BOX HILL NORTH - THE GABLES

Vegetation Management Plan - Precinct E

For:

Celestino Developments Pty Limited

January 2017

Final

PO Box 2474
Carlingford Court 2118

Report No. 15029RP5

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 recommendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

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1	22/12/2016	BF, GK	Draft
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Approved by: David Robertson

Position: **Director**

Signed:

Date: *25 January, 2017*

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Glossary of Terms

APZ	Asset Protection Zone
BRC	Bushland Regeneration Contractor
CEEC	Critically Endangered Ecological Community
CPW	Cumberland Plain Woodland
DA	Development Application
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
Guideline	The Hills Vegetation Management Plan Guideline (The Hills Shire Council 2015)
LGA	Local Government Area
Master Plan	Vegetation Management Master Plan (REF 15029RP1) (Cumberland Ecology 2015)
NW Act	NSW *Noxious Weeds Act 1993*
OEH	NSW Office of Environment and Heritage
PPE	Personal Protective Equipment
SIS	Species Impact Statement
Study area	The area of land likely to be affected by the Box Hill North development (all precincts) (Figure 1.1), either directly or indirectly, by future development.
Subject site	The area within Precinct E that is subject to this VMP
The Hills LEP 2012	*The Hills Local Environment Plan 2012*
TSC Act	NSW *Threatened Species Conservation Act 1995*
VMP	Vegetation Management Plan
Waterfront Guideline	The Guidelines for Vegetation Management Plans on Waterfront Land (NSW Office of Water 2012)
WM Act	NSW *Water Management Act 2000*
WONS	Weeds of National Significance

Chapter 1

Introduction

1.1 Purpose

The purpose of this Vegetation Management Plan (VMP) is to prescribe management of a section of vegetation within a riparian corridor at Box Hill North, Precinct E, that is the subject to revegetation works as a condition of a future Development Application (DA). This land is hereafter referred to as the "subject site".

J. Wyndham Prince, on behalf of Celestino Pty Limited is intending to submit a DA for the future development of Precinct E (including the subject site) as part of an Integrated Development. Under the DA the subject site is to be entirely cleared of vegetation and ultimately be revegetated with endemic riparian vegetation using species characteristic of the communities Cumberland Plain Woodland and Riverflat Eucalypt Forest, The aim of this VMP is to enhance the subject site's ecological values over time by providing a guide to revegetate (using bushland regeneration techniques) the subject site as an endemic riparian corridor as per requirements under the NSW *Water Management Act 2000* (WM Act).

The VMP applies to the entire subject site and has been prepared with due reference to the following documents:

- Vegetation Management Master Plan (the 'Master Plan') (REF 15029RP1) (Cumberland Ecology 2015) for all precincts within Box Hill North (hereafter referred to as the "study area", see **Figure 1.1**);
- The Hills Vegetation Management Plan Guideline (the 'Guideline') (The Hills Shire Council 2015). **Table 1.1** identifies where each required component of the Guideline is addressed in this VMP; and
- The Guidelines for Vegetation Management Plans on Waterfront Land (the 'Waterfront Guideline') (NSW Office of Water 2012).

This VMP should be used in association with the Master Plan to ensure that all measures implemented meet the requirements set out by the Guideline, the Waterfront Guideline and any other relevant legislation including the TSC Act*, Noxious Weeds Act 1993 (*NW Act) and *Water Management Act 2002* (WM Act).

Table 1.1 Required components of the Hills Vegetation Management Plan Guideline and the location of where each component is addressed within this VMP

Hills Vegetation Management Plan Guideline Required Component	Where Component is Addressed within VMP
2.1 Site Description	Section 1.2
2.2 Aims of the VMP	Section 1.1
2.3 Objectives of the VMP	Section 1.3
2.4 Identification of Management Zones	Section 3.2
2.5 Define Management Tasks by Management Zone	**Chapters 5** and **6**
2.6 Fencing	n/a
2.7 Determine Performance Criteria	**Chapter 8** (**Table 8.1**)
2.8 Define Monitoring and Reporting Methods	**Chapter 7**
2.9 Provide a Timeframe	Section 6.9 and **Chapter 8** (**Table 8.1**)
2.10 Costing	Section 7.3
2.11 Identify Existing and Potential Threats to the VMP Managed Area and Provide Mitigation Measures	**Chapters 5** and **6**
2.12 Maintenance Requirements into the Future	**Chapters 5** and **6**
2.13 Mapping	**Figures 1.1**, **1.2**, **6.1**, **6.3** and **7.1**
3.1 Signage	Section 6.6
3.2 Local Provenance	Section 4.6, 6.4
3.3 Habitat Supplementation	Section 4.5
3.4 Information Fact Sheet	**Appendix C**

1.2 Background

1.2.1 Location

The subject site at Box Hill North, Precinct E is bound by previously cleared farm land on all edges with the exception of the northern boundary which adjoins a stretch of woodland vegetation, and is located within The Hills Shire Local Government Area (LGA). The boundary of the subject site is shown in **Figure 1.2.**

1.2.2 Description

The subject site is approximately 11.20 ha in size consisting of gently undulating terrain with well-structured clay soils derived from Wianamatta Shale and Tertiary and Quaternary alluvial soils associated with the Hawkesbury-Nepean River system. The subject site consists of an existing dam, and predominately previously cleared land used primarily for

cattle grazing and cropping. A small area of the site in the north consists of degraded, regrowth Shale Sandstone Transition Forest while patches of regrowth consisting predominately of *Acacia* spp, occur along an existing creek line. Areas adjacent to the site following completion of the riparian corridor revegetation will be open space and residential dwellings and roads.

