn and consideration given to time of day, likelihood of rainfall, wind direction and likely impact on native species as per guidelines on the label. Use of glyphosate will be appropriate for most species. Glyphosate is the preferred herbicide for use in environmentally sensitive areas as it is rapidly broken down by microbes in the soil so residue is short lived and will not affect remnant and planted native individuals in the long term following application. 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.

### 6.1.6. Types of Weed Control

#### 6.1.6.1. Primary Weeding

Primary weeding is the first stage of bushland regeneration. Primary weeding may involve techniques such as:

- The selective spraying of weeds, with selective and non-selective herbicides (targeting weeds listed in **Table 1**);
- Cutting/scraping and painting deep rooted woody weeds and climbers with hand tools, chainsaws and brush cutters and painting cut stumps with herbicides containing Glyphosate or Picloram;
- Target drilling and injecting certain large tree weeds such as willow with herbicides such as Glyphosate; and
- Selective hand removal of weeds and wicker wiping of tall herbaceous weeds in situations where damage to proximate, low growing native plants can be avoided.



Primary weeding in the VMP Area can be implemented over the course of the initial period of regeneration works, and/or anytime after 10 days of herbicide application. Primary weeding can be implemented immediately after DA approval.

#### **6.1.6.2. Follow up Weeding**

Follow-up weeding is undertaken in areas that have received past primary weeding treatments and involves the selective removal or treatment of weeds, whilst allowing regenerating or planted native plants to grow. All weeds should be targeted where possible during the follow-up weeding phase. The follow-up bushland regeneration works are likely to be required once a month until weeds are at negligible levels. Site visits may be more frequent if determined necessary.

It is recommended that woody weeds, climbers, and key herbaceous weeds are subject to a programme of intense follow up weeding around any regenerating native plants to encourage the spread of the native plant species.

Follow-up weeding should be implemented for a minimum period of five continuous years for the VMP area, after primary weeding and revegetation works have been completed. After the five-year follow-up and maintenance period has been completed, a review should be conducted to determine ongoing on-site maintenance requirements necessary to maintain ESBS health into perpetuity.

## **6.2. Weed Management in the VMP Area**

The VMP Area has become slightly modified and degraded as a result of historic and surrounding land uses. In order to successfully rehabilitate and improve the health of the ESBS within the VMP Area, weeding and revegetation works are required. The details of these works are provided below and the directions under the following headings should be undertaken sequentially.

### **6.2.1. Site-preparation for Revegetation**

Prior to commencing weed management in the VMP Area, the ground layer should be searched for native shrubs, herbs and grasses present within the area. These plants where practical should have a plastic tree guard installed around them to protect them from herbicide drift.

### **6.2.2. Primary Weeding**

The goal of primary weeding in the VMP Area will be to eliminate all the priority weeds and larger weed infestations to allow planting to take place to fill gaps in the understorey and canopy without competition from weed species.

The first priority for weed treatment will be targeting mature individuals of State Level Priority Weeds and Regional Priority Weeds if present in the VMP Area (**Table 1**). Many of these species are perennial and take several years to reach reproductive maturity so are easily controlled provided juveniles are continuously eradicated before reaching maturity. Following control of mature individuals of priority weed species, primary weeding should be undertaken throughout the VMP Area areas. The aims of primary weeding will be:

- Eliminating any woody weed species; and

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

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

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

### 6.2.3. Ongoing Weed Maintenance in the VMP Area

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**.

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

Tree guards should remain around native remnant plants, and native plants that have been planted, for at least six months to protect them from herbivory. Rabbits can devastate revegetation areas soon after planting, if tree guards are not used. Tree guards will also allow herbicide to be used, without damage to native plants through herbicide drift.

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

1. Initially the bushland regeneration team visiting the site should sweep from one end of each area to the other. During this sweep, weeds within each tree guard alongside native plants should be removed by hand along with any weeds within an area dominated by native species (such as a patch of native grasses). During this sweep, woody weeds that require other techniques such as manual removal, stem injection or basal bark application etc. should be targeted.
2. A member of the team should then sweep the entire area, spraying all regrowth weeds between native plantings/remnant natives in open areas with herbicide, and spot spraying where possible in regeneration areas.

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

During site visits for weed control, Priority Weeds (**Table 1**) should be prioritised for control. Individuals of these species should also not be allowed to set seed.

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

All vegetation to be removed from the VMP Area and subject land will be disposed of at a waste facility that accepts and processes green waste, and will be transported in a manner that prevents the spread of exotic weed propagules.

# 7. Revegetation Plan

## 7.1. Introduction

The Revegetation Plan has been prepared to re-establish the buffer area (Zone 2) along the boundaries of Lot 22 and Lot 23. The revegetation of Zone 2 with species indicative of ESBS within the VMP Area will also enhance the value of the VMP Area as a habitat resource for native fauna species.

## 7.2. Objectives

The long term management goal of Zone 2 is be to revegetate the ground and shrub layers of Zone 2 to provide high quality native vegetation comprised of ESBS species. The short to medium term management goals should be to eradicate all major weed infestations.

The aim for Zone 2 is to achieve the following performance-based outcomes:

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

## 7.3. Recommended Revegetation Techniques

Following site preparation, revegetation works will take place in Zone 2 using the planting of seedlings propagated from locally sourced plant material.

Appropriate species for ESBS revegetation within the VMP Area are provided in **Appendix C**. The species identified in **Appendix C** should be used for revegetation and all plants will be sourced from local provenance; these may come from seed collections or cuttings from within the existing remnant vegetation within and surrounding the VMP Area. If required, in order to ensure increased diversity, tube stock of species identified in **Appendix C** may be acquired from nearby native plant nurseries, in the event that seed collections do not deliver sufficient diversity.

Although protocols are outlined below for revegetation through planting, as the VMP Area still contains native species, it is considered appropriate that direct seeding is used in combination with weed control to restore the ground layer in some areas. Direct seeding can also be used in conjunction with planting within Zone 2. The specific combination of planting and direct seeding should be determined through a cost/benefit analysis undertaken by the contracted bushland regeneration company.

