total earth care

Vegetation Management Plan

International Centre of Training Excellence
Blacktown International Sports Park, Rooty Hill
Blacktown City Council

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Total Earth Care Pty Ltd
March 2120

Quality Control	© Total Earth Care Pty Ltd 2020		
Revision/Version No.	FINAL	**Date of revision**	02/09/2020
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TEC Job No.	J4766		

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Glossary

Abbreviations

BC Act 2016	NSW *Biodiversity Conservation Act 2016*
CEEC	Critically Endangered Ecological Community
CPW	Cumberland Plain Woodland
DA	Development Application
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act 1999	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
LGA	Local Government Area
PCT	Plant Community Type
REF	Review of Environmental Factors
TEC	Total Earth Care
VMP	Vegetation Management Plan

1 Introduction

1.1 Overview

Total Earth Care (TEC) has been commissioned by Blacktown City Council to prepare this Vegetation Management Plan (VMP) for the development of the International Centre of Training Excellence (ICTE) at the Blacktown International Sports Park, Eastern Road, Rooty Hill NSW 2766 (the proposal). The proposal is located within the Blacktown City Council Local Government Area (LGA) and within the Western Sydney Parklands.

Site-specific plans and documents reviewed for this proposal include the Flora and Fauna Impact Assessment prepared by TEC in August 2020.

1.2 Subject Site

The subject site (the site) comprises the area of land that will be managed by this VMP. It covers an area of approximately 22 ha including two (2) areas of remnant vegetation located to the north and west, additional car parks and playing fields and an artificial wetland in the east. Significant natural landscape features within the site including two (2) remnant isolated patches of *Cumberland Shale Plains Woodland* which is listed as a Critically Endangered Ecological Community (CEEC) under the *Biodiversity Conservation Act 2016* (BC Act 2016) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999).

The site is located within the Western Sydney Parklands which is managed under the *State Environmental Planning Policy (Western Sydney Parklands) 2009* (Western Sydney Parklands SEPP) (refer to Section 1.2.1). It is accessed off Eastern Road and is bound by the main western rail-link corridor to the north, athletics fields to the east, Blacktown International Sports Park car park and the M7 Motorway to the south and Angus Creek to the west. Details of the site are provided in Table 1.

Table 1. Subject site details

Property name	Blacktown International Sports Park
Property Ownership	Blacktown City Council
Site address	Eastern Rd, Rooty Hill NSW 2766
Property identifier (Lot and DP)	Lot 1 DP1145826
Local Government Area	Blacktown City Council
Zoning	Unzoned

1.2.1 Western Sydney Parklands Plan of Management

The VMP has considered the objectives stated for Western Sydney Parklands Plan of Management 2030 (NSW Government 2018) Precinct 2 which are to:

- Continue developing the precinct as a high-quality regional sport and structured recreation destination;
- Enhance linkages with internal Parklands access trails, and to surrounding areas including Bungarribee Park and the M7 Motorway cycleway; and
- Provide ecological links to the east and south to Bungarribee.

The site is not within the designated bushland corridors or environmental conservation areas.

2 Purpose and Objectives

2.1 Purpose and Scope

The purpose of this VMP is to ensure proper guidelines and methodologies are in place to manage the potential impacts to vegetation from the construction and operation of the proposal. It provides an overview of the vegetation management that will be implemented across the site and describes the activities to manage removal, protection and restoration of vegetation. It provides a description of specific vegetation management, monitoring and reporting measures that will be undertaken.

Further details of the proposal are provided in Section 3.

2.2 Objectives

Project Management:

- To formulate and implement vegetation management actions.
- To clearly identify objectives, methods and reporting lines.
- To inform all relevant participants of their responsibilities.
- To engage and supervise bush regenerators to implement the plan.

Vegetation Protection:

- To protect vegetation during construction and operational phases, with particular reference to the areas of Cumberland Shale Plains Woodland CEEC.

Rehabilitation and Maintenance:

- To restore and enhance areas in post construction phase.
- To achieve a weed density of less than10% in the initial works period. Weeds should then be reduced to less than 5% cover within the first year of maintenance and maintained at less than 5% by the second year.
- To achieve 80% survival rate of all potted plants and tube stock planted.

3 The Proposal

The proposal includes the demolition of the existing administration building, construction of a new two-storey academy accommodation building, construction of the International Centre for Training Excellence (ICTE) building, regrading of existing cark parks and playing fields and construction of surrounding landscape areas and private road. The footprint of the proposal is approximately 5.56 ha.

For the majority of the proposal Blacktown Council is seeking a Part 5 approval under the Environmental Planning and Assessment Act 1979 (EP&A Act) and so a Review of Environmental Factors (REF) has been prepared. However, a Part 4 approval is being sought for the academy accommodation and so an additional Development Application (DA) has been prepared. This VMP will support both the Part 4 and Part 5 approvals, providing management actions for the present vegetation on-site.

3.1 Previous Studies

A Flora and Fauna Impact Assessment was previously prepared by Total Earth Care (TEC 2020) which comprised a desktop assessment and site survey conducted on 3rd July 2020. Details of this assessment are provided in Section 4.

4 Site Description

The site forms part of a larger fractured landscape consisting of disjunct patches of remnant and fragmented bushland between developments and in creek line corridors. This is a common landscape of western Sydney.

The entire study area is mapped as the Sydney Basin Cumberland Plain Mitchell Landscape (DECC, 2002). This is described as low rolling hills and valleys in a rain shadow area between the Blue Mountains and the coast on horizontal Triassic shales and lithic sandstones forming a down-warped block on the coastal side of the Lapstone monocline.

4.1 Soils and Geology

The western side of the site is mapped as the Blacktown Soil Landscape which is comprised of residual Wianamatta Group Shales. This soil type is characterised by broad rounded crests and ridges with gently inclined slopes. Soils are shallow to moderately deep hard-setting mottled texture contrast soils with red and brown podzolic soils on crests grading to yellow podzolic soils on lower slopes and in drainage lines (Bannerman and Hazelton 1990).

The eastern side of the site is mapped as South Creek Soil landscape which is comprised of quaternary alluvium derived from Wianamatta Group shales and Hawkesbury Sandstone. The landscape is characterised by floodplains, valley flats and drainage depressions of the channels on the Cumberland Plain. Soils are often very deep layered sediments over bedrock or relict soils of red and yellow podzolic soils, structured grey clays and yellow solodic soils. Immediately adjacent to drainage lines soils are structured plastic clays or loams (Bannerman and Hazelton 1990).

4.2 Vegetation Communities

The majority of the site has been historically cleared or is not mapped as a native vegetation community (TEC 2020, OEH 2013). The site contains one (1) vegetation community which comprises plant community type (PCT) 849 Grey Box-Forest Red Gum Grassy Woodland on Flats of the Cumberland Plain, Sydney Basin. PCT 849 aligns with the *Cumberland Plain Woodland (CPW) in the Sydney Basin Bioregion* (Cumberland Plain Woodland) which is a Critically Endangered Ecological Community (CEEC) under the BC Act 2016 and the EPBC Act 1999.

This PCT is located in two (2) sections of the site. Both Cumberland Plain Woodland areas on site are characterised by semi-mature native canopy trees to predominantly ten (10) to fifteen (15) metres. Species include *Eucalyptus moluccana* (Grey Box), *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus crebra* (Narrow-leaved Ironbark). Whist the lower stratum, particularly at ground level, were predominately dominated by exotics (densities of ~60-80% exotic foliage cover).