1.2.3 Vegetation

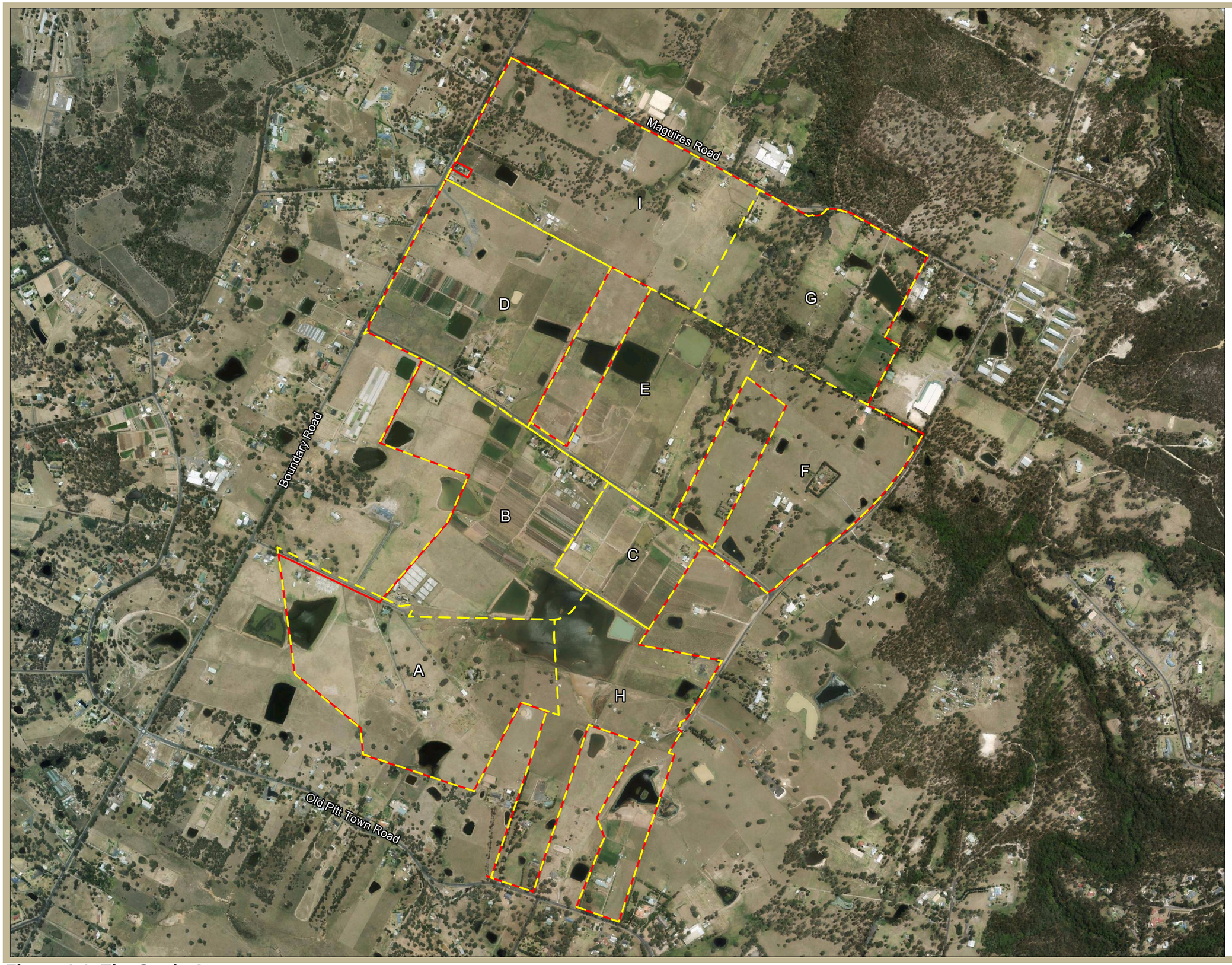
The subject site is largely cleared of native vegetation and is primarily dominated by exotic grasses. Some treed vegetation and shrubby regrowth is present in the north and along the creek line, and areas with higher abundances of native ground layer species are present patchily in association with native woody vegetation (**Figure 1.2**). The extant vegetation within the subject site in the north conforms to a degraded form of Shale Sandstone Transition Forest listed under the TSC Act and *Environment Protection and Biodiversity Conservation Act (1999)* (EPBC Act).

1.3 Objectives

The objective of the VMP is to guide the revegetation of the subject site. To accomplish this objective, the following measures are addressed within this VMP:

- Identification of management zones (Chapter 3);
- Vegetation clearing protocols (Chapter 4);
- Weed management strategies (Chapter 5);
- Reconstruction Plan (Chapter 6);
- Monitoring strategies and reporting requirements (Chapter 7);
- Performance and Completion criteria (Chapter 8); and
- Schedule of works and responsibilities (Chapter 8).

Coordinate System: MGA Zone 56 (GDA 94)



Legend

- Study Area (Box Hill North)
- Development Stages

Grid North

Image Source:
Image © 2016 Aerometrex
(dated 01-01-2014)

cumberland ecology

I:\...\15029\Figures\RP5\20161206\Figure 1.1. The Study Area

Figure 1.1. The Study Area

200 0 200 400 600 800 m

Coordinate System: MGA Zone 56 (GDA 94)

Grid North

RED GABLES ROAD

Legend

Study Area (Box Hill North)

Subject Site

Image Source:
Image © 2016 Aerometrex
(dated 01-01-2014)

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25 0 25 50 75 100 m

I:\...\15029\Figures\RP5\20161206\Figure 1.2. The Subject Site

Figure 1.2. The Subject Site

Chapter 2

Methods

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 site. This literature review involved a variety of sources including government fact sheets and websites. Cumberland Ecology staff with expertise in bushland maintenance were also consulted on current best practice methods and techniques.

In order to prepare species planting lists for revegetation the following documents were reviewed in conjunction with a review of field survey data:

- Restoring Bushland on the Cumberland Plain (DEC (NSW) 2005);
- Cumberland Plain Recovery Plan (DECCW 2011); and
- Atlas of NSW Wildlife (OEH 2016)

The species list prepared for revegetation areas within the subject site not only includes species listed as diagnostic for the vegetation communities, but also includes additional species that were recorded as naturally occurring local endemics within these communities in adjacent areas. It should be noted that these additional species are not listed under the final determination for the community. Species listed under final determinations are a broad view of characteristic species for a particular community, and do not take into account natural variation at the site level which the proposed species list attempts to do. Suitability for planting of each species recommended was checked against NSW Wildlife Atlas records to determine if it naturally occurs within the locality.

2.2 Flora Survey Effort

Cumberland Ecology has surveyed the Box Hill North Development (the study area) (as shown in Figure 1.1) extensively during preparation of a Fauna and Flora Assessment (Cumberland Ecology 2013) and a Species Impact Statement (SIS) (Cumberland Ecology 2014) of which the subject site is a component. This study area has also undergone surveys by NGH Environmental in 2012 (NGH Environmental 2013).

Species lists for weed and native species present in the Box Hill North study area and as used in this VMP, have been compiled from quadrat data, random meander surveys, photo-points, and rapid assessment points undertaken during these surveys. The Master Plan VMP provides an in-depth description of previous survey effort for the subject site and study area.

Chapter 3

Vegetation Management Zones

3.1 Introduction

The subject site covers an area of approximately 11.20 ha and is identified as Zone 3 – CPW Recontruction Following Major Earthworks in the Masterplan VMP management zones. Although the final layout of the subject site has undergone minor amendments compared to the Master Plan, as per the Master Plan, the majority of the subject site is identified as a Basin and a Lake with adjoining open space and riparian open space corridor (Cumberland Ecology 2015).

The subject site will be completely cleared of existing vegetation during construction, with the landform to be changed following major earthworks. Under the Master Plan VMP, the subject site is to be completely revegetated with endemic, native plantings characteristic of the community Cumberland Plain Woodland following the completion of major earthworks. The revegetation works will occur along two riparian corridors and surrounding a central lake area.