Planting densities and a species planting list has been provided for ESBS in subsequent sections of this VMP and in **Appendix C**.

### 7.3.1. Species Selection and Planting Densities for ESBS

#### 7.3.1.1. Species Selection

It is recommended that a mix of local small trees, shrubs, and ground layer plants are replanted at the specified densities outlined below. Lists of suitable ESBS plant species for revegetation are provided in **Appendix C**.

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:

- Nursery location within 10 km of the subject land;
- Availability of seed material;
- Exclusion of plants likely to naturally regenerate on the site; and
- Previous experience with species re-vegetation performance.

#### 7.3.1.2. Planting Densities

The recommended revegetation planting specifications for ESBS are as follows:

- Small Trees/ Shrubs @ 4 unit / 10 m<sup>2</sup>
- Groundcovers @ 4 unit / 1m<sup>2</sup> (can be planted in clumps)

Planting densities should be modified as required (reduced) with regard to existing native vegetation within specific structural layers within a specific patch identified for revegetation. Additionally, any plant dieback should be replaced by new plantings in order to maintain the densities provided above.

### 7.3.2. Characteristic Planting Units

It is advised that species should be planted in characteristic planting units to correspond with the topology, aspect, soil type and proximity to water.

Grasses may be planted in clumps of 3+ (spaced 15–20 cm apart within clumps) to generate physical / structural support for each other and microclimates. Wind pollinated grasses such as *Eragrostis brownii* may be planted in clumps to create a natural grassy understorey.

### 7.3.3. Plant Supply

All plants must be sourced from local provenance, ideally within 10 km of the subject land. If required, prior to the initiation of planting procedures it may be necessary to collect or source suitable quantities of local native seed to ensure suitable volumes of seed are available for the propagation phase of the bushland revegetation works programme.

Local native plant species should be collected using principles prescribed in 'Bringing the Bush back to Western Sydney' (DIPNR 2003). Seeds and vegetative propagules to be collected and propagated in a local commercial

or community nursery should be of local provenance and ideally sourced not more than 10 km from the subject land.

## 7.4. Maintenance of Plantings

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. Re-growing weeds will be treated following planting as detailed in **Chapter 6**.

Provision should be made to water newly reconstructed areas, as required, in the first three months after installation, (on at least four to five occasions, depending on rainfall). Plants that have died should be replaced as required. Plants that have died should be replaced by the bushland maintenance team with a planting of the same form during the next site visit by the team. At the end of the maintenance period the density of living planted plants should be as outlined in **Section 7.3.1.2**.

## 7.5. Protective Fencing

Protective fencing is already installed around Zone 1 in order to prohibit public access into this section of the VMP Area and eliminate illegal dumping. This fencing must be checked on a regular basis (minimum annually) to identify any damage and associated maintenance requirements, and any necessary repairs should be conducted.

Fencing will be updated to include permanent educational signage that will identify the importance of the vegetation being managed as well as any threatened species that are known to utilise the community. It is expected that the signage installed will have to be approved by Council prior to its installation.

## 8. Monitoring and Reporting

A project manager/supervisor with the Bushland Regeneration Contractor (BRC) should be assigned to coordinate, supervise, and manage all works and correspondence with respect to the revegetation using ESBS species. Ideally, the project manager must be available for the duration of the project and become familiar with the site and progress of all aspects of works undertaken.

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

### 8.1. Monitoring Program

The following monitoring activities are to be conducted within the VMP Area, unless otherwise stated as part of the monthly site visits:

- Note any weed outbreaks in the regeneration and revegetation areas;
- Note approximate survival percentage of plantings;
- Note areas where erosion control is inadequate and needed; and
- Photographs taken from northern-eastern corner (Photograph Monitoring Point) of each monitoring quadrat facing across the quadrat (south-west).

These notes are both to be reported in the annual monitoring report, and to be used to plan priorities for the next month's regeneration works. The locations of the monitoring points are provided in **Figure 2** and **Table 2**.

Each six months a site inspection will be conducted to survey monitoring quadrats. Monitoring will be undertaken in three 2 m x 10 m quadrats within the VMP Area. The locations of monitoring quadrats are provided in **Figure 2** and **Table 2**. In each monitoring quadrat notes will be made of the following:

- Percentage coverage of exotic and native species;
- Native and exotic species present;
- Percentage survival of native plantings; and
- Photopoints to be established on one corner of each monitoring plot (**Figure 2**)

**Table 2 Locations of Six Monthly Monitoring Plots**

Monitoring Plot Number	Easting	Northing	Vegetation Community to be Revegetated/Regenerated
1	337500.9	6247592	ESBS
2	337529.7	6247565	ESBS
3	337566.5	6247472	ESBS

## 8.2. Reporting

A brief and concise report should be submitted every year for the life of the VMP (5 years). This report will be forwarded to Waverly Council and will provide a record of the implementation of the VMP. The report will:

- Describe the bushland regeneration works undertaken;
- State the findings of the monitoring activities;
- Discuss any problems encountered in implementing the VMP; and
- Recommend any adaptations or additions to the VMP.

The report should contain the photographs taken during the monitoring surveys, as well as a short description of weeds in the VMP Area and a short comparison of the photographs to the previous years. The report should also recommend and prioritise areas where weed control should be targeted within the VMP Area.

A final report should be prepared at the end of the initial five-year intensive management period of the VMP documenting the success of the works against performance criteria. Although it is intended that management of the VMP Area will continue in perpetuity, this VMP will be current only for the first five years. After this time, management requirements will be reviewed and if required a new VMP will be prepared to guide subsequent management of the VMP Area.



# 9. Timing and Responsibilities

The VMP Area is to be managed in a series of phases as follows:

- Phase 1 – Site Preparation;
- Phase 2 – Restoration Works Commence;
- Phase 3 – Maintenance; and
- Phase 4 – Monitoring and Reporting

Timing and responsibilities at each phase of management within the VMP Area are shown within **Table 3**. This table assigns each activity within each phase to those responsible.