Under the EPBC Act 1999, condition thresholds are specified for the community including dominant tree species, foliage cover, patch size, native perennial understorey vegetation, hollow bearing trees and patch connectivity (Commonwealth of Australia, 2010, Appendix A). The western patch of Cumberland Plain Woodland contains key canopy species such as *Eucalyptus tereticornis* and *Eucalyptus moluccana,* however the patch size is approximately 0.2 ha, and therefore does not meet the condition

criteria under the EPBC Act 1999. The northern patch of Cumberland Plain Woodland is 0.75 ha and contains an *E. tereticornis* with a DBH of 80 cm so therefore does meet the condition criteria of the listed ecological community under the EPBC Act 1999.

The state-listed woodland community specifically includes derived grasslands, irrespective of their landscape context. Areas of Cumberland Plain Woodland can present with no canopy, however must have an intact or moderately diverse native shrub or ground layer with diagnostic species of Cumberland Plain Woodland. Some native positive diagnostic species were present across both patches including *Bursaria spinosa* (Native Blackthorn) and *Acacia parramattensis* (Parramatta Wattle), and a ground cover of *Microlaena stipoides* (Weeping Grass), *Dichondra repens* (Kidney Weed), *Einadia hastata* (Berry Saltbush) and *Glycine tabacina* (Variable Glycine). Therefore both the remnant patches of Cumberland Plain Woodland are listed under the BC Act 2016.

Figure 1. Example of the Cumberland Plain Woodland (PCT 849) at the north west of the site

The remaining areas pf vegetation at the site which do not conform to a PCT are made up of:

- **Planted Woodland:** generally comprising mown grass understorey and canopy of indigenous tree species including *Eucalyptus moluccana (*Grey Box), *Eucalyptus tereticornis* (Forest Red Gum) and either *Casuarina glauca* or *Melaleuca decora* (Figure 2).
- **Planted Natives:** generally comprising decorative features bordering existing roads and buildings including a row of *Casuarina glauca* (Swamp Oak) along the north eastern oval, *Eucalyptus sideroxylon* (Mugga Ironbark) between the athletics track and the western road and car park area, *Angophora bakeri* (Narrow-leaved Apple) located around the existing administration and amenities building (Figure 3).
- **Planted Exotics**: non-native species generally planted for landscaping including a stand of planted semi mature *Araucaria bidwillii* (Bunya pine).
- **Exotic/Native Grasses and Weeds**: an area of fill which has been overrun by *Cenchrus clandestinus* (Kikuyu Grass) and a variety of weed species including *Cirsium vulgare* (Spear Thistle) and *Bidens pilosa* (Cobbler's Pegs). Some scattered natives persist including *Acacia parramattensis* (Parramatta Wattle) and *Phragmites australis* (Common Reed).

The vegetation mapping is shown in Map 1.

Figure 2. Example of the planted woodland

Figure 3. Example of the planted native

Title: **Current Vegetation Communities (TEC 2020)**

Map No: 1
Site: Blacktown ISP
Client: Blacktown City Council
Date: August 2020
Project No: J4766
Author: K Raines

Legend

- Site
- Lot

Current Vegetation Communities (TEC 2020)

- Cumberland Plain Woodland
- Planted Woodland
- Planted Natives
- Planted Exotics
- Exotic/Native Grasses and Weeds

0 37.5 75 150 Meters

N

Data Source:
Total Earth Care
Nearmap

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4.3 Flora

A total of eighty-four (84) plant species were recorded during the July 2020 flora survey including one (1) threatened flora species, *Grevillea juniperina* subsp. *juniperina* (Juniper-leaved Grevillea), listed as vulnerable under the BC Act 2016 (TEC 2020) (Figure 4). Multiple individual planted shrubs were identified in an area of fenced planted native vegetation adjacent to the constructed water body on the eastern side of the study area. Due to the history of soil disturbance, and without ecological burns to stimulate potential stored native soil seed bank in remnant areas to assess for resilience, it is unlikely that this species occurs on the site naturally. The species would not be directly impacted by the proposal.

The total list of flora species on site is provided in Appendix B.

Figure 4. Planted *Grevillea juniperina* subsp. *juniperina*

Five (5) threatened flora species have been identified as having a medium likelihood of occurring on site. These species have suitable habitat for these species is located in the two (2) degraded patches of remnant Cumberland Plains Woodland in the north and west of the site. These species are:

- *Dillwynia tenuifolia* - Vulnerable under the BC Act 2016*;*
- *Acacia pubescens* (Downy Wattle) - Vulnerable under the BC Act 2016 and Vulnerable under the EPBC Act 1999;
- *Pimelea curviflora var. curviflora* - Vulnerable under the BC Act 2016 and Vulnerable under the EPBC Act 1999*;*
- *Pimelea spicata* (Spiked Rice-flower) – Endangered under the BC Act 2016 and Endangered under the EPBC Act 1999; and
- *Pultenaea parviflora* - Endangered under the BC Act 2016 and Vulnerable under the EPBC Act 1999*.*

4.4 Weeds

Forty-seven (47) introduced flora species were identified during the July 2020 survey (TEC 2020). Of these, three (3) species, *Asparagus asparagoides* (Bridal Creeper), *Asparagus officinalis* and *Senecio madagascariensis* (Fireweed) are listed as Weeds of National Significance (WONS). One (1) of the weed species identified, *Olea europaea* subsp. *cuspidata* (African Olive), is listed as a Priority Weed within the Greater Sydney Regional Strategic Weed Management Plan 2017-2022 (LLS 2019).

The land occupier's obligations under this *Biosecurity Act 2015* and the management and recommended treatment methods further described in Appendix C.

The total list of flora species identified during the July 2020 survey is provided in Appendix B.

4.5 Fauna

A total of thirty-two (32) fauna species were recorded during the field survey including three (3) threatened species (TEC 2020). One (1) species is listed as endangered under the BC Act 2016, the Cumberland Plain Land Snail (*Meridolum corneovirens*) and two (2) microbat species are listed as vulnerable under the BC Act 2016.

Twenty (20) fauna species were found to have a medium or high likelihood of occurring on site, these are:

Known to occur:

- Cumberland Plain Land Snail (*Meridolum corneovirens*) – Endangered under the BC Act 2016;
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*) - Vulnerable under the BC Act 2016 (four (4) unresolved calls (TEC 2020)); and
- Southern Myotis (*Myotis macropus*) - Vulnerable under the BC Act 2016 (three (3) unresolved calls (TEC 2020)).

High likelihood of occurring:

- Little Lorikeet (*Glossopsitta pusilla*) – Vulnerable under the BC Act 2016;
- Little Bent-winged Bat (*Miniopterus australis*) - Vulnerable under the BC Act 2016;
- Grey-headed Flying-fox (*Pteropus poliocephalus*) - Vulnerable under the BC Act 2016 and Vulnerable under the EPBC Act 1999; and
- Greater Broad-nosed Bat (*Scoteanax rueppellii*) - Vulnerable under the BC Act 2016.

Medium likelihood of occurring:

- Regent Honeyeater (*Anthochaera phrygia*) – Critically Endangered under the BC Act 2016 and Critically Endangered under the EPBC Act 1999;
- Fork-tailed Swift (*Apus pacificus*) – Camba, Jamba, Rokamba under the EPBC Act 1999;
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*) – Vulnerable under the BC Act 2016;
- Varied Sittella (*Daphoenositta chrysoptera*) – Vulnerable under the BC Act 2016;
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) – Vulnerable under the BC Act 2016;
- Latham's Snipe (*Gallinago hardwickii*) – Camba, Jamba, Rokamba under the EPBC Act 1999;
- Little Eagle (*Hieraaetus morphnoides*) – Vulnerable under the BC Act 2016;
- Swift Parrot (*Lathamus discolor*) - Endangered under the BC Act 2016 and Critically Endangered under the EPBC Act 1999;
- Black-chinned Honeyeater (eastern subspecies) (*Melithreptus gularis gularis*) – Vulnerable under the BC Act 2016;
- Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*) – Vulnerable under the BC Act 2016;
- Powerful Owl (*Ninox strenua*) – Vulnerable under the BC Act 2016;
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) – Vulnerable under the BC Act 2016; and
- Masked Owl (*Tyto novaehollandiae*) – Vulnerable under the BC Act 2016.