In addition to replanting, construction bank stabilisation will be required including installation of natural features such as pool/riffle/run sequences, variable width and depth and variable bed substrate sizes. Erosion dropdown structures are to be constructed to provide a gentle grade to reduce energy of water flow, minimise erosion, and provide sediment control. The specific location and design of these features will be outlined in the riparian corridor and stormwater drawings, and are not featured in this VMP. It should be noted that the riparian corridors will constitute ephemeral waterways and will not be perennially flowing.

3.2 Proposed Works

3.2.1 Precinct Management Zones

Revegetation within the riparian area is being undertaken to primarily to satisfy legislative requirements under the WM Act. The central areas of riparian revegetation are to consist of a Vegetated Riparian Zone (VRZ), to satisfy requirements under the WM Act. Additional landscaping and recreational areas will be located adjacent to the VRZ areas.

Overall the subject site can be divided into four management zones. These are:

- PrE Zone 1: Vegetated Creek Bed;

- PrE Zone 2: Riparian Area;
- PrE Zone 3: Rain gardens; and
- PrE Zone 4: Recreation.

PrE Zones 1 and 2 form the VRZ . PrE Zones 3 and 4 constitute landscaped areas that are not fully revegetated. These management zones largely correspond to similar management zones in the adjacent Precinct C. The equivalent zones between Precinct C and Precinct E are summarised in **Table 3.1** below.

Table 3.1 Corresponding Management Zones between Precinct C and Precinct E

Precinct C	Precinct E
PrC Zone 1: Vegetated Creek Bed;	PrE Zone 1: Vegetated Creek Bed;
PrC Zone 2: Riparian Area;	PrE Zone 2: Riparian Area;
PrC Zone 3: CPW Area;	
PrA Zone 4: Rain gardens; and	PrE Zone 3: Rain gardens;
PrA Zone 5: Recreation.	PrE Zone 4: Recreation.-

3.2.2 Management Zone Objectives

The objectives for Zone 3, as listed under the Master Plan VMP, apply to all the management zones within the subject site. These objectives include:

- Restore cleared areas to form contiguous high-quality riparian corridor;
- Replace exotic species with locally endemic natives; and
- Utilise endemic, native species in landscaped open areas not to be fully revegetated.

Additional objectives specific to the Precinct E management zones include:

i. PrE Zone 1

- Revegetate areas with native ground layer species able to withstand ephemeral conditions, such as sedges and rushes; and
- Establish native species along the creekbed to enhance substrate stability.

ii. PrE Zone 2

- Revegetate areas with native canopy, understorey and ground layer species able to withstand ephemeral conditions; and

- Establish native species along the riparian zone to enhance bank stability.

PrE Zone 3 and PrE Zone 4 constitute landscaped areas that are not to be fully revegetated and do not have any additional objectives to the Master Plan VMP objectives.

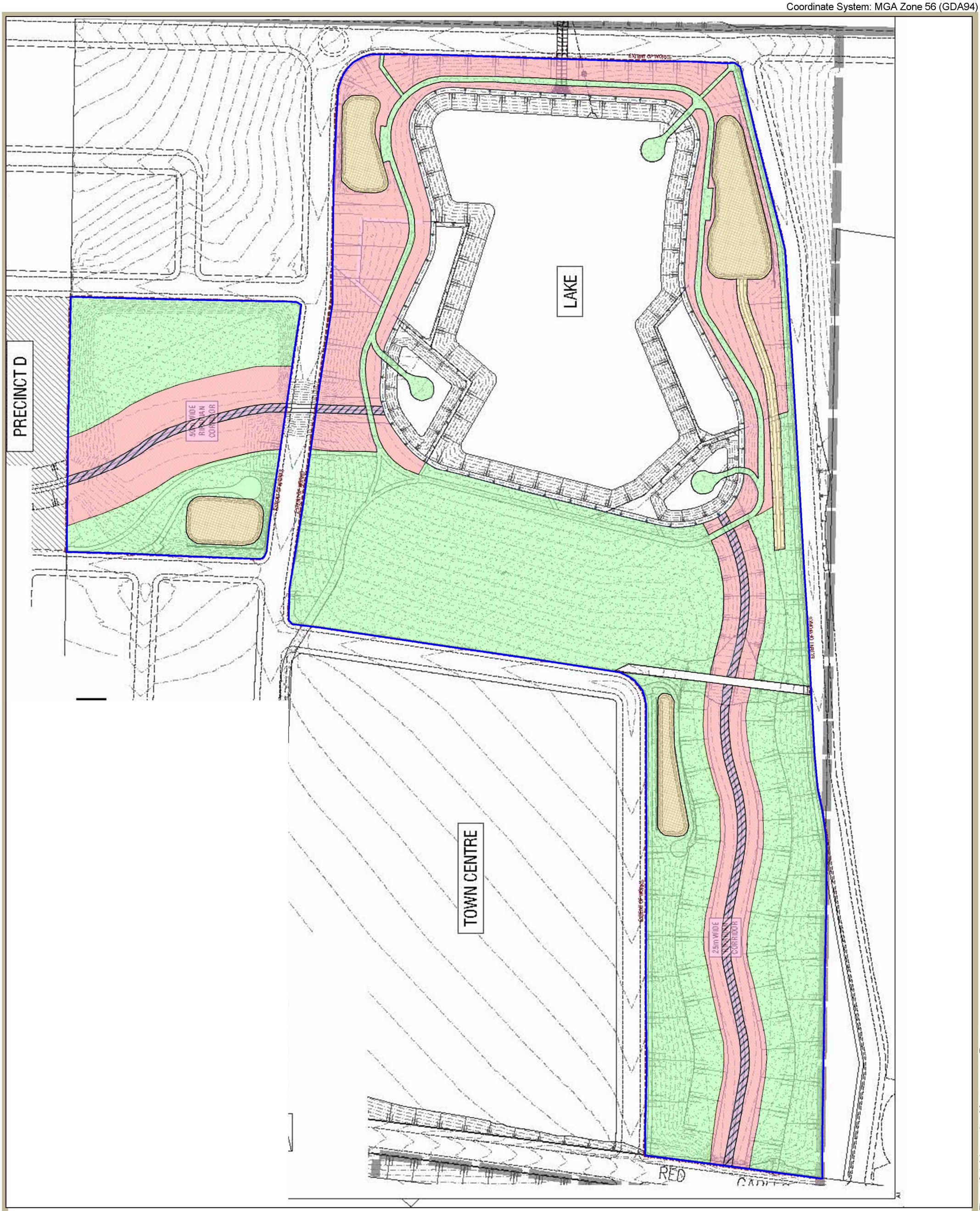
3.2.3 Actions

The subject site is to undergo weed management by the Bushland Regeneration Contractor (BRC) of any exotic species remaining or regrowing following clearing for development.