**Table 3 Timing and Responsibilities**

Management	Action	Responsibility	Key Performance Indicators	Timing
<b>Phase 1: Site Preparation</b>				
VMP Area	Delineation of clearing boundary	Property Owner or Construction Subcontractor	Existing fencing remains in place in Zone 1 Removal of any hardstand areas in Zone 2	Before construction works commence
VMP Area	Establish fixed monitoring points and quadrats	Bush Regeneration Contractor or Ecologist	3 monitoring plots established (star pickets or stakes with flagging tape installed at the north-east corner) GPS locations of all monitoring plots (3 total) corners recorded (12 total)	Prior to commencement of Revegetation and Weeding works
Extent of Development	Vegetation Clearance	Construction Contractor	Vegetation removed across Development Footprint	During Construction Works
VMP Area	Installation of educational signage on fencing	Property Owner or Construction Subcontractor	Permanent fencing and educational signage has been installed around Zone 1 in the VMP Area	Prior to commencement of Revegetation and Weeding works.

Management	Action	Responsibility	Key Performance Indicators	Timing
<b>Phase 2: Restoration Works</b>				
VMP Area	Fixed Point Monitoring	Bush Regeneration Contractor	Photographs (3 total) taken of fixed monitoring sites before initial weeding	Prior to commencement of restoration works for each area.
VMP Area	Carry out primary weeding	Bush Regeneration Contractor	0 large weed infestations remaining 0 reproductively mature priority weeds and woody weeds remaining	First two months of restoration works
VMP Area	Shrubs and ground cover ESBS species planted throughout VMP Area	Bush Regeneration Contractor	Native plants planted (species from <b>Appendix C</b> and Planting Schedule) at following densities: Small Trees/ Shrubs @ 4 unit / 10 m <sup>2</sup> Groundcovers @ 4 unit / 1m <sup>2</sup>	First two months of restoration works
VMP Area	Fixed Point Monitoring	Bush Regeneration Contractor	Photographs (3 total) of fixed monitoring sites to compare the survival and retention of plantings.	Every 3 months after the first year of plantings immediately prior to monthly works. Every 6 months following the initial year for five year intensive maintenance period under the VMP.
<b>Phase 3: Maintenance</b>				
VMP Area	Carry out maintenance weeding	Bush Regeneration Contractor	0 new weed species or infestations at end of each visit	Monthly for duration of 5 year intensive

Management	Action	Responsibility	Key Performance Indicators	Timing
	(control of all weed species including annual weeds) throughout VMP Area			maintenance period under VMP
VMP Area	Maintenance of plantings	Bush Regeneration Contractor	<p>0 dead plantings remaining (each replaced with new planting)</p> <p>Plants watered when drought stressed.</p> <p>Additional plantings where required due to observed gaps in any strata. Densities for each stratum will be as below or greater:</p> <p>Small Trees/ Shrubs @ 4 unit / 10 m<sup>2</sup></p> <p>Groundcovers @ 4 unit / 1m<sup>2</sup></p>	Monthly duration of 5 year maintenance period under VMP
<b>Phase 4: Monitoring and reporting</b>				
VMP Area	Biannual inspection of site	Bushland Management or Ecologist	Site inspection completed as outlined in <b>Chapter 8.</b>	Every 6 months for 5 year maintenance period of VMP
VMP Area	Progress report preparation	Bushland Management or Ecologist	Annual Report prepared on progress of restoration works.	Once a year for the 5 year maintenance period of VMP
VMP Area	Final Inspection of Site	Bushland Management or Ecologist	Final inspection carried out at completion of 5 years of maintenance under VMP.	After 5 years of maintenance under VMP
VMP Area	Final Report	Bushland Management or Ecologist	Final report prepared detailing success of restoration or outlining further works needed.	After 5 years of maintenance under VMP

# 10. References

Botanic Gardens Trust (2008). Best Practice Management Guidelines for *Phytophthora cinnamomi* within the Sydney Metropolitan Catchment Management Authority Area. Sydney, Botanic Gardens Trust Royal Botanic Gardens.

CPaMPT (2018). "Centennial Parklands and York Road Eastern Suburbs Banksia Scrub."

DPI (2017). Fact Sheet: Weed Management Legislation is Changing. D. o. P. Industries.

Landcom (2004). Managing Urban Stormwater: Soils and Construction ("Blue Book"), Fourth Edition, NSW Government, Parramatta.

LLS: Greater Sydney, Ed. (2017). Greater Sydney Regional Strategic Weed Management Plan 2017 - 2022, Local Land Services NSW.

OEH (2016). The Native Vegetation of the Sydney Metropolitan Area - VIS ID 4489. Sydney, Office of Environment and Heritage.

Botanic Gardens Trust (2008). Best Practice Management Guidelines for *Phytophthora cinnamomi* within the Sydney Metropolitan Catchment Management Authority Area. Sydney, Botanic Gardens Trust Royal Botanic Gardens.

CPaMPT (2018). "Centennial Parklands and York Road Eastern Suburbs Banksia Scrub."

DPI (2017). Fact Sheet: Weed Management Legislation is Changing. D. o. P. Industries.

Landcom (2004). Managing Urban Stormwater: Soils and Construction ("Blue Book"), Fourth Edition, NSW Government, Parramatta.

LLS: Greater Sydney, Ed. (2017). Greater Sydney Regional Strategic Weed Management Plan 2017 - 2022, Local Land Services NSW.

OEH (2013). The Native Vegetation of the Sydney Metropolitan Area. Volume 2: Vegetation Community Profiles. Sydney, NSW Office of Environment and Heritage.

Botanic Gardens Trust (2008). Best Practice Management Guidelines for *Phytophthora cinnamomi* within the Sydney Metropolitan Catchment Management Authority Area. Sydney, Botanic Gardens Trust Royal Botanic Gardens.

CPaMPT (2018). "Centennial Parklands and York Road Eastern Suburbs Banksia Scrub."

DPI (2017). Fact Sheet: Weed Management Legislation is Changing. D. o. P. Industries.