4.6 Other Site Features

There are artificial wetlands in the east of the site. These wetlands provide foraging area for wetland bird species and frog species.

5 Key Management Issues

Key management issues to be addressed and the relevant works or action required can be found in Table 2.

Table 2. Site-specific management issues

Issue	Management Issues	Relevant Works or Actions	Comments and References
Cumberland Plain Woodland	Restoring the condition of the Cumberland Plain Woodland.	Areas of Cumberland Plain Woodland are to be fenced off as no-go zones during the works period. Removal of weeds and prevention of weed reestablishment.	
Damage to trees	Protection of the mature trees to be retained.	Appropriate protection of trees to be installed and maintained during the works period for the trees which are to be retained.	
Revegetation	Use of appropriated species for planting in the proposed landscape areas (VMZ 3). Availability of local provenance planting stock for revegetation.	Plant native winter flowering feed tree species to replace those which will be removed as a result of the works. Source plant stock from nursery with evidence of local provenance.	
Weeds	There is a presence of weeds listed under the NSW *Biosecurity Act 2015* across the site, particularly in the area of Cumberland Plain Woodland.	Removal of weeds and prevention of weed reestablishment.	Greater Sydney Regional Strategic Weed Management Plan 2017 - 2022
Erosion and sediment control	Sediment runoff from disturbed ground or soil stock piles has the potential to enter the constructed waterways at the east of the site and Eastern Creek.	Appropriate sediment controls are to be specified in the Construction Environmental Management Plan (CEMP).	
Rubbish dumping	Rubbish dumping observed in western patch of Cumberland Plain Woodland.	Areas of Cumberland Plain Woodland are to be fenced off as no-go zones during the works period. Delineation to be maintained post works to discourage public access.	
Relevant land use	Site is a sports park precinct.	Maintain accessibility for users of the park.	Land zoning: Unzoned

6 Vegetation Management

6.1 Vegetation Management Zones

The Vegetation Management Zones (VMZs) have been determined based on various attributes including the existing vegetation communities (refer to Section 4.2), topology and proposed works. As such, four VMZs have been identified:

- **VMZ 1:** Cumberland Plain Woodland;
- **VMZ 2:** Retained plantings;
- **VMZ 3:** Proposed landscape areas; and
- **VMZ 4:** Exotic/native grasses and weeds.

The location of each zone is provided in Map 2 and described in the following sections. The VMZs generally exclude the playing fields, carparks and open grassed area located within the site.

6.1.1 Vegetation Management Zone 1 (VMZ 1) – (approx. 1.5 ha)

VMZ 1 comprises the two (2) patches of Cumberland Plain Woodland. Both sections were found to contain a high proportion of weed species in the understory.

The priorities of VMZ 1 are to:

- Remove weeds to restore the condition of the Cumberland Plain Woodland.
- Ensure weeds present are removed responsibly, and are not transported outside of the zone.
- To achieve a weed density of less than 10% in the initial works period. Weeds should then be reduced to less than 5% cover within the first year of maintenance and maintained at less than 5% by the second year and ongoing into the future.
- Minimum supplementary planting should be conducted of 6,000 plants, which should include 1,500 shrubs. The remainder of the plantings should be grasses and groundcover. Trees do not need to be planted in this zone. Only species appropriate for Cumberland Plain Woodland should be used when planting. Refer to Appendix D.
- Achieve at least an 80% survival rate of all planted tube stock over 2 years.

This zone would not be directly impacted by the construction of the proposal. Sections of this zone are listed as CEEC under the BC Act 2016 and the EPBC Act 1999 (refer to Section 4.2).

This zone currently contains a high proportion of weed species in the understory. It is important these weed species do not spread to the rest of the site and become established. Therefore maintenance work is required on a bi-monthly basis following the initial works period to achieve and maintain a weed density of less than 5%.

It is expected that natural regeneration of native species would occur following the removal of weeds, however if this is not observed by the six (6) month survey (refer to Section 6.2) planting will be required. A minimum of 6,000 supplementary plants should be installed. A full list of recommended species is provided in Appendix D.

6.1.2 Vegetation Management Zone 2 (VMZ 2) – (approx. 3.9 ha)

VMZ 2 generally comprises areas of planted native species including *Eucalyptus moluccana (*Grey Box), *Eucalyptus tereticornis* (Forest Red Gum), *Melaleuca decora* (White Feather Honeymyrtle), *Casuarina glauca* (Swamp Sheoak), *Angophora bakeri* (Narrow-leaved Apple) and planted species not native to NSW including *Araucaria bidwillii* (Bunya pine).

The priorities of VMZ 2 are:

- Delineate the area to protect the existing vegetation.
- Achieve and maintain a weed density of less than 5%.

6.1.3 Vegetation Management Zone 3 (VMZ 3) – (approx. 5.5 ha including the works footprint)

VMZ 3 comprises the area to be directly impacted by the proposal and requiring new landscaping.

The priorities of VMZ 3 are to:

- All plants included in the landscaped areas should be native, of which a minimum of 80% should be from the list provided in Appendix D. This ensures that appropriate species are used in accordance with the nearby Cumberland Plain Woodland.
- Prevent any sediment entering the artificial wetlands.
- Ensure weeds present are removed responsibly, and are not transported outside of the zone.
- Achieve at least an 80% survival rate of all plantings over 2 years.

This zone would be prone to erosion due to the extensive ground disturbance of the construction footprint. Appropriate erosion and sediment control measures need to be implemented, particularly to the east near the artificial wetlands. Hygiene controls must be implemented for all vehicles and personnel entering the site. Example phytophthora hygiene controls are provided in Appendix C.

The choice of planted species must be selected in accordance with the nearby Cumberland Plain Woodland. A full list of recommended species is provided in Appendix D.

6.1.4 Vegetation Management Zone 4 (VMZ 4) – (approx. 0.5 ha)

VMZ 4 comprises an area of fill which has been overrun by *Cenchrus clandestinus* (Kikuyu Grass) and a variety of weed species including *Cirsium vulgare* (Spear Thistle) and *Bidens pilosa* (Cobbler's Pegs). Some sparse natives persist including *Acacia parramattensis* (Parramatta Wattle) and *Phragmites australis* (Common Reed). This area should be revegetated to provide connectivity to the patches of Cumberland Plain Woodland present on site.

The priorities of VMZ 4 are to:

- Prevent the encroachment of the weeds downslope into VMZ 1.
- Ensure weeds present are removed responsibly, and are not transported outside of the zone.
- Revegetate the area by mulching the area and then planting with species appropriate for Cumberland Plain Woodland. Refer to Appendix D.
- Planting should achieve a minimum of 4 plants per square metre.
- Achieve at least an 80% survival rate of all planted tube stock over 2 years.

This zone is situated on a mound between the two (2) patches of Cumberland Plain Woodland (VMZ 1). There is potential for erosion downslope and movement of weed species to encroach on VMZ 1.

Title: **Vegetation Management Zones**

Map No: 2

Site: Blacktown ISP

Client: Blacktown City Council

Date: August 2020

Project No: J4766

Author: K Raines

Legend

Site

Lot

Vegetation Management Zones

1 - Cumberland Plain Woodland

2 - Retained plantings

3 - Proposed landscape areas

4 - Exotic/native grasses and weeds

0 37.5 75 150 M

N

Data Source:
Total Earth Care
Nearmap

total earth care

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6.2 Monitoring Guidelines

A program of monitoring and inspection is to be carried out by a qualified vegetation management consultant (qualified ecologist or bush regeneration supervisor) to ensure the measures outlined in this VMP are implemented and that performance criteria have been satisfied. The monitoring program will commence prior to any works to gather baseline data and continue for the duration of the maintenance period.