All management zones are to be planted with a diverse range of the species listed in **Appendix A**, **Table A.1**. These species are characteristic of the community Cumberland Plain Woodland which would have historicaly occurred in the area. The subset of species as listed in **Appendix A, Table A.2 c**onsists of species that are better able to withstand ephemeral conditions and must be planted within PrE Zone 1 and PrE Zone 2. This subset of species is consistent with the community River-Flat Eucalypt Forest, a community that often adjoins or intergrades with CPW in floodplain areas of the Cumberland Plain.

The species selection and planting densities for the different management zones are addressed further in **Section 6.4.1** of this VMP.

Coordinate System: MGA Zone 56 (GDA94)



N
Grid North

Legend

- Subject Site
- PrE Zone 1: Vegetated Creek Bed
- PrE Zone 2: Riparian Area
- PrE Zone 3: Rain gardens
- PrE Zone 4: Recreation

Image Source: Oculus 2016, Drawing No. L-E-BEW-100 Revision C. 28-11-2016.

cumberland ecology

I:\...\15029\Figures\RP5\20161206\Figure 3.1. Vegetation Management Zones

Figure 3.1. Vegetation Management Zones within the Subject Site

25 0 25 50 75 100 m

Chapter 4

Vegetation Clearing Protocols

4.1 Introduction

This chapter outlines the protocols to be followed during clearing to minimise the impacts on native flora and fauna within the subject site.

4.2 Marking Limits of Vegetation Clearing

Prior to clearing being undertaken within Precinct E, the edge of the vegetation to be cleared needs to be clearly delineated. Clearing limits can be marked with high visibility tape, temporary fencing, or other appropriate boundary markers. To avoid unnecessary damage to vegetation or inadvertent habitat removal, disturbance is to be restricted to the delineated area. No stockpiling of equipment, soils, or machinery will occur beyond the boundary.

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

4.3 Pre-clearing Surveys

Prior to the commencement of clearing, a pre-clearing survey needs to be undertaken by a certified ecological consultant. During the survey, native flora and fauna that have the potential to be disturbed during clearing will be identified.

4.3.1 Flora Pre-clearing Surveys

Prior to clearing, a flora survey will be conducted by the certified ecological consultant to search for threatened plant species that have potential to occur, based on habitat available (see Master Plan for list of potential threatened plant species).

If a threatened plant species is identified, the numbers of plants will be counted and/or the population estimated/mapped. A review of translocation methods, collection of propagules, and propagation from seeds or cuttings from plants within the disturbance area and/or surrounds will be undertaken. Following this review, a translocation/propagation program will be developed and implemented where appropriate in consultation with the NSW Office of Environment and Heritage (OEH), and the Commonwealth Department of the Environment and Energy (DoEE) where relevant.

All threatened plant species identified during pre-clearing will be reported to OEH and to DoEE (for relevant Matters of National Environmental Significance species).

4.3.2 Fauna Pre-clearing Surveys

Habitat features that have a high potential to support native fauna species will be identified prior to any clearing activities. These include significant rock outcrops and in particular trees bearing hollows that have potential to contain species such as bats, gliders, possums, reptiles and birds. Trees containing hollows or nests that have a high potential to contain fauna will be identified, recorded, flagged with fluorescent marking tape, and marked with a large (>1 m) "H" using spray paint on two sides of the tree.

The location of suitable nearby habitat for the release of fauna that may be encountered during the pre-clearing process will be identified and marked on a map. These relocation areas will be within areas of CPW in the north-west section of the study area that are be retained and rehabilitated (see Master Plan).

Within one week prior to clearing trees, a pre-clearing fauna survey will be conducted by the ecologist for the presence of fauna species that were identified in the Flora and Fauna Assessment and SIS as likely to occur. This will be undertaken to identify and minimise impacts to resident fauna. To determine fauna usage, the ground around each tree will be inspected for scats, and each tree trunk will be inspected for scratch marks. Any fauna utilising the area will be recorded, and where possible, these will be encouraged to leave the area.

4.4 Weed Management during Construction

Prior to clearance, infestations of significant weeds (noxious weeds listed under the NW Act or Weeds of National Significance (WONS)) will be recorded in the subject site and mapped. If recommended by the ecologist, control of weeds will be undertaken to minimise the risk of spread of weeds during clearing. Weed control measures will be species specific.

Prior to clearing, all plant equipment entering the site will be inspected and recommended for wash down (in designated wash down areas) as required to ensure weed material from off-site locations do not establish or spread into native vegetation within the subject site.

Any weed materials will need to be carefully removed off site in a manner appropriate to the species or at the direction of the ecologist and The Hills Shire Council guidelines so as to prevent the spread of propagules to uncleared areas of native vegetation, both on and off site.

Machinery involved in weed management will also be washed down prior to removal from site to prevent weeds from spreading into off site areas.

After construction is complete, a final inspection will be undertaken by the ecologist to check that weeds have been successfully contained to prevent weed spread including:

- Negligible weed proliferation throughout construction areas (at the discretion of the BRC);
- Bunding/sedimentation fencing around weed storage areas; and
- Correct disposal of weed material at an approved disposal facility.

4.5 Salvage of Hollow-Bearing Trees, Hollow-bearing Logs, other Woody Material, and Bushrock

The following fauna habitat features are to be salvaged during clearing and stockpiled for future use in restoration of the CPW within the subject site. The placement of salvaged items within the subject site will increase habitat complexity as such items are used by a variety of invertebrate and vertebrate species as microhabitat areas.

Habitat features are to be stored until such time as restoration of the reconstruction of vegetation commences. Storage should be undertaken within designated stockpile areas within the subject site, with onsite contractors made aware material is to be retained, to prevent loss of stored habitat features prior to utilisation. Placement of stored habitat features within reconstructed areas will be undertaken in co-ordination with the BRC or the ecologist.

4.5.1 Tree Hollows

Trees and stags containing hollows felled during the clearing process will be relocated within the CPW. These will be used for habitat reconstruction within the subject site. Hollows will be trimmed by a tree removal specialist and will be relocated to trees within vegetation to be retained within the study area. When the relocation of a hollow is not possible, a nest box will be placed in a tree within the retained CPW and Shale/Sandstone Transition Forest (SSTF) patches of the study area to ensure that all lost arboreal habitat is offset.

Hollows to be translocated will be those that are structurally sound to the extent that they survive the trees felling and subsequent translocation. The suitability of each hollow is to be determined during pre-clearance surveys by an ecologist.

4.5.2 Log Hollows

Any logs with hollows from clearing areas are to be salvaged for relocation into the CPW patch of vegetation to be reconstructed within the subject site. Any logs that are not structurally sound to the extent that they will survive translocation do not need to be translocated.

4.5.3 Other Woody Material

Tree trunks and branches > 20 mm diameter should be cut into logs of varying lengths and stockpiled during clearing and subsequently relocated into the CPW to be used for habitat reconstruction.

4.5.4 Bushrock

Any bushrock from clearing areas is to be salvaged and stockpiled during clearing, and subsequently relocated into the CPW to be reconstructed.