Landcom (2004). Managing Urban Stormwater: Soils and Construction ("Blue Book"), Fourth Edition, NSW Government, Parramatta.

LLS: Greater Sydney, Ed. (2017). Greater Sydney Regional Strategic Weed Management Plan 2017 - 2022, Local Land Services NSW.

OEH (2013). The Native Vegetation of the Sydney Metropolitan Area. Volume 2: Vegetation Community Profiles. Sydney, NSW Office of Environment and Heritage.

# APPENDIX A :

## Flora Survey Data



**Table 4 List of Flora Species Within Subject Land**

Family	Scientific Name	Common Name	Exotic	ESBS (BAM Plot)
Fabaceae (Mimosoideae)	<i>Acacia falcata</i>			
Fabaceae (Mimosoideae)	<i>Acacia longifolia</i>			
Fabaceae (Mimosoideae)	<i>Acacia longifolia</i> var. <i>sophorae</i>	Coastal Wattle		Yes
Fabaceae (Mimosoideae)	<i>Acacia suaveolens</i>	Sweet Wattle		Yes
Fabaceae (Mimosoideae)	<i>Acacia ulicifolia</i>	Prickly Moses		Yes
Polygonaceae	<i>Acetosa sagittata</i>	Rambling Dock	*	
Alliaceae	<i>Agapanthus praecox</i> subsp. <i>orientalis</i>		*	
Apiaceae	<i>Apium graveolens</i>	Celery	*	
Asparagaceae	<i>Asparagus aethiopicus</i>	Asparagus Fern	*	
Ericaceae	<i>Astroloma pinifolium</i>	Pine Heath		Yes
Poaceae	<i>Austrostipa pubescens</i>			Yes
Proteaceae	<i>Banksia aemula</i>	Wallum Banksia		
Poaceae	<i>Austrostipa pubescens</i>			
Proteaceae	<i>Banksia integrifolia</i>	Coast Banksia		
Asteraceae	<i>Bidens pilosa</i>	Cobbler's Pegs	*	
Fabaceae (Faboideae)	<i>Bossiaea heterophylla</i>	Variable Bossiaea		Yes
Poaceae	<i>Bromus catharticus</i>	Praire Grass	*	
Poaceae	<i>Bromus catharticus</i>	Praire Grass	*	
Buxaceae	<i>Buxus microphylla</i>		*	
Brassicaceae	<i>Cardamine hirsuta</i>	Common Bittercress	*	
Casuarinaceae	<i>Casuarina glauca</i>	Swamp Oak		
Ulmaceae	<i>Celtis sinensis</i>	Japanese Hackberry	*	
Poaceae	<i>Cenchrus clandestinus</i>	Kikuyu Grass	*	
Poaceae	<i>Cenchrus setaceus</i>	Fountain Grass	*	
Caryophyllaceae	<i>Cerastium glomeratum</i>	Mouse-ear Chickweed	*	
Solanaceae	<i>Cestrum parqui</i>	Green Cestrum	*	
Lauraceae	<i>Cinnamomum camphora</i>	Camphor Laurel	*	
Asteraceae	<i>Conyza bonariensis</i>	Flaxleaf Fleabane	*	Yes
Asteraceae	<i>Conyza sumatrensis</i>	Tall fleabane	*	
Sapindaceae	<i>Cupaniopsis anacardioides</i>	Tuckeroo		
Lythraceae	<i>Cuphea hyssopifolia</i>		*	

Family	Scientific Name	Common Name	Exotic	ESBS (BAM Plot)
Apiaceae	<i>Cyclospermum leptophyllum</i>	Slender Celery	*	
Poaceae	<i>Cynodon dactylon</i>	Common Couch		
Cyperaceae	<i>Cyperus gracilis</i>	Slender Flat-sedge		
Phormiaceae	<i>Dianella caerulea</i>	Blue Flax-lily		Yes
Phormiaceae	<i>Dianella caerulea</i> var. <i>producta</i>			
Phormiaceae	<i>Dianella revoluta</i>	Blueberry Lily		Yes
Poaceae	<i>Dichelachne crinita</i>	Longhair Plumegrass		Yes
Poaceae	<i>Ehrharta erecta</i>	Panic Veldtgrass	*	
Poaceae	<i>Eragrostis tenuifolia</i>	Elastic Grass	*	
Fabaceae (Faboideae)	<i>Erythrina x sykesii</i>	Coral tree	*	
Myrtaceae	<i>Eucalyptus robusta</i>	Swamp Mahogany		
Myrtaceae	<i>Eucalyptus scoparia</i>	Wallangarra White Gum		
Asteraceae	<i>Euchiton sphaericus</i>	Star Cudweed		Yes
Poaceae	<i>Festuca</i> spp.			
Cyperaceae	<i>Ficinia nodosa</i>	Knobby Club-rush		
Moraceae	<i>Ficus benjamina</i>	Weeping Fig	*	
Moraceae	<i>Ficus rubiginosa</i>	Port Jackson Fig		
Oleaceae	<i>Fraxinus</i> spp.		*	
Asteraceae	<i>Gamochaeta americana</i>	Purple Cudweed	*	
Asteraceae	<i>Gamochaeta pensylvanica</i>	Cudweed	*	Yes
Proteaceae	<i>Grevillea</i> spp.			
Asteraceae	<i>Hypochoeris radicata</i>	Catsear	*	
Bignoniaceae	<i>Jacaranda mimosifolia</i>	Jacaranda	*	
Myrtaceae	<i>Kunzea ambigua</i>	Tick Bush		Yes
Verbenaceae	<i>Lantana camara</i>	Lantana	*	
Myrtaceae	<i>Leptospermum laevigatum</i>	Coast Teatree		Yes
Ericaceae	<i>Leucopogon juniperinus</i>	Prickly Beard-heath		Yes
Poaceae	<i>Lolium perenne</i>	Perennial Ryegrass	*	
Lomandraceae	<i>Lomandra hystrix</i>			
Lomandraceae	<i>Lomandra longifolia</i>	Spiny-headed Mat- rush		Yes
Primulaceae	<i>Lysimachia arvensis</i>	Scarlet Pimpernel	*	