The monitoring program will involve:

- Assessment of weed control works and revegetation success via permanent repeatable photographic monitoring points, and surveys of the management zones by a suitably qualified person (ecologist or bush regeneration supervisor) to measure percentage cover of native and exotic species;
- Mapping of weed density per zone to assess the progress of the works towards the final requirement of maximum 5% weed cover;
- Monitoring and assessment to work towards the final requirement of 80% survival rates of plantings;
- Estimates of the success rate of plantings and assessment of plant replacement requirements;
- Assessment of evidence of herbivory, and recommendations to counteract;
- Assessment of evidence of erosion, and recommendations to mitigate;
- Recommendations for corrective measures and/or specific vegetation management required; and
- Provision of regular reports outlining data collected and tracking of works towards final Key Performance Indicators (KPIs). Monitoring and reporting timing outlined below.

Photo monitoring point locations will be established to visually document the progression of management in each of the four (4) VMZs. The specific locations will be representative of the VMZ and will generally comprise of:

- 4x points in VMZ 1, two (2) in each patch of Cumberland Plain Woodland;
- 4x points in VMZ 2;
- 4x points in VMZ 3; and
- 2x point in VMZ 4.

Monitoring events and reporting are to follow the following schedule:

- Baseline survey – Prior to commencement of vegetation management works. No report required, but this information must be added to initial progress report.
- Practical completion – At the end of the initial works period a report should be provided which summarises the baseline survey and the works completed.
- Year 1 Maintenance - 6 month survey – Survey and Progress Report – Following 6 months of management activities. Report to include baseline from previous report, commencement and continuation of works, and survey results.
- End of Year 1 Maintenance - 12 month survey – Survey and Progress Report – following 12 months of management activities. Report to include baseline from previous report, commencement and continuation of works, and survey results.
- End of Year 2 Maintenance - Final monitoring report – (24 months after construction is completed) required as to whether KPIs (outlined below – Actions Tables) have been achieved, and if not, include recommendation on further works required.

7 Implementation

Table 3 outlines the management actions, zones and performance indicators for each task prior, during, and after construction works. Management actions have been listed in order of highest to lowest priority. All tasks are to be completed unless there is written approval from the consent authority. Unless otherwise specified, in the "Estimated duration" section, the term "One (1) day" refers to an eight (8) hours per day for one (1) person.

Table 3. Schedule of Works

Management Action	Management Zone	Task	Specifications	Timing	Estimated Duration	Responsibility	Performance Indicators/ deliverables
Site Meeting, Induction and WH&S	N/A	Project meeting with client, construction contractors and bush regeneration contractors.	Meeting on site with all concerned parties prior to commencement of works. Induction, including environmental inductions undertaken. Review and implementation of site specific WH&S. Discussion, review and induction for protocols for prevention of pathogen and weed spread.	Start of VMP implementation.	Half a (0.5) day, all concerned parties.	Blacktown City Council, bush regeneration and construction contractors	WH&S documentation. Inductions, including environmental inductions completed by all staff. Wash down area designated.
Baseline Survey	All zones	Begin establishment of baseline monitoring photo points. Begin baseline weed mapping of all zones.	Establish baseline monitoring photo points (see Map 3). Conduct weed density mapping. An overall assessment of the density of weeds on site is to be conducted by an ecologist or qualified bush regenerator.	Start of VMP implementation.	One (1) day.	Ecologist or bush regeneration contractor.	Baseline photo points, and weed densities established, to be collated into first progress report (at six (6) months from implementation of VMP).
Sediment Fencing	VMZ 2, VMZ 3	Installation of sediment fencing.	Sediment fencing to be installed down slope of any earthworks. Sediment fencing to be built according the specifications provided in the CEMP.	Before construction works begin.	One (1) day.	Construction contractor.	No sediment flow into the artificial wetlands. Sediment fence functional throughout the period of construction.

Management Action	Management Zone	Task	Specifications	Timing	Estimated Duration	Responsibility	Performance Indicators/ deliverables
			Fence to be maintained and functional throughout period of construction.				Performance of fence noted in monitoring VMP reporting.
Tree Protection	VMZ 2, VMZ 3	Install tree protection to those being retained.	All trees identified to be retained must have tree protection measures installed prior to construction works beginning, which must be maintained throughout the work period. Any works around trees to be retained is recommended to be supervised by a qualified Arborist to ensure the tree's long-term survival. The whole of VMZ 2 is to be delineated as a no-go zone so as to prevent impacts.	Before construction works begin.	Entire construction period.	Blacktown City Council, construction contractor or arborist.	Tree protection installed and maintained during construction as per specifications by arborist. No damage to the trees.
Primary Weeding	VMZ 1, VMZ4	Weed Control	In VMZ 1 locate patches of resilience containing native groundcover species, isolate them and buffer weed around these patches. The remaining area with high density weeds present should be slashed and sprayed to then allow re-growth of native species from the seedbank. In VMZ 4 existing native species such as established *Acacia* shrubs should be marked and retained. The remainder of the area should be slashed and sprayed.	After construction and prior to mulch application and planting.	Fifteen (15) days for a team of four (4) bush regenerators/ landscapers.	Bush regeneration contractor.	Reduce weeds to less than 10% cover.

Management Action	Management Zone	Task	Specifications	Timing	Estimated Duration	Responsibility	Performance Indicators/ deliverables
Installation of Native Mulch	VMZ 3, VMZ 4	Installation of Native Leaf Mulch.	Install native leaf mulch throughout landscaped areas in VMZ 3 and throughout VMZ 4 at a minimum of 100mm thick. Bobcat to spread mulch followed by hand raking. Do not have *Eucalyptus moluccana* in the mulch chip unless it has been sourced from the site, due to the potential for psyllid associated dieback. Install coir logs at the base of the slope in VMZ 4 to prevent loss of mulch.	After construction in VMZ 3 and prior to planting in both zones.	Three (3) days, one (1) bush regenerator/ landscaper and one (1) bobcat driver.	VMZ 3 - Qualified landscaper or bush regeneration contractor. VMZ 4 - Bush regeneration contractor.	Minimum 100mm thick layer of mulch spread throughout landscaped surfaces of VMZ 3 and entire VMZ 4.
Planting and Watering	VMZ 1, VMZ 3, VMZ 4	Planting of tube stock.	**Plant Selection** All plants included in the landscaped areas of VMZ 3 should be native, of which a minimum of 80% should be from the list provided in Appendix D. This ensures that appropriate species are used in accordance with the nearby Cumberland Plain Woodland. All species planted in VMZ 1 and VMZ 4 should be from list provided in Appendix D. **Method** VMZ1 to be monitored for natural regeneration. Supplementary planting to be conducted in Year 1 Maintenance in areas where	Upon commencement of the landscaping for VMZ 3. VMZ 4 during or prior to construction. Planting of VMZ 1 to occur during Year 1 maintenance.	Ten (10) days for a team of five (5) bush regenerators/ landscapers.	VMZ 1 & VMZ 4 - Bush regeneration contractor. VMZ 3 - Qualified landscaper or bush regeneration contractor.	VMZ1 to be monitored for natural regeneration. Supplementary planting to be conducted in Year 1 Maintenance in areas where natural regeneration is not occurring. Monitoring and progress reports every six (6) months to include monitoring of plant survival rates, to ensure they are maintained at 80% survival rate. Infill planting is required if plant survival rates are below 80%.