All salvageable items should be translocated and placed in areas where they will do minimal harm to planted vegetation. Large logs should not be placed at densities of closer than 10 m to each other following translocation.

4.6 Seed Collection / Harvest

Seed collection of native plants occurring within the subject site has commenced as part of the general seed collection/harvest works for the wider Gables Development area.

Seed collection is being undertaken by a BRC that also specialises in growing endemic native plants from seed collected in bushland areas. Seed collection visits should occur in each season across the subject site to obtain a seed collection from as many native species as possible, as flowering and seed setting times vary with species. Seed must be collected from all strata including grass and herb species. During clearing supervision works the ecologist must collect any seed present on felled trees to be passed on to the BRC or nursery staff.

Seeds collected should be germinated, and grown in a nursery for later planting during bushland restoration works within the subject site. Use of seed sourced on site for plantings will maintain local genetic diversity of species occurring on site.

If in the event the requisite quantum of seeds cannot be collected onsite, then seeds may be collected in the first instance within 10 km of the site. If it can be shown that all reasonable steps have been taken to source from this radius unsuccessfully, then a larger area can be utilised provided:

- Seeds are sourced from the Cumberland IBRA subregion; and
- Seeds are from species listed in the planting list in **Table A.1** of **Appendix A**; or
- Seeds are from species listed in the Final Determination for Cumberland Plain Woodland.

Substitution of alternate species from those listed in **Table A.1** of **Appendix A** or the Final Determination for Cumberland Plain Woodland is not advised as the final revegetated area must represent the species composition of CPW. Substitution of plant species outside the planting areas described within this VMP is reasonable.

Chapter 5

Weed Management Plan

5.1 Introduction

5.1.1 Definition of Terms Used in this Chapter

Reconstruction:

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

This form of ex-situ restoration is referred to as: “Reconstruction” and “Revegetation” in this report.

5.1.2 Species Lists

Weeds identified by Cumberland Ecology (2012) make up the weed species lists used for the basis of this Weed Management Plan (refer to Master Plan). A list of control methods for specific weeds recorded on the site is provided in **Appendix B**.

Noxious weeds listed in The Hills Shire LGA and WONS recorded on site are listed in **Table 5.1** below.

Table 5.1 Noxious weeds and WONS recorded in the study area

Species	Common Name	Category	Legal Requirements
Asparagus asparagoides	Bridal Creeper	WONS/Noxious Class 4	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed.
Ligustrum sinense	Small-leaved Privet	WONS/Noxious Class 4	The plant must not be sold, propagated or knowingly distributed
Rubus fruticosus	Blackberry	WONS/Noxious Class 4	The plant must be fully and continuously suppressed and destroyed and the plant must not be sold, propagated or knowingly

Table 5.1 Noxious weeds and WONS recorded in the study area

Species	Common Name	Category	Legal Requirements
			distributed
Senecio madagascariensis	Fireweed	WONS	N/A

5.1.3 Relevant Legislation

The NW Act provides for the identification, classification and control of noxious weeds in New South Wales. Changes to the Act came into force in March 2006 via the *Noxious Weeds Amendment Act 2005*. Plants that are declared noxious weeds by the Minister are placed into the following weed control categories:

- Class 1 – State prohibited weeds:
  - These are plants that pose a potentially serious threat to primary production or the environment and are not present in the State or are present only to a limited extent.
  - Class 2 – regionally prohibited weeds:
  - These are plants that pose a potentially serious threat to primary production or the environment of a region to which the order applies and are not present in the region or are present only to a limited extent.
  - Class 3 – regionally controlled weeds:
  - These are plants that pose a serious threat to primary production or the environment of an area to which the order applies, are not widely distributed in the area and are likely to spread in the area or to another area.
  - Class 4 – locally controlled weeds:
  - These are plants that pose a threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area.
  - Class 5 – restricted plants:
  - These are plants that are likely, by their sale or the sale of their seeds or movement within the State or an area of the State, to spread in the State or outside the State.

A noxious weed that is classified as a Class 1, 2 or 5 noxious weed is referred to in the NW Act as a notifiable weed.

5.1.4 Best Management Practice

Contractors for weed removal within the subject site 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, 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.

5.1.5 Weed Control Methods

Bush reconstruction weed control is to be implemented over the entire subject site. All weed removal works should be approached using the strategies outlined below.

i. 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, and the unviable plant material will be retained on site to provide mulch and natural leaf litter to protect the soil surface.

ii. 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. In areas near water courses, an appropriate form of the herbicide should be used to minimise impact to aquatic life and amphibians. Herbicide use should be avoided within 2 m of the riparian edges. Examples of appropriate herbicide forms are Roundup Biactive and Clearup Bio 360 which have

surfactants that are formulated to minimise harm to amphibians. As runoff is a likely way for herbicide residue to enter 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 researched prior to herbicide application. While the recommended methods for weed treatment detailed in **Appendix B** are effective, some will require a permit to be undertaken. The 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 occur within 10 days of herbicide application.

5.1.6 Types of Weed Control

i. Primary Weeding

Primary weeding is the first stage of bushland regeneration; however no primary weeding will occur within the subject site, as described in the Master Plan, because the entire subject site is proposed to be entirely cleared of vegetation and undergo reconstruction, not regeneration.

ii. Maintenance Weeding

Maintenance Weeding is to be undertaken throughout the entire subject site in the months following reconstruction works, to treat any establishment or regrowth of weeds.

Maintenance weeding involves the selective removal or treatment of weeds, whilst allowing planted native plants to increase in size, abundance and percentage cover. Weed control during each site visit should prioritise Noxious Weeds and Weeds of National Significance, followed by environmental weeds, and then infestations of any weed species within reconstruction areas becoming established to the extent they threaten the viability of native plantings. The follow-up bushland reconstruction works are likely to be required at least every month until weeds are at negligible levels, whereby they do not compete with planted tubestock nor occur in densities greater than 10/m^2. Site visits may be more frequent or infrequent depending on weed levels.

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

Follow-up weeding should be implemented for a minimum period of five continuous years, upon the completion of the initial reconstruction works. After the five-year follow-up and

maintenance period has been completed, a review should be conducted to determine on-site maintenance requirements.

5.2 Weed Management in the Subject Site

5.2.1 Site Preparation

The directions under the following headings should be undertaken sequentially during preparation of the subject site for bushland reconstruction.

i. Sediment Fencing

The entire subject site will require site preparation prior to reconstruction works. Initially, it should be determined whether the topography of the land will facilitate runoff of surface soil after the completion of the bulk earthworks. In areas where soil runoff is likely to occur, temporary silt sediment fencing will be installed around the area to be revegetated, to prevent soil runoff during rain into drainage lines. Sediment fencing may be installed by the BRC or the Civil contractor.

ii. Initial Weed Treatment

After installation of sediment fencing has been completed, initial weed treatment will commence. This will consist of spraying the entire surface of the subject site with Glyphosate 360g/L at a concentration of 10 mL herbicide to 1 L of water. This strength is commonly used in bushland regeneration works as it will effectively kill most herbaceous weed species. A marker dye should be used in the herbicide solution to ensure no areas are missed. Knapsack sprayers with a spray cone to direct the spray towards the ground are recommended to be used to prevent herbicide drift into adjacent vegetated areas. A boom sprayer, or other method of sprayer more suited to large sites may be used, if adequate measures are undertaken to prevent herbicide drift into non-target areas.