Family	Scientific Name	Common Name	Exotic	ESBS (BAM Plot)
Fabaceae (Faboideae)	<i>Medicago polymorpha</i>	Burr Medic	*	
Myrtaceae	<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark		
Myrtaceae	<i>Melaleuca styphelioides</i>	Prickly-leaved Tea Tree		
Meliaceae	<i>Melia azedarach</i>	White Cedar		
Poaceae	<i>Microlaena stipoides</i>	Weeping Grass		Yes
Ericaceae	<i>Monotoca elliptica</i>	Tree Broom-heath		Yes
Ericaceae	<i>Monotoca elliptica</i>	Tree Broom-heath		
Oleaceae	<i>Olea europaea</i>	Common Olive	*	
Convallariaceae	<i>Ophiopogon japonicus</i>	Dwarf lilyturf	*	
Oxalidaceae	<i>Oxalis corniculata</i>	Creeping Oxalis	*	
Urticaceae	<i>Parietaria judaica</i>	Pellitory	*	
Caryophyllaceae	<i>Paronychia brasiliensis</i>	Chilean Whitlow Wort, Brazilian Whitlow	*	
Passifloraceae	<i>Passiflora edulis</i>	Common Passionfruit	*	
Proteaceae	<i>Persoonia lanceolata</i>	Lance Leaf Geebung		Yes
Arecaceae	<i>Phoenix canariensis</i>	Canary Island Date Palm	*	
Pinaceae	<i>Pinus radiata</i>	Radiata Pine	*	
Pittosporaceae	<i>Pittosporum undulatum</i>	Sweet Pittosporum		
Plantaginaceae	<i>Plantago lanceolata</i>	Lamb's Tongues	*	
Plumbaginaceae	<i>Plumbago auriculata</i>	Cape leadwort	*	
Poaceae	<i>Poa annua</i>	Winter Grass	*	
Caryophyllaceae	<i>Polycarpon tetraphyllum</i>	Four-leaved Allseed	*	
Amygdalaceae	<i>Prunus spp.</i>		*	
Asteraceae	<i>Soliva sessilis</i>	Bindyi	*	
Asteraceae	<i>Sonchus asper</i>	Prickly Sowthistle	*	
Asteraceae	<i>Sonchus oleraceus</i>	Common Sowthistle	*	
Asteraceae	<i>Sonchus spp.</i>	Sowthistle		
Poaceae	<i>Sporobolus africanus</i>	Parramatta Grass	*	
Caryophyllaceae	<i>Stellaria media</i>	Common Chickweed	*	
Poaceae	<i>Stenotaphrum secundatum</i>	Buffalo Grass	*	



Family	Scientific Name	Common Name	Exotic	ESBS (BAM Plot)
Asteraceae	<i>Taraxacum officinale</i>	Dandelion	*	Yes
Fabaceae (Faboideae)	<i>Trifolium repens</i>	White Clover	*	
Myrtaceae	<i>Tristania laurina</i>	Kanooka		
Campanulaceae	<i>Wahlenbergia gracilis</i>	Sprawling Bluebell		Yes
Lamiaceae	<i>Westringia fruticosa</i>	Coastal Rosemary		
Apiaceae	<i>Xanthosia pilosa</i>	Woolly Xanthosia		Yes
Agavaceae	<i>Yucca aloifolia</i>	Spanish Bayonet	*	

# APPENDIX B :

## Weed Control Methods



**Table 5 Weed Control Treatment Methods**

Family	Scientific Name	Common Name	Status	Control Method
Agavaceae	<i>Yucca aloifolia</i>		No Status	<ul style="list-style-type: none"> <li>- Wear thick protective clothing and gloves and eye protection to protect against sharp leaf spines</li> <li>- Cut plant at base with hand saw and apply undiluted glyphosphate to cut stume</li> </ul>
Alliaceae	<i>Agapanthus praecox subsp. orientalis</i>	Agapanthus	Other Weed of Regional Concern	<ul style="list-style-type: none"> <li>- Plant is resistant to herbicide</li> <li>- Needs to be dug out with a mattock, or hand mattock, with care taken to remove all rhizomes (rhizomes should be bagged and removed from site)</li> </ul>
Rosaceae	<i>Prunus spp.</i>		No Status	<ul style="list-style-type: none"> <li>- Hand weed or if not possible cut-back to stump and paint stem with undiluted Glyphosate</li> </ul>
Apiaceae	<i>Apium graveolens</i>	Celery	No Status	<ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>
Apiaceae	<i>Cyclospermum leptophyllum</i>	Slender Celery	No Status	<ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>
Arecaceae	<i>Phoenix canariensis</i>	Phoenix palm, Canary Island date palm	Other Weed of Regional Concern	<ul style="list-style-type: none"> <li>- Large trees require an arborist to safely remove</li> <li>- PPE including thick leather gloves and eye protection should be used when handling small individuals due to dangerous spines at leaf bases</li> <li>- Cut all leaves off at base with long handles loppers</li> <li>- Remove leaves from site for safety of other site users (handle with caution due to spines)</li> <li>- Cut tree below crown and leave stump to rot</li> <li>- Use hand tools such as a trowel or knife to dig up seedlings</li> </ul>
Asparagaceae	<i>Asparagus aethiopicus</i>	Asparagus weed	State Priority - Asset Protection ; WONS	<ul style="list-style-type: none"> <li>- Any branches profuse with fruit should be cut with secateurs and bagged to prevent further spread of species by birds</li> <li>- Juvenile plants can be eased out of soil with a trowel or knife - care should be taken to remove below ground plant material</li> </ul>