Management Action	Management Zone	Task	Specifications	Timing	Estimated Duration	Responsibility	Performance Indicators/ deliverables
			natural regeneration is not occurring. Plantings are best planted during growing season (Autumn/Spring) to maximise plant survival rates. Plants to be planted with added water crystals at the base of the hole to increase survival rates. Plants should be water immediately after installation. Plants from pot sizes 5L or larger must be staked with three wooden stakes and hessian straps as per Appendix F. Plants to be watered once per week after installation for a six (6) week period. Watering events to be skipped if there are heavy rain events during scheduled watering periods. Plant guards only used if required, if herbivory is evident on site.				Decisions on infill plantings will be made after each progress report. Plant guards removed as required.
Year 1 Maintenance	VMZ 1	Planting	In VMZ 1, following monitoring so as to ascertain which areas are regenerating naturally from the seedbank, supplementary planting should be conducted. Minimum supplementary planting should be conducted of 6000 plants, which should include 1500 shrubs. The	After one (1) year of monitoring if natural regeneration not occurring	Three (3) days, team of four (4) for each visit.	Bush regeneration contractor.	Monitoring and progress reports every six (6) months to include monitoring of plant survival rates, to ensure they are maintained at 80% survival rate.

Management Action	Management Zone	Task	Specifications	Timing	Estimated Duration	Responsibility	Performance Indicators/ deliverables
			remainder of the plantings should be grasses and groundcover. Trees do not need to be planted in this zone. Only species appropriate for Cumberland Plain Woodland should be used when planting. Refer to Appendix D for the species list. Planting should be conducted as per the method stated above.				Infill planting is required if plant survival rates are below 80%. Decisions on infill plantings will be made after each progress report. Plant guards removed as required.
	VMZ 1, VMZ 4	Secondary weed control and replacement planting.	Maintenance works to prevent re-establishment of weeds. Weed control methods that can be undertaken include hand weeding and spraying if necessary. Replacement planting of any planted tube stock that has died in VMZ 4.	Minimum nine (9) visits.	One (1) day, team of two (2) for each visit.	Bush regeneration contractor.	Reduce weeds to less than 5% cover within in Year 1.
	VMZ 3	Maintenance weeding and replacement planting.	Monthly visits to maintain planted areas.	Minimum (12) visits.	One (1) day, two (2) people per visit.	Qualified landscaper or bush regeneration contractor.	Reduce weeds to less than 5% cover.
Year 2 Maintenance	VMZ 1, VMZ 4	Maintenance weeding and replacement planting.	Minimum six (6) visits. Maintenance works to prevent establishment of weeds. Weed control methods that can be undertaken include hand weeding and spraying if necessary.	Minimum six (6) visits.	One (1) day, team of two (2) for each visit.	Bush regeneration contractor.	Maintain weeds at less than 5% cover.

Management Action	Management Zone	Task	Specifications	Timing	Estimated Duration	Responsibility	Performance Indicators/ deliverables
			Replacement planting of any planted tube stock that has died.				
	VMZ 3	Maintenance weeding and replacement planting.	Minimum twelve (12) visits. Maintenance works to prevent establishment of weeds. Weed control methods that can be undertaken include hand weeding and spraying if necessary. Replacement planting of any planted tube stock that has died.	Minimum (12) visits.	Òne (1) day, two (2) people per visit.	Qualified landscaper or bush regeneration contractor.	Reduce/maintain weeds to less than 5% cover.
Monitoring and Reporting	All zones	Conduct monitoring, surveys and progress reports every six (6) months for the first two (2) years.	Assess and present progress and monitoring reports to Council to show whether KPIs have been satisfactorily met to Council guidelines.	Six (6) months after the completion of construction.	All years.	VMZ 1 & VMZ 4 - Ecologist or Bush regeneration contractor. VMZ 2 & VMZ 3 - Qualified landscaper, ecologist or bush regeneration contractor.	Planting survival rates are to be at 80% or higher at the end of Year 1 and Year 2. Weeds are to be reduced to less than 5% cover within Year 1 and to maintain less than 5% by Year 2.
Final Monitoring Report	All zones	Conduct final monitoring, surveys and progress reports.	Assess and present a final report to Council to show whether KPIs have been satisfactorily met to Council guidelines.	Twenty-four (24) months after the completion of construction (end of Year 2).	All years.	VMZ 1 & VMZ 4 - Ecologist or Bush regeneration contractor. VMZ 2 & VMZ 3 - Qualified landscaper, ecologist or bush regeneration contractor.	Planting survival rates at 80% or higher at the end of Year 2. Weeds to be reduced/maintained to less than 5% cover within Year 1 and maintained at less than 5% by Year 2.

7.1 Estimated Budget

The estimated budget for the proposed management actions is provided in Table 4. This pricing schedule excludes sediment fencing and tree protection costs as these should be installed by the construction contractor or arborist. The price of the plants for VMZ 3 has also not been included as the area of the landscaping within this zone is not yet known and this dictates the required plant densities and subsequent numbers.

Table 4. Estimated budget for the works outlined in this VMP

Description	Cost
Administration	
WH&S inductions and set up	$480
Baseline Survey	$960
Planting/Weeding works	
Primary Weeding – VMZ 1 & VMZ 4	$24,000
Installation of Native Organic Mulch* & Coir Logs in VMZ 4 *This price is for the install of mulch only, assuming mulch chip will be sourced on site. If supply & install is required for mulch this is at a rate of $10 per square metre	$9,480
Planting and Watering for VMZ 4 The install of plants in VMZ 3 has not been included until a landscape design is confirmed. Supply and install rates for native tubestock are $3.50 without plant guards and $5 per plant with plant guards. Planting should be at a density of 4 plants per square metre.	$70,000
Year 1 Maintenance – Planting in VMZ 1	$23,250
Year 1 Maintenance – Secondary weed control & replacement planting – VMZ 1 & VMZ 4	$9,200
Year 1 Maintenance weed control & replacement planting – VMZ 3	$11,600
Year 2 Maintenance weed control & replacement planting – VMZ 1 & VMZ 4	$9,200
Year 2 Maintenance weed control & replacement planting– VMZ 3	$11,600
Monitoring and Reporting	
Report for the end of the initial works period and 6 month, 12 month and 24 months surveys and reports of the VMP period including mapping of weed densities and documentation of photo monitoring points.	$2,400
Total EX GST	**$172,170.00**
GST	**$17,217.00**
Total inc. GST	**$189,387.00**

7.2 Roles and Responsibilities

Depending on the complexity of the tasks specified under the VMP, a bush regenerator will generally be required to carry out the works. A qualified landscaper would also be acceptable for most of the tasks specified as per the Schedule of Works, aside from bush regeneration works within the two (2) patches of Cumberland Plain Woodland in VMZ 1 and the area to be revegetated in VMZ 4.

The bush regenerator staff implementing the VMP will need to demonstrate the following minimum qualifications and experience:

- Certificate III in Conservation and Land Management and/or Certificate III in Natural Area Restoration; and
- Minimum of 100 hours practical bushland regeneration under an experienced supervisor.

Supervisors will need to demonstrate the following minimum qualifications and experience:

- Certificate III in Conservation and Land Management and/or Certificate III in Natural Area Restoration; and
- Minimum of 500 hours practical bushland regeneration.

A Chemcert AQF III or greater is required for persons undertaking chemical application.

Site Ecologist – A suitably qualified site ecologist will be required to oversee or monitor some of the works required in this VMP.

The tree protection and erosion controls are to be installed by the construction contractor or arborist.