Following the initial spraying of the entire surface where reconstruction is to take place, the site should be left for three weeks to allow time for any treated weeds to die back. After this period the entire area should be resprayed with Glyphosate again, with a focus made on treating any exotic plant species that still have green colouring left in foliage, and any juvenile germinated exotic grasses.

The BRC may use other herbicides if labels and permits are followed. As the reconstruction area is a riparian corridor however, care must be taken to use only herbicides suitable for use near water courses.

iii. Laying of Weed Suppression Materials

Several days after the second application of herbicide across the bushland reconstruction areas weed suppression materials will be installed across the entire soil surface. This will inhibit germination rates of exotic weed seed in the soil, inhibit vegetative regrowth of resilient exotic weed species, and prevent soil runoff of surface soils during rain in the period

until native plantings have become established sufficiently to prevent erosion. Weed suppression material can be a form of biodegradable matting such as jute matting, or mulch.

Jute matting is a commonly used biodegradable form of matting for bushland regeneration works. The heavier available forms of this product suppress weed growth. Holes would be cut into the matting to plant tube stock. As this is quite labour intensive, the most cost-effective method of weed suppression for the reconstruction areas would be using mulch. However jute matting will be required to be used in any areas in which mulch will not prevent erosion of surface soils.

Mulch can be easily laid across the subject site in areas that contain no native plants. In areas containing native plants, the mulch can be spread on the ground surface around the occurrences of remnant native plants. If mulch is used a certified weed-free mulch of known provenance should be used. While mulch or any other form of weed suppressing layer across the ground will inhibit regrowth of weeds, it will also inhibit regrowth of native plants from seed. For this reason, weed suppression matting or mulch should only be used initially to establish the reconstruction of the site while weed control is needed, and be allowed to biodegrade over time without being reapplied, unless required during the establishment period. Following application of weed suppression materials the reconstructed bushland areas will be planted out with native plants as per **Chapter 6**.

5.2.2 Ongoing Weed Maintenance

Weed suppression methods such as mulching/matting will suppress mass regrowth of weeds within the subject site, but not entirely prevent regrowth of weeds. The most cost and time effective method of controlling weed regrowth will be by spraying a non-selective Glyphosate herbicide. A list of effective methods for control of weeds on site is found in **Appendix B**. This is only to be used for large infestations. If targeting individual weeds then wick wiping/direct press techniques are advisable.

Ongoing maintenance of the subject site should occur for a five year period by the contracted bushland regeneration company, and the subject site be covered in its entirety once every month, to diminish the soil seed bank of exotic weed species present on site. In order to eliminate the occurrence of these species they need to be controlled before they have a chance to set seed, otherwise progress on the site will not be made.

Tree guards should remain around all native planted trees and shrubs, for at least 18 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 for control of the majority of regrowth weeds, without damage to native plants by 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 occurring within each tree guard alongside native plants should be removed by hand and any weed occurring within a patch of dominant native plants (such as a patch of grasses).

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 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* (Cobbler's Pegs), and *Ehrharta erecta* (Panic Veldtgrass) are prolific seeders, and many exotic plants can have seed that remains viable in the soil for long periods of time. In order to effectively diminish the soil seed bank occurrences of exotic species it is important that individuals are not allowed to set seed.

During site visits for weed control, noxious weeds and WONS (**Table 5.1**) must be prioritised for control. Individual plants of these species on site should not be allowed to achieve a reproductive stage in their life cycles.

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

It is recommended that signs of rabbit herbivory be noted during site visits, and control measures undertaken if significant impacts to planted vegetation are occurring threatening the long term viability of the reconstruction area.

5.3 Weed Control Methods

Weed control methods for all exotic and non-endemic species recorded on the site are located in **Appendix B**. The preparation of weed control methods involved a literature review to determine the most up-to-date methods of weed control for exotic species that are present on the site. This literature review involved a variety of sources including government fact sheets and websites. Previous professional experience of a Cumberland Ecology botanist formerly employed in bushland maintenance was also utilised. This list includes additional species not recorded on the site that are common, exotic weed species in the Sydney Region. Exotic species recorded in the North Box Hill study area are provided in the Master Plan.

5.4 Pest Species Management

Rabbits can potentially devastate planted tubestock. Whilst rabbit numbers are considered low within the subject site, it is important to consider their potential impacts and propose control methods for the species. Impacts of rabbits can be effectively mitigated by using tree guards for planted tubestock.

If more than 25% of planted tubestock are demonstrated to be impacted by rabbits, then a baiting program using Pindone is recommended to reduce the population of the species.

Chapter 6

Reconstruction Plan

6.1 Introduction

This chapter outlines the techniques and strategies to fulfil the objectives listed below. The Reconstruction Plan is proposed to improve the vegetation condition across the site to provide a VRZ as required under the WM Act and enhance the value of the site as a habitat resource for threatened fauna species.

The definition of "Reconstruction" used in this chapter is the same as for **Chapter 5**, and is as follows:

Reconstruction:

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

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

6.2 Purpose

Reconstruction work is being undertaken to create a Vegetated Riparian Zone (VRZ), largely to satisfy requirements under the WM Act.

6.3 Aims

This chapter provides details for the restoration of the different management zones of the subject site. **Figure 6.1** contains an overview of the General Arrangement and Planting Plan for the reconstruction of the subject site.

The VRZ (PrE Zone 1 and PrE Zone 2)) covers an area of approximatly 3.57 ha.

In addition to the Landscape Plan for the subject site (see **Figure 6.1**) the Waterfront Guideline (NSW Office of Water 2012) identifies what a typical riparian corridor should look like (see **Figure 6.2**). The planting guidelines outlined in **Figure 6.2** should be referenced by the BRC team during the reconstruction phase.

The aim for the vegetation to be reconstructed is to achieve the following performance based outcomes:

- Control threats either affecting the health of native vegetation or inhibiting its future regeneration potential;
- Increase species diversity and percentage cover of planted native vegetation;
- Improve the resistance of native vegetation to future weed colonization and establishment and related threats, by initiating the two above aims;
- Use measurable indicators to monitor planting success and regeneration responses, and to assist in prioritizing bushland regeneration works during the proposed works program; and
- Restore native vegetation areas to indigenous communities.