Family	Scientific Name	Common Name	Status	Control Method
				<ul style="list-style-type: none"> <li>- For large, mature plants the woody crown at the base can be cut around with a sharp knife, or hacked out with a mattock or peter lever and removed - it is easiest to cut all branches off near the base with secateurs prior to removing crown - plant will not resprout from water storing tubers or roots below ground so these can be left to rot to reduce soil disturbance.</li> <li>- Spray mature and juvenile plants with metsulfuron methyl 6g/100mL + surfactant</li> </ul>
Asteraceae	<i>Bidens pilosa</i>	Cobbler's Pegs	No Status	<ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>
Asteraceae	<i>Conyza bonariensis</i>	Flaxleaf Fleabane	No Status	<ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>
Asteraceae	<i>Conyza sumatrensis</i>	Tall Fleabane	No Status	<ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L - On-going grubbing (all year)</li> </ul>
Asteraceae	<i>Gamochaeta americana</i>	Cudweed	No Status	<ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>
Asteraceae	<i>Gamochaeta pensylvanica</i>	Cudweed	No Status	<ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>
Asteraceae	<i>Hypochoeris radicata</i>	Catsear	No Status	<ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>
Asteraceae	<i>Soliva sessilis</i>	Bindyi	No Status	<ul style="list-style-type: none"> <li>- Blanket-spray all the affected lawn with herbicides containing bromoxynil plus MCPA</li> </ul>
Asteraceae	<i>Sonchus asper</i>	Sow Thistle	No Status	<ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>
Asteraceae	<i>Sonchus oleraceus</i>	Milk Thistle	No Status	<ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>
Asteraceae	<i>Taraxacum officinale</i>	Dandelion	No Status	<ul style="list-style-type: none"> <li>- Hand Weed</li> <li>- Spot Spray - Glyphosate 10mL/1L</li> </ul>
Bignoniaceae	<i>Jacaranda mimosifolia</i>	Jacaranda	No Status	<ul style="list-style-type: none"> <li>- Hand weed seedlings or spray with glyphosate 10mL/1L</li> <li>- Cut larger individuals/trees to ground level with hand saw or chainsaw and apply undiluted</li> </ul>

Family	Scientific Name	Common Name	Status	Control Method
				glyphosate to cut stump - Large trees need to be felled by an arborist
Brassicaceae	<i>Cardamine hirsuta</i>	Common Bittercress	No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Buxaceae	<i>Buxus microphylla</i>		No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Caryophyllaceae	<i>Cerastium glomeratum</i>	Mouse-ear Chickweed	No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Caryophyllaceae	<i>Paronychia brasiliensis</i>	Chilean Whitlow Wort	No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Caryophyllaceae	<i>Polycarpon tetraphyllum</i>		No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Caryophyllaceae	<i>Stellaria media</i>	Common Chickweed	No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Convallariaceae	<i>Ophiopogon japonicus</i>		No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Fabaceae (Faboideae)	<i>Erythrina x sykesii</i>	Coral tree, Common coral tree	Other Weed of Regional Concern	- Cut and paint mature individuals with undiluted glyphosate (will require an arborist for removal of large trees) - Inject stem with undiluted glyphosate - All vegetative material from removed tree/shrub needs to be contained and disposed of carefully (burnt or taken to landfill); the species will regrow vegetatively from twigs, branches, logs, and on occasion, woodchipped material
Fabaceae (Faboideae)	<i>Medicago polymorpha</i>	Burr Medic	No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Fabaceae (Faboideae)	<i>Trifolium repens</i>	White Clover	No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Lauraceae	<i>Cinnamomum camphora</i>	Camphor laurel	Other Weed of Regional Concern	- Hand weed seedlings - Spray seedlings and coppice regrowth with glyphosate 10mL/1L - Drill and inject stem with, or chisel and apply, undiluted glyphosate - Cut and paint stump with undiluted glyphosate (will require an arborist for large trees)

Family	Scientific Name	Common Name	Status	Control Method
				- Cut and grind stump of large trees (arborist)
Lythraceae	<i>Cuphea hyssopifolia</i>		No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Moraceae	<i>Ficus benjamina</i>	Weeping fig	No Status	- Hand weed seedlings or spray with glyphosate 10mL/1L - Cut larger individuals/trees to ground level with hand saw or chainsaw and apply undiluted glyphosate to cut stump
Oleaceae	<i>Fraxinus spp.</i>		No Status	- Spray juveniles with glyphosate 10mL/1L - Cut mature individuals with saw or loppers near ground level and paint stump with undiluted glyphosate or Triclopyr (600g/L formulation)/diesel at 4L/60L concentration (as per Garlon 600 label)
Oleaceae	<i>Olea europaea</i>	Olive (subspecies required)	Regional Priority	- Spray juveniles with glyphosate 10mL/1L - Cut mature individuals with saw or loppers near ground level and paint stump with undiluted glyphosate or Triclopyr (600g/L formulation)/diesel at 4L/60L concentration (as per Garlon 600 label) - Use a power drill (9mm drill bit with dowelling tip) to drill holes less than 20 mm apart throughout lignotuber of mature trees and fill holes with glyphosate a 1:5 mixture with water. After all holes have been filled with herbicide mixture refill holes with herbicide mixture a second time (plant will have absorbed herbicide by this time). Check trees monthly for regrowth and repeat treatment if resprouting foliage is observed
Oxalidaceae	<i>Oxalis corniculata</i>	Yellow Wood Sorrel	No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Passifloraceae	<i>Passiflora edulis</i>	Passionfruit	No Status	- Hand weed Juveniles - Dig roots out of ground for larger individuals or use secateurs to cut the

Family	Scientific Name	Common Name	Status	Control Method
				vine near the base and treat cut surface with undiluted glyphosate
Pinaceae	<i>Pinus radiata</i>	Radiata pine, Pine wildings	Other Weed of Regional Concern	- 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. - 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
Plantaginaceae	<i>Plantago lanceolata</i>	Lamb's Tongues	No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Plumbaginaceae	<i>Plumbago auriculata</i>	Blue Plumbago	No Status	- Cut shrub at base with loppers or secateurs and apply undiluted glyphosphate to cut stump - Dig shrub out with mattock or other hand tools
Poaceae	<i>Bromus catharticus</i>	Brome Grass	No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	<i>Cenchrus clandestinus</i>	Kikuyu	Other Weed of Regional Concern	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	<i>Cenchrus setaceus</i>	Fountain grass	Other Weed of Regional Concern	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	<i>Ehrharta erecta</i>	Panic Veldtgrass	No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	<i>Eragrostis tenuifolia</i>	Elastic Grass	No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	<i>Lolium perenne</i>	Perennial Ryegrass	No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	<i>Poa annua</i>	Winter Grass	No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Poaceae	<i>Sporobolus africanus</i>	Parramatta Grass	No Status	- Dispose of waste carefully, as smallest cutting can regrow.