8 References

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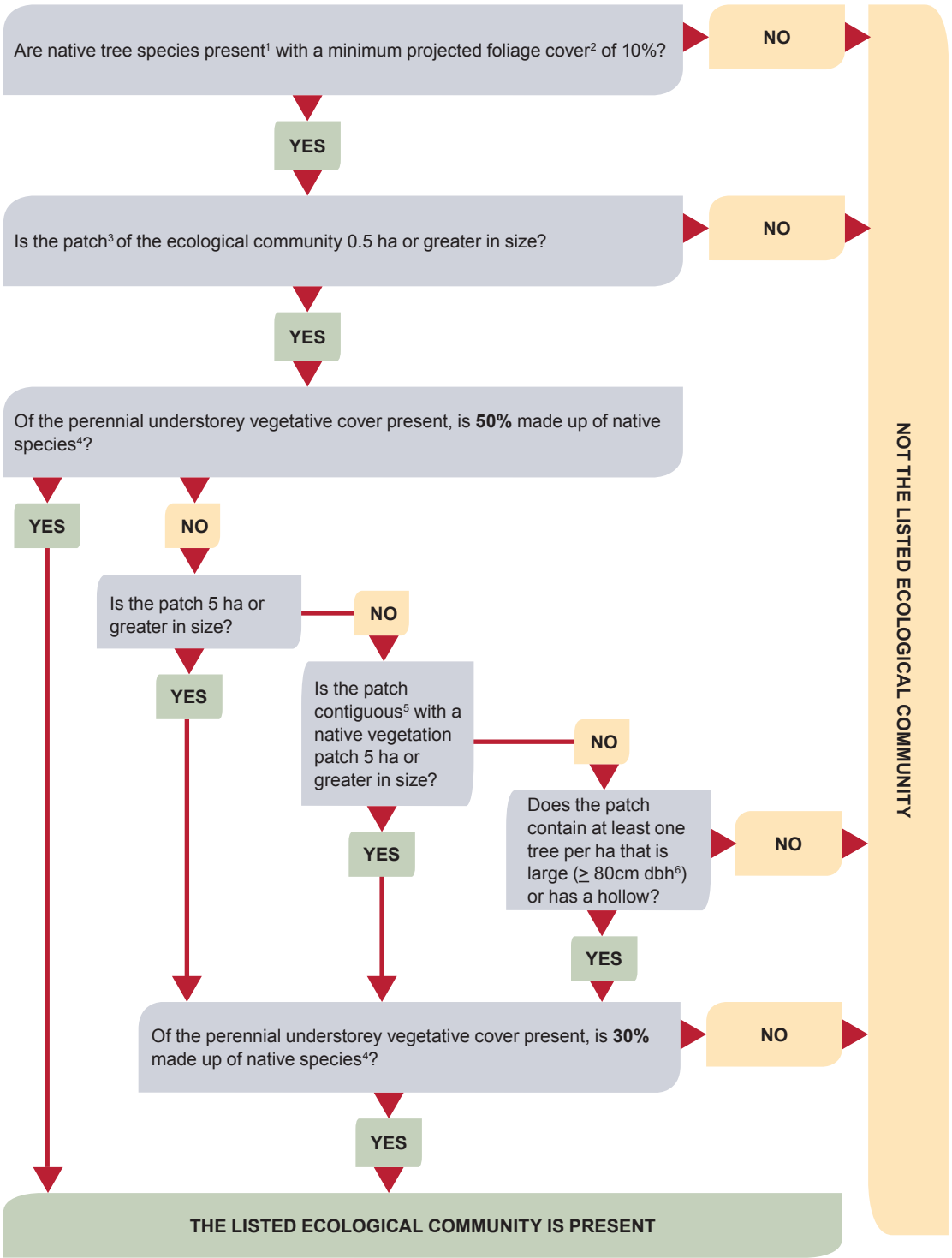
Appendix A. EPBC Act 1999 Condition Thresholds to Identify the Cumberland Plain Shale Woodlands

Notes for the flowchart:

The flowchart summarises the key diagnostic characteristics and condition thresholds and is intended to help identify whether the Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest ecological community is likely to be present at a particular site. Other considerations to help with assessment of significant impact (see page 16), such as landscape connectivity, need to be taken into account when doing an on-site inspection.

1. The typical dominant tree species are grey box, forest red gum and red ironbark. Dominant means that one or more of these species comprises 50 per cent or more of the tree cover. Other tree canopy species may occur in association with the typical dominant species and may be locally dominant within the patch at some sites (see *Key species* on page 17).
2. Projected foliage cover excludes gaps between branches and leaves—for example, the amount of shadow that would be cast on the ground if there were a light source directly overhead.
3. A patch is defined as a discrete and continuous area that comprises the ecological community. It is recognised that patches may occur in a range of sizes and shapes. In general, surveys within patches should be based on samples of at least 0.04 ha (a 20 m x 20 m plot or equivalent). The number of plots (quadrats or survey transects) per patch must take into consideration the size, shape and condition across the site. Permanent man-made structures, such as roads and buildings, are typically excluded from a patch, but a patch may include small-scale disturbances, such as tracks or breaks or other small-scale variations in native vegetation that do not significantly alter the overall functionality of the ecological community—for instance, the easy movement of wildlife or dispersal of plant spores and seeds.
4. This determines how much of the understorey is native versus exotic. Perennial understorey vegetation cover includes vascular plant species of the ground and shrub layers with a lifecycle of more than two growing seasons. Measurements of perennial understorey vegetation cover exclude annuals, lichens and mosses, leaf litter or exposed soil.
5. Contiguous means the woodland patch is continuous with, or close to (within 100 m), another patch of vegetation that is dominated by native species in each vegetation layer present. Apart from native vegetation with a tree canopy, adjoining native vegetation may consist of derived grasslands or shrublands. ‘Derived’ or ‘secondary’ grasslands or shrublands are sites where the trees have been cleared but the native understorey is retained, giving the appearance of a grassland or shrubland.
6. dbh—diameter at breast height (measured 1.3 m above the base of the tree).

Flowchart of key diagnostic features and condition thresholds to identify the Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest ecological community



Notes: See page 10 for notes.

Appendix B. Site Flora Inventory

Scientific Name	Common Name	BC Status	Exotic	Vegetation Type			
				CPW Patch	Planted Woodland	Planted Natives	Planted Exotics
Acacia fimbriata	Fringed Wattle					X	
Acacia floribunda	White Sally					X	
Acacia parramattensis	Parramatta Wattle			X			
Ambrosia artemisiifolia	Annual Ragweed		*	X			
Angophora bakeri	Narrow-leaved Apple					X	
Araucaria bidwillii	Bunya Pine		*				X
Araujia sericifera	Moth Vine		*	X			
Asparagus asparagoides	Bridal Creeper		*	X			
Asparagus officinalis	Asparagus		*	X			
Bidens pilosa	Cobbler's Pegs		*	X			
Brachychiton populneus subsp. populneus						X	
Brassica juncea	Indian Mustard		*	X			
Bromus catharticus	Praire Grass		*	X			
Bursaria spinosa	Native Blackthorn			X			
Callistemon citrinus	Crimson Bottlebrush					X	
Callistemon salignus	Willow Bottlebrush				X	X	
Calystegia sepium				X			
Capsella bursa-pastoris	Shepherd's Purse		*		X		
Carex appressa	Tall Sedge			X			
Casuarina glauca	Swamp Oak			X	X	X	
Cenchrus clandestinus	Kikuyu Grass		*	X			
Chloris gayana	Rhodes Grass		*	X			
Cirsium vulgare	Spear Thistle		*	X			
Commelina cyanea	Native Wandering Jew			X			
Conyza bonariensis	Flaxleaf Fleabane		*	X			
Corymbia maculata	Spotted Gum				X	X	