6.4 Recommended Revegetation techniques

Appropriate plant species for use within the riparian areas within the subject site are provided in **Appendix A** and are to be used for selection for revegetation of the subject site. Plantings to be planted will be sourced from local provenance; these may come from seed collections or cuttings from within the existing remnant/regrowth vegetation within the north of the subject site and along the creek line with additional material sourced from local provinence as required..

6.4.1 Species Selection and Planting Densities

i. Species Selection

It is recommended that a mix of local native trees, shrubs, and ground layer plants are replanted at the specified densities outlined below. A list of suitable plant species for CPW reconstruction within the different zones of the subject site is provided in **Appendix A**.

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

Final species selection will be based upon:

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

As many species as are able to be sourced should be planted to maximise diversity within the revegetation areas. The minimum numbers of species to be used in the initial establishment phase of the revegetation are:

- Four tree species;
- Six shrub species; and
- Twelve groundcover species.

It is essential that the species *Eucalyptus tereticornis* and *Eucalyptus moluccana* are well represented in the tree plantings and *Eucalyptus crebra* should also be represented as it is a common species in CPW within the locality.

Although final species selection will be based on availability, the species listed in **Appendix A, Table A.2** should be prioritised for planting within PrE Zone 1 and PrE Zone 2 as they are more likely to withstand the ephemeral conditions within the constructed creek.

ii. Planting Densities

a. Vegetated Riparian Zone

The Vegetated Riparian Zone (VRZ) encompasses management zones PrE Zone 1 and PrE Zone 2.

The recommended reconstruction planting specifications for CPW species in the VRZ are as follows:

- Canopy Trees @ 1 unit / 16 m^2

- Shrubs @ 1 unit / 3 m^2
- Groundcovers @ 6 unit / 1 m^2 planted in clumps/thickets or singly.

These densities are appropriate for the VRZ areas under the Office of Water guidelines, which specify plantings should be dense enough to achieve quick vegetation cover and root mass to maximise bed and bank stability along a watercourse (NOW 2012).

The revegetation of PrE Zone 1 is to be limited to groundcover vegetation while revegetation of PrE Zone 2 is to include canopy trees, shrubs and groundcovers.

b. Landscaped Areas

The landscaped areas encompass management zones PrE Zone 3 and PrE Zone 4

The planting densities for PrE Zone 3 should be as below:

- Canopy Trees @ 1 unit / 30 m^2
- Shrubs @ 1 unit / 30 m^2 (can be differentially spaced across reconstruction area in thickets)
- Groundcovers @ 4 unit / 1 m^2 planted in clumps/thickets or singly.

PrE Zone 4 constitutes a recreational area and should be maintained in accordance with the Landscape plans.

6.4.2 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 *Themeda australis* may be particularly planted in clumps to aid fertilisation and to create a natural grassland understorey within the restoration areas.

6.4.3 Plant Supply

Local native plant species should be collected using principles prescribed in 'Bringing the Bush back to Western Sydney' (DIPNR 2003). Seeds and vegetative propagules should be of local provenance from within The Hills Shire LGA, preferably from within 10 kilometres of the site. Material should be propagated in a local commercial or community nursery, with well-established plants used for revegetation, for trees and shrub species particularly. Where it is determined there is a greater chance for establishment of a ground layer consisting of representative CPW forbs and graminoids, this layer can be established using direct seeding, hydroseeding, or other methods, as long as recommended CPW species of local provenance seed are used. It may be necessary to get the required amounts of seed and vegetative material contract-collected and grown-on by specialist nurseries. Local native

plants should be grown in "Hiko" tube, maxi cell or viro-tube, or Forestry Tube-type containers.

6.4.4 Re-vegetation Objectives to Maximise Fauna Utilisation

In order to improve habitat on site for fauna, plant species will be chosen that provide food, shelter and refuge opportunities for native and threatened fauna. Plant species selection for CPW has taken account of the following principles:

- Increase winter flowering Eucalypts for threatened bird species such as the Regent Honeyeater and Swift Parrot;
- Include marsupial feed trees such as *Eucalyptus punctata* (Grey Gum) and *Eucalyptus tereticornis* (Forest Red Gum);
- Increase trees and groundcovers favoured by arboreal mammals such as flowering Eucalypts; and
- Include species that mature to become good hollow-bearing trees (such as eucalypts) for hollow-dependent fauna such as parrots, owls, gliders and microchiropteran bats.

6.5 Reconstruction Preparation

The replanting of individuals from seed or tube stock will require the treatment of soils, the installation of protective plant fencing, and ongoing maintenance treatments such as watering and weeding.

Recommended reconstruction strategies should include:

- Initial and ongoing control of weeds and competing grasses using bushland regeneration techniques and conventional best practice chemical and physical strategies;
- Specifically collecting local plant seed and subsequent propagation in cell-grown seedling containers;
- Treatment of soils within each planted tube stock plant hole with a plant establishment aid that contains a mix of materials such as slow and quick release fertilisers, water holding crystals, rooting hormones and wetting agents, (i.e. products such as Terra Cottem by TC Advantage Pty Ltd or Sure Start by Barmac). These agents assist in establishing newly installed plants and can reduce establishment watering resources by up to 50%;
- Installing suitable propagated cell-grown seedlings, using specified techniques, species composition schedules and rates, using hand planting or mechanical planting techniques;

- Stabilising soils and suppressing weeds around individual reconstruction plantings using products, such as 40 cm square jute fibre mats or woodchip leaf mulch to a 50 cm diameter and 75 mm depth;

- Protecting individual tree and shrub plantings with a tree guard from feral animal grazing, frost and maintenance herbicide spraying overspray. Bamboo stakes 3 x 10-12 mm x 750 mm and 1 x 350 mm x 450 mm plastic tree guards are suitable for this purpose; and

- Maintaining reconstruction treatments (including watering, weeding, replacing dead plant material and repairing / replacing weed mat/mulch), as a part of an ongoing maintenance programme.

6.6 Signage

Signage will be installed at any public access points to areas to be reconstructed as CPW, such as at gates and boardwalks. **Figure 6.3** identifies suitable locations for signage to be installed within the subject site. The aim of the signage is to inform residents, public or construction workers of the presence of environmentally significant vegetation.

Signs will be made of a durable material, have a minimum size of A4 (210 mm x 297 mm) and contain the following permanent and legible wording:

> *"The vegetation within bushland is protected. Activities such as firewood collection, bushrock removal, picking of native flowers and dumping of garden waste are prohibited".*

6.7 Maintenance of Reconstruction Area

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.

Provision should be made to irrigate newly reconstructed areas, as required, in the first 3 months after installation, (on at least 4-5 occasions, depending on rainfall conditions, more watering if required). Irrigation water may be sourced by pumping from the river and local dams. A permit from the NSW Office of Water may be sought to use water for watering-in newly installed plants.

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

Plants that have died due to drought or pest and disease damage should be replaced as required. Plants that are observed to have died should be replaced by the bushland maintenance team with a planting of the same form. At the end of the annual maintenance period the density of living planted plants should be as outlined in Section 6.4.1 and described within the annual report.