Family	Scientific Name	Common Name	Status	Control Method
Poaceae	<i>Stenotaphrum secundatum</i>	Buffalo Grass	No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Polygonaceae	<i>Acetosa sagittata</i>	Turkey rhubarb	Other Weed of Regional Concern	- Bag and remove seed present on mature plants - Cut vines close to the ground and dig out as much as of root system and tubers as possible - Juvenile plants growing from seed can be dug out or hand pulled - Tuber at base of plant needs to be removed - On individuals with deep and difficult to remove tubers, stems can be scraped on one side with a blade for a length of 45cm and scraped area painted with undiluted glyphosate - This treatment may need to be repeated on subsequent site visits - On plants with difficult and deep to remove tubers the tubers close to the surface can also be scraped and painted with undiluted glyphosate
Primulaceae	<i>Lysimachia arvensis</i>	Scarlet Pimpernel	No Status	- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Solanaceae	<i>Cestrum parqui</i>	Green cestrum	Regional Priority	- Hand weed juveniles - Scrape stem and paint with undiluted glyphosate - Cut all above ground suckering individuals with loppers or saw and paint stumps with undiluted glyphosate - Spray regrowth foliage with glyphosate 10mL/1L
Cannabaceae	<i>Celtis sinensis</i>	Chinese celtis/ Chinese hackberry	Other Weed of Regional Concern	- Hand weed seedlings - Spray seedlings and coppice regrowth with glyphosate 10mL/1L - Drill and inject stem with, or chisel and apply, undiluted glyphosate - Cut and paint stump with undiluted glyphosate (will require an arborist for large trees) - Cut and grind stump of large trees (arborist)



Family	Scientific Name	Common Name	Status	Control Method
Urticaceae	<i>Parietaria judaica</i>	Pellitory, Asthma weed	Other Weed of Regional Concern	- Spray large areas of weed with glyphosate 10ml/L and follow up by removing or spraying any seedlings for several months at least.
Verbenaceae	<i>Lantana camara</i>	Lantana	State Priority - Asset Protection ; WONS	- Hand weed juveniles and regrowth from small pieces - Spot spray with glyphosate 10mL/1L - Slash using brushcutter, or hand cut with loppers, and spray regrowth foliage with glyphosate 10mL/1L - Cut near ground level and paint with undiluted glyphosate - Some individuals will have stumps which will still regrow foliage, spray regrowth foliage with glyphosate 10mL/1L

# APPENDIX C :

## ESBS Planting List



**Table 6 ESBS Plant List**

Family	Scientific Name	Common Name
<b>Small Trees</b>		
Casuarinaceae	<i>Allocasuarina distyla</i>	Scrub She-Oak
Elaeocarpaceae	<i>Elaeocarpus reticulatus</i>	
Ericaceae	<i>Monotoca elliptica</i>	Tree Broom Heath
Fabaceae (Mimosoideae)	<i>Acacia suaveolens</i>	Sweet Wattle
Fabaceae (Mimosoideae)	<i>Acacia longifolia</i>	
Fabaceae (Mimosoideae)	<i>Acacia longifolia subsp. sophorae</i>	Coast Wattle
Myrtaceae	<i>Kunzea ambigua</i>	Tick Bush
Myrtaceae	<i>Leptospermum laevigatum</i>	Coast Tea Tree
Myrtaceae	<i>Melaleuca nodosa</i>	Prickly-leaved Paperbark
Pittosporaceae	<i>Pittosporum undulatum</i>	Native Daphne
Proteaceae	<i>Banksia ericifolia</i>	Heath Leaved-Banksia
Proteaceae	<i>Banksia integrifolia</i>	Coast Banksia
<b>Shrubs</b>		
Apiaceae	<i>Platysace stephensonii</i>	
Casuarinaceae	<i>Allocasuarina distyla</i>	Scrub She-Oak
Elaeocarpaceae	<i>Elaeocarpus reticulatus</i>	
Ericaceae (Epacridoideae)	<i>Astroloma pinifolium</i>	
Ericaceae (Epacridoideae)	<i>Epacris longiflora</i>	
Ericaceae (Epacridoideae)	<i>Epacris microphylla</i>	Coast Coral Heath
Ericaceae (Epacridoideae)	<i>Leucopogon ericoides</i>	Pink Beard-Heath
Ericaceae (Epacridoideae)	<i>Monotoca elliptica</i>	Tree Broom Heath
Ericaceae (Epacridoideae)	<i>Woolisia pungens</i>	
Euphorbiaceae	<i>Amperea xiphoclada var. xiphoclada</i>	
Euphorbiaceae	<i>Homalanthus populifolius</i>	
Euphorbiaceae	<i>Ricinocarpos pinifolius</i>	Wedding Bush
Fabaceae (Epacridoideae)	<i>Brachyloma daphnoides subsp. daphnoides</i>	
Fabaceae (Faboideae)	<i>Bossiaea heterophylla</i>	
Fabaceae (Faboideae)	<i>Bossiaea prostrata</i>	
Fabaceae (Faboideae)	<i>Bossiaea scolopendria</i>	
Fabaceae (Faboideae)	<i>Dillwynia retorta</i>	
Fabaceae (Faboideae)	<i>Pultenaea daphnoides</i>	Large-leaf Bush-pea
Fabaceae (Mimosoideae)	<i>Acacia longifolia subsp. sophorae</i>	Coastal Wattle
Fabaceae (Mimosoideae)	<i>Acacia suaveolens</i>	Sweet Wattle