Scientific Name	Common Name	BC Status	Exotic	Vegetation Type			
				CPW Patch	Planted Woodland	Planted Natives	Planted Exotics
Crassocephalum crepidioides	Thickhead		*	X			
Cyperus eragrostis	Umbrella Sedge		*	X			
Dichondra repens	Kidney Weed			X			
Digitaria spp.	Couch grass				X		
Ehrharta erecta	Panic Veldtgrass		*	X	X		
Einadia hastata	Berry Saltbush			X			
Einadia nutans	Climbing Saltbush			X			
Elymus repens	English Couch		*	X			
Eragrostis curvula	African Lovegrass		*	X			
Eucalyptus crebra	Narrow-leaved Ironbark			X		X	
Eucalyptus moluccana	Grey Box			X	X	X	
Eucalyptus sideroxylon	Mugga Ironbark				X	X	
Eucalyptus tereticornis	Forest Red Gum			X	X	X	
Ficus macrophylla				X			
Galium aparine	Goosegrass		*	X			
Glycine tabacina	Variable Glycine			X			
Grevillea juniperina subsp. juniperina	Juniper-leaved Grevillea	V				X	
Grevillea robusta	Silky Oak					X	
Hypochaeris radicata	Catsear		*	X			
Juncus usitatus				X			
Leptospermum petersonii	Lemon-scented Teatree					X	
Ligustrum lucidum	Large-leaved Privet		*	X			
Ligustrum sinense	Small-leaved Privet		*	X			
Lobelia purpurascens	whiteroot			X			
Malva parviflora	Small-flowered Mallow		*	X			
Melaleuca decora				X	X	X	
Melaleuca linariifolia	Flax-leaved Paperbark			X		X	
Microlaena stipoides	Weeping Grass			X			

Scientific Name	Common Name	BC Status	Exotic	Vegetation Type			
				CPW Patch	Planted Woodland	Planted Natives	Planted Exotics
Modiola caroliniana	Red-flowered Mallow		*	X	X		
Morus alba	White Mulberry		*	X			
Olea europaea subsp. cuspidata	African Olive		*	X			
Oplismenus aemulus				X			
Opuntia stricta	Common Prickly Pear		*				
Oxalis spp.				X			
Paspalum mandiocanum	Broadleaf Paspalum		*	X			
Paspalum urvillei	Vasey Grass		*	X			
Phoenix canariensis	Canary Island Date Palm		*	X			
Phragmites australis	Common Reed						
Plantago lanceolata	Lamb's Tongues			X			
Ricinus communis	Castor Oil Plant		*				
Rorippa nasturtium-aquaticum	Watercress		*	X			
Senecio madagascariensis	Fireweed		*	X			
Setaria pumila	Pale Pigeon Grass		*	X			
Sida rhombifolia	Paddy's Lucerne		*	X			
Solanum mauritianum	Wild Tobacco Bush		*	X			
Solanum nigrum	Black-berry Nightshade		*	X			
Solanum pseudocapsicum	Madeira Winter Cherry		*	X			
Solanum sisymbriifolium			*	X			
Soliva sessilis	Bindyi		*		X		
Sonchus oleraceus	Common Sowthistle		*	X			
Sphagnum cristatum				X			
Stellaria media	Common Chickweed		*	X	X		
Taraxacum officinale	Dandelion		*	X			
Tradescantia fluminensis	Wandering Jew		*	X			

Scientific Name	Common Name	BC Status	Exotic	Vegetation Type			
				CPW Patch	Planted Woodland	Planted Natives	Planted Exotics
Trifolium repens	White Clover		*	X	X		
Verbena bonariensis	Purpletop		*	X			
Vicia sativa subsp. sativa	Common Vetch		*	X			
Viola hederacea	Ivy-leaved Violet			X			

BC Act 2016: V - Vulnerable

Appendix C. Weed Species listed as a Biosecurity Risk and Control Techniques

Table 5. Categories of Management under the Greater Sydney Regional Strategic Weed Management Plan 2017-2022 under the NSW Biosecurity Act 2015

Category	Management Action
Prevention (Prevent)	To prevent the weed species arriving and establishing in the Region.
Eradication (Eliminate)	To permanently remove the species and its propagules from the Region, OR to destroy infestations to reduce the extent of the weed in the region with the aim of local eradication.
Containment (Minimise)	To prevent the ongoing spread of the species in all or part of the Region.
Asset Protection (Manage)	To prevent the spread of weeds to key sites/ assets of high economic, environmental and social value, or to reduce their impact on these sites if spread.
GBD (General Biosecurity Duty)	All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable."
RRM **(Regional Recommended Measure)**	Specific details for each species included in table.
PoD **(Prohibition on Dealings)**	Must not be imported into the State or sold.
B Zone **(Biosecurity Zone)**	Specific details for each species included in table.
PM **(Prohibited Matter)**	A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries.

Table 6. Weeds under the Biosecurity Act recorded within the subject site listed as State or Regional Priority Weeds in the Greater Sydney Regional Strategic Weed Management Plan 2017-2022

Common Name	Botanical Name	WONS	State Priority Weed-Mgmt. Actions	Regional Priority Weeds-Mgmt. Actions	Other Regional Weeds-Asset/value at risk	Weeding Technique	Herbicide Application	Herbicide Group	Ratio
Turkey Rhubarb	*Acetosa sagittata*				Environment	Juvenile single specimens to be dug out. Large infestations foliar spraying with Glyphosate.	Glyphosate 360g/L	M	1/100
Crofton Weed	*Ageratina adenophora*				Environment, Agriculture	Hand removal, brush cut and foliar sprayed with Glyphosate	Glyphosate 360g/L	M	1/100
Madeira Vine	*Anredera cordifolia*	Yes	Asset Protection			Individuals to be dug out			
Moth Vine, Moth Plant	*Araujia sericifera*				Environment	Small patches to be hand pulled, scraped & painted with Glyphosate	Glyphosate 360g/L	M	Neat
Cobblers Pegs	*Bidens pilosa*					Foliar spraying using Glyphosate, hand pulled and brush cut	Glyphosate 360g/L	M	1/100
Green Cestrum	*Cestrum parqui*			Asset Protection		Scrape & painted with Glyphosate or cut and painted with Vigilant Gel	Glyphosate 360g/L or Picloram 43g/km	M or I	Neat
Fleabane	*Conyza bonariensis*					Foliar spraying with Glyphosate, hand pulled and brush cut	Glyphosate 360g/L	M	1/100
Pampas Grass	*Cortaderia jubata*			Asset Protection		Foliar spraying or cutr/paint with Glyphosate or hand removed.	Glyphosate 360g/L	M	1/100 & Neat
Panic Veldgrass	*Ehrharta erecta*					Foliar spraying with Glyphosate	Glyphosate 360g/L	M	1/100
Cockspur Coral Tree	*Erthrina crista-galli*				Environment	<80mm cut & painted; >80mm will be drilled/frilled with neat Glyphosate	Glyphosate 360g/L	M	Neat
English Ivy	*Hedera helix*					Small single specimens hand pulled, skirting larger vines scraping/cut and painting with neat Glyphosate	Glyphosate 360g/L	M	Neat
Pennywort	*Hydrocotyle bonariensis*					Hand pulled or spot sprayed with Dicamba			