Family	Scientific Name	Common Name
Myrtaceae	<i>Callistemon citrinus</i>	Crimson Bottlebrush
Myrtaceae	<i>Darwinia fascicularis</i>	
Myrtaceae	<i>Kunzea ambigua</i>	Tick Bush
Myrtaceae	<i>Leptospermum laevigatum</i>	
Myrtaceae	<i>Melaleuca armillaris</i>	Bracelet Honey Myrtle
Myrtaceae	<i>Melaleuca nodosa</i>	Prickly-leaved Paperbark
Pittosporaceae	<i>Pittosporum undulatum</i>	Sweet Pittosporum
Proteaceae	<i>Banksia aemula</i>	Wallum Banksia
Proteaceae	<i>Banksia ericifolia</i>	Heath Leaved-Banksia
Proteaceae	<i>Banksia integrifolia</i>	Coast Banksia
Proteaceae	<i>Hakea gibbosa</i>	Needlebush
Proteaceae	<i>Hakea teretifolia</i>	Dagger Hakea
Proteaceae	<i>Lambertia formosa</i>	Mountain Devil
Proteaceae	<i>Persoonia lanceolata</i>	Lance Leaf Geebung
Proteaceae	<i>Persoonia levis</i>	Broad-leaved Geebung
Proteaceae	<i>Petrophile pulchella</i>	
Rutaceae	<i>Eriostemon australasius</i>	
Rutaceae	<i>Philotheca buxifolia</i> subsp. <i>buxifolia</i>	Box-Leaf Waxflower
Rutaceae	<i>Philotheca salsolifolia</i>	
Rutaceae	<i>Zieria laevigata</i>	Smooth Zieria
<b>Herbs - Ferns and Allies</b>		
Dennstaedtiaceae	<i>Pteridium esculentum</i>	Bracken Fern
<b>Herbs - Dicots</b>		
Apiaceae	<i>Xanthosia pilosa</i>	Woolly Xanthosia
Fabaceae (Faboideae)	<i>Dillwynia retorta</i>	
Goodeniaceae	<i>Goodenia paniculata</i>	Branched Goodenia
Haloragaceae	<i>Gonocarpus micranthus</i> subsp. <i>micranthus</i>	Creeping Raspwort
Haloragaceae	<i>Gonocarpus teucrioides</i>	Raspwort
Proteaceae	<i>Banksia ericifolia</i>	Heath Leaved-Banksia
Proteaceae	<i>Persoonia levis</i>	Broad-leaved Geebung
Restionaceae	<i>Hypolaena fastigiata</i>	
Rubiaceae	<i>Opercularia aspera</i>	Coarse Stinkweed
Rubiaceae	<i>Pomax umbellata</i>	
Stylidiaceae	<i>Stylidium lineare</i>	Narrow-leaved Trigger Plant

Family	Scientific Name	Common Name
<b>Herbs - Monocots (Grasses)</b>		
Poaceae	<i>Austrostipa</i> sp.	
Poaceae	<i>Eragrostis brownii</i>	Brown's Lovegrass
Poaceae	<i>Imperata cylindrica</i>	Blady Grass
Poaceae	<i>Microlaena stipoides</i>	Weeping Grass
Poaceae	<i>Paspalidium distans</i>	
Poaceae	<i>Rytidosperma tenuius</i>	
<b>Herbs - Monocots (Other)</b>		
Commelinaceae	<i>Commelina cyanea</i>	
Cyperaceae	<i>Cyathochaeta diandra</i>	
Cyperaceae	<i>Lepidosperma forsythii</i>	
Cyperaceae	<i>Lepidosperma laterale</i>	
Cyperaceae	<i>Baumea acuta</i>	
Cyperaceae	<i>Schoenus brevifolius</i>	Zig-Zag Bog-rush
Haemodoraceae	<i>Haemodorum planifolium</i>	
Juncaceae	<i>Juncus continuus</i>	
Juncaceae	<i>Juncus kraussii</i> subsp. <i>kraussii</i>	Sea Rush
Lomandraceae	<i>Lomandra glauca</i>	Pale Mat-rush
Lomandraceae	<i>Lomandra longifolia</i>	Spiny Mat-rush
Orchidaceae	<i>Cryptostylis subulata</i>	Large Tongue Orchid
Phormiaceae	<i>Dianella caerulea</i> var. <i>producta</i>	
Phormiaceae	<i>Dianella revoluta</i>	Blueberry Lily
Restionaceae	<i>Lepyrodia scariosa</i>	
Restionaceae	<i>Leptocarpus tenax</i>	
Typhaceae	<i>Entolasia stricta</i>	
Xanthorrhoeaceae	<i>Xanthorrhoea resinosa</i>	Grass Tree
<b>Herbs - Climbers</b>		
Dilleniaceae	<i>Hibbertia obtusifolia</i>	Hoary Guinea Flower
Dilleniaceae	<i>Hibbertia scandens</i>	Climbing Guinea Flower
Lauraceae	<i>Cassytha glabella</i>	Slender Devil's Twine
Lauraceae	<i>Cassytha pubescens</i>	
Oleaceae	<i>Jasminum volubile</i>	Stiff Jasmine
Pittosporaceae	<i>Billardiera scandens</i>	Hairy Apple Berry
Smilacaceae	<i>Smilax glycyphylla</i>	Sweet Sarsaparilla

# FIGURES





**Legend**

- VMP Area
- Subject Land
- Development Site

Image Source:  
Image © Nearmap (2019)  
Dated: 01/07/2019

Data Source:  
Spatial Services  
NSW Department of Finance and Services

Coordinate System: MGA Zone 56 (GDA 94)

cumberland  
ecology

0 10 20 30 40 m

Figure 1. Location of subject land, development site and VMP area





**Legend**

- VMP Area
- Subject Land
- Development Site
- Monitoring Plots (2 x 10 m)
- Photopoints

**Management Zone**

- Zone 1
- Zone 2

Image Source:  
Image © Nearmap (2019)  
Dated: 01/07/2019

Data Source:  
Spatial Services  
NSW Department of Finance and Services

Coordinate System: MGA Zone 56 (GDA 94)



Figure 2. Location of management zones and monitoring plots