Common Name	Botanical Name	WONS	State Priority Weed-Mgmt. Actions	Regional Priority Weeds-Mgmt. Actions	Other Regional Weeds-Asset/value at risk	Weeding Technique	Herbicide Application	Herbicide Group	Ratio
Morning Glory / Blue Morning Glory	*Ipomoea indica*				Environment, Human health	Small single specimens hand pulled, skirting larger vines scraping and painting with neat Glyphosate	Glyphosate 360g/L	M	Neat
Lantana	*Lantana camara*	Yes	Asset Protection			Cut and paint, sprayed or splattered with Glyphosate	Glyphosate 360g/L	M	Neat
Large Leaf Privet	*Ligustrum lucidum*					<80mm cut & painted; >80mm will be drilled/frilled with neat Glyphosate	Glyphosate 360g/L	M	Neat
Small Leaf Privet	*Ligustrum sinense*					<80mm cut & painted; >80mm will be drilled/frilled with neat Glyphosate	Glyphosate 360g/L	M	Neat
Caterpillar Grass	*Paspalum dilatatum*					Foliar spraying with Glyphosate	Glyphosate 360g/L	M	1/100
Phoenix Palm, Canary Island Date Palm	*Phoenix canariensis*				Environment	Physical removial, defolitating then cut and paint.	Glyphosate 360g/L	M	Neat
Castor Oil Plant	*Ricinus communis*					Hand pulled and cut & painted with neat Glyphosate	Glyphosate 360g/L	M	Neat
Senna / Cassia	*Senna pendula*				Environment	Small individuals hand removed, larger plants cut and painted with neat Glyphosate	Glyphosate 360g/L	M	Neat
Paddy's Lucerne	*Sida rhombifolia*					Foliar spraying with Glyphosate, hand pulled and brush cut	Glyphosate 360g/L	M	1/100
Trad	*Tradescantia fluminensis*				Environment	Raked, piled and bagged.	Hand removal		

Appendix D. Recommended Planting Species List

Scientific Name	Common Name	VMZ 1	VMZ 3	VMZ4
Canopy species				
Angophora floribunda	Rough-barked Apple		X	X
Angophora subvelutina	Broad-leaved Apple		X	X
Acacia decurrens	Black wattle		X	X
Acacia implexa	Hickory wattle		X	X
Acacia parramattensis	Parramatta Wattle		X	X
Corymbia maculata	Spotted Gum		X	X
Eucalyptus amplifolia	Cabbage Gum		X	X
Eucalyptus crebra	Narrow-leaved Ironbark		X	X
Eucalyptus eugenioides	Thin-leaved stringybark		X	X
Eucalyptus moluccana	Grey Box		X	X
Eucalyptus sideroxylon	Mugga Ironbark		X	
Eucalyptus tereticornis	Forest Red Gum		X	X
Syncarpia glomulifera	Turpentine		X	
Midstorey species				
Bursaria spinosa	Sweet Bursaria	X	X	X
Breynia oblongifolia	Coffee bush	X	X	X
Daviesia ulicifolia	Gorse bitter pea	X	X	X
Dodonaea viscosa subsp. cuneata	Wedge-leaf hop-bush	X	X	X
Grevillea juniperina subsp. juniperina	Juniper-leaved Grevillea		X	
Indigofera australis	Australian indigo	X	X	X
Pultenaea microphylla		X	X	X
Groundcover species				
Aristida ramosa	Purple wiregrass	X	X	X
Aristida vagans	Threeawn Speargrass	X	X	X
Bothriochloa decipiens	Pitted Bluegrass	X	X	X
Carex appressa	Tall Sedge	X	X	X
Chloris truncata	Windmill Grass	X	X	X
Chloris ventricosa	Tall chloris	X	X	X
Cyperus gracilis	Slender Flat-sedge	X	X	X
Dianella caerulea	Blue Flax-lily		X	
Dianella longifolia	Blueberry lily	X	X	X
Dichelachne micrantha	Plumegrass	X	X	X
Echinopogon ovatus	Forest Hedgehog Grass	X	X	X
Eragrostis brownii	Brown's Lovegrass	X	X	X

Scientific Name	Common Name	VMZ 1	VMZ 3	VMZ4
Eremophila debilis	Winter apple	X	X	X
Juncus usitatus		X	X	X
Lomandra filiformis	Wattle Mat-rush	X	X	X
Lomandra multiflora subsp. multiflora	Many-flowered Mat-rush	X	X	X
Melaleuca decora	White feather honeymyrtle	X	X	X
Microlaena stipoides var. stipoides	Weeping grass	X	X	X
Sporobolus creber	Slender Rat's Tail Grass	X	X	X
Sporobolus elongatus	Slender Rat's Tail Grass	X	X	X
Themeda triandra	Kangaroo grass	X	X	X

Appendix E. Phytophthora Hygiene Protocols

Task	Action
Timing	When possible/practical, the development should be completed in dry soil conditions and postponed following significant rainfall. Working in dry soil conditions will reduce the need for cleaning vehicles and equipment. If it is necessary to work in wet or damp areas then greater attention will need to be spent on vehicle and equipment cleaning.
Staff	Contractors and staff involved in the development are to be made aware that fungus has / has not been recorded on site, and provided with information regarding management protocols and its threat to native vegetation.
Drainage and Water	Alterations to drainage that may result in the spread of *Phytophthora* into new areas are to be avoided as highest priority. Water used during construction should be minimised. When water is necessary, it should be from a reticulated mains system, bore supply or sterilised source. Surface water collected from infected areas should not be used. Water draining from the site should not to enter bushland areas. The use of water for dust suppression should be kept to a minimum.
Landscaping and Bush Regeneration	Plants used in landscaping should be purchased from a nursery with accreditation from the Nursery Industry Association, or from a nursery with excellent hygiene conditions. Species selected for landscaping should preferably be resistant to *Phytophthora cinnamomi*. Any gravel/sand/topsoil to be bought onto site should be purchased from a Nursery Industry Association accredited supplier, or should be certified (through testing) to be free of *Phytophthora cinnamomi*. Any infected soil/sand/gravel/vegetation moved on the site, or removed from the site should be stored at in area that is also infected with *Phytophthora cinnamomi*, or a site where the pathogen will not have any impact. Storage of gravel/sand/topsoil on site should preferably be on a dry well drained surface. Construction materials such as pipes, rocks, timber, bricks etc, should be free of mud and soil when arriving at the site. Staff should not enter infected areas unless necessary, movement within these areas should be kept to a minimum.
Vehicles and Machinery	All machinery, vehicles and equipment should arrive at the site free of uncontained mud and soil, particularly on tyres, mudflaps and the underbody. Vehicles and machinery exiting the site to be free of all uncontained mud and soil, particularly on the tyres, mudflaps and the underbody. Minimise the amount of water used. Try to remove soil and mud when it is dry (a stiff brush or stick maybe useful). Cleaning will be easier and more effective if it is completed at a depot or a permanent/designated cleaning area (it is acceptable for vehicles and machinery to be taken to a cleaning facility on sealed roads). If cleaning is to occur in the field select a site with a hard, well-drained surface (eg. a road) that is well away from remnant vegetation. If possible, wash down in an area that is close to the area you have been operating in. Wash down on ramps if possible. Do not allow mud and wash-down effluent to drain into bushland. Do not drive through wash-down effluent.
Footwear and Tools	Try to remove as much mud and soil as possible when it is dry with a stiff brush or stick. Minimise the amount of water used to initially clean footwear and tools. Footwear and tools should be scrubbed with a sterile solution (see below). All mud and soil should be collected (including in liquid) and removed in a bag or bucket. This material is to be disposed of at a site that is already infected with Cinnamon Fungus, or a site that contains no bushland.
Sterilising	Equipment can be sterilised by soaking in a disinfectant such as bleach (containing sodium hypochlorite). The bleach should be diluted (1 part bleach to 10 parts water), soak the tools for a few minutes, and then rinse. Alternatively methylated spirits can also be used for sterilising small hand tools and footwear in the field. A spray bottle containing methylated spirits can be used to cover all surfaces, allowing time for it to soak into all soil material (a couple of minutes is sufficient). A sterile water solution suitable for spraying down vehicles and machinery can be made by mixing 6mL of sodium hypochlorite (eg. pool chlorine or bleach) to every 10L of water.

Appendix F. How to Stake and Support a Tree

FIGURE 4: Tree planting detail