6.8 Ongoing Management

Revegetation will involve an initial establishment phase followed by a maintenance period. The establishment phase includes the initial primary weeding and planting works and will occur shortly after approval of Construction Certificate drawings.

A five year maintenance period following the primary works has been allowed for in this plan and will commence upon Council certified completion of the establishment phase.

The requisite maintenance works are outlined below.

6.8.1 Weed Control

Weed control is the largest component of long-term management of the site. Eradication of noxious and / or serious weeds will occur along with the suppression of introduced grasses, annuals, vines and perennial weeds. A strategic weed control plan is included in this report (**Chapter 5**) for a maintenance period of five years.

6.8.2 Monitoring of Reconstructed Vegetation

Inspection of the reconstructed areas should be undertaken by the supervisor / project manager monthly thereafter for the duration of the project. Areas where noxious / serious weeds have been treated should be inspected on a fortnightly basis following initial treatment to assess when and if repeat treatments are necessary. This can be done by maintenance personnel during normal maintenance tasks and reported back to the supervisor / project manager.

6.8.3 Management of Ground Fuel Loads

Following the establishment of canopy plantings, a ground fuel assessment may be required to determine if any areas require a reduction in ground fuel loads. An initial assessment is to be undertaken by a suitably qualified bushfire ecologist and will inform the future management of the site with regards to the manual removal of ground fuels and hazard reduction burns. The assessment will provide clear directions as to the amount of ground fuel to be removed annually, a timeline for works and adjustments to the planting densities of groundcover in any requisite fuel reduction areas. If any fuel reduction areas are identified for Precinct E, they will require reclassification as a separate management zone, equivalent to the Precinct A zone PrA Zone 4. Any annual monitoring will be undertaken by a bushfire ecologist to ensure that targets are being met. This is only required in areas identified in the ground fuel assessment.

6.9 Schedule of Works

This Reconstruction Plan covers work to be carried out on site over five years. The measures that are planned over this time period within the subject site are as follows:

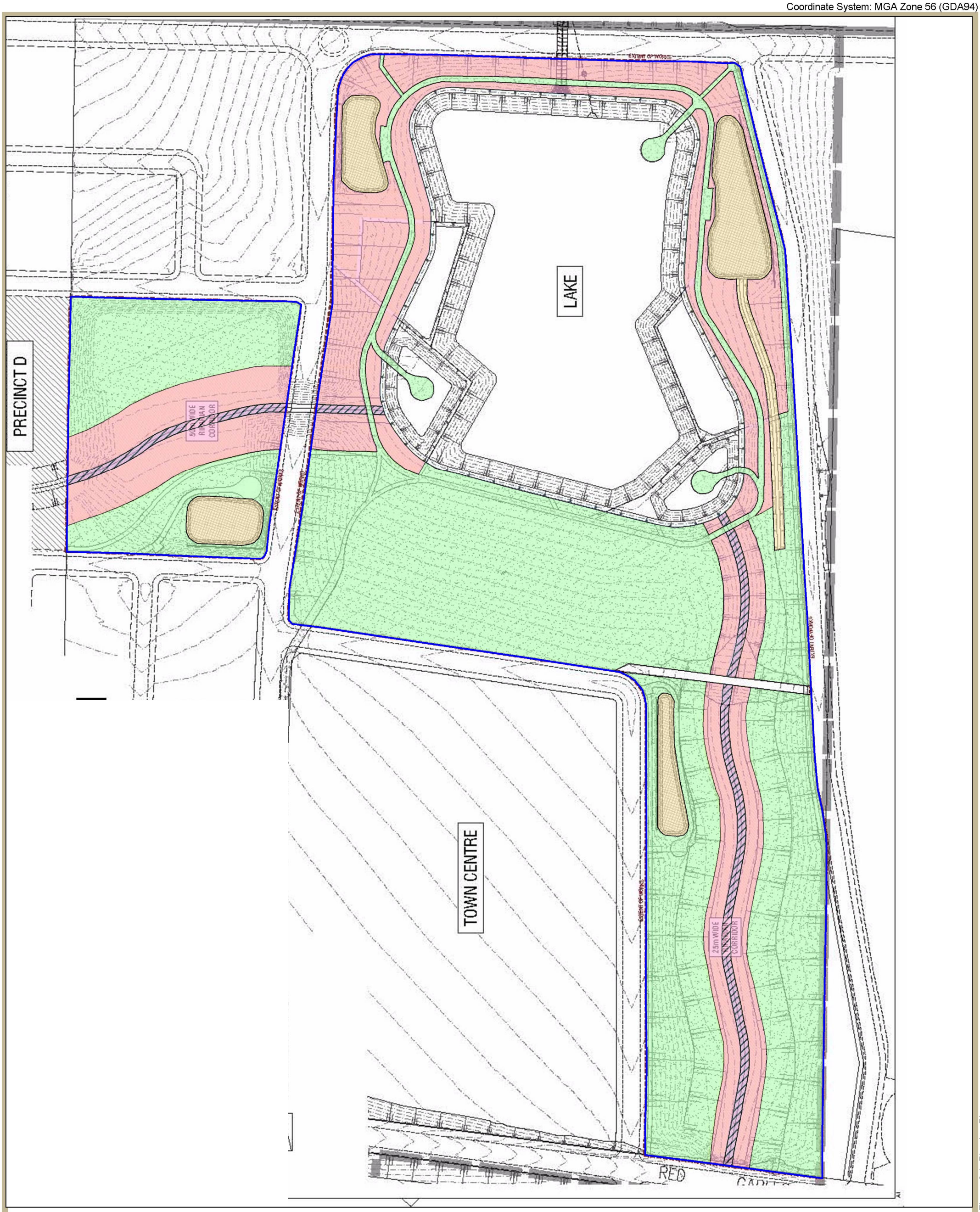
i. *Short term: years 1 and 2*

- Weed control;
- Planting of canopy species;
- Planting of canopy, shrub, and groundcover species;
- Replacement of any tube stock individuals that have died between site visits;
- Management of fuel loads within APZs; and
- Monitoring, management and reporting.

ii. *Long Term: years 3, 4, and 5*

- On-going weed control in accordance with Hills Shire Council weed management practices;
- Replacement of any tube stock individuals that have died between site visits; and
- Monitoring, management and reporting in accordance with Hills Shire Council policy.

Coordinate System: MGA Zone 56 (GDA94)



N
Grid North

Legend

- Subject Site
- PrE Zone 1
- PrE Zone 2
- PrE Zone 3
- PrE Zone 4

Image Source: Oculus 2016, Drawing No. L-E-BEW-100 Revision C. 28-11-2016.

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I:\...\15029\Figures\RP5\20161206\Figure 6.1. Planting Plan

Figure 6.1. General Arrangement and Planting Plan Overview

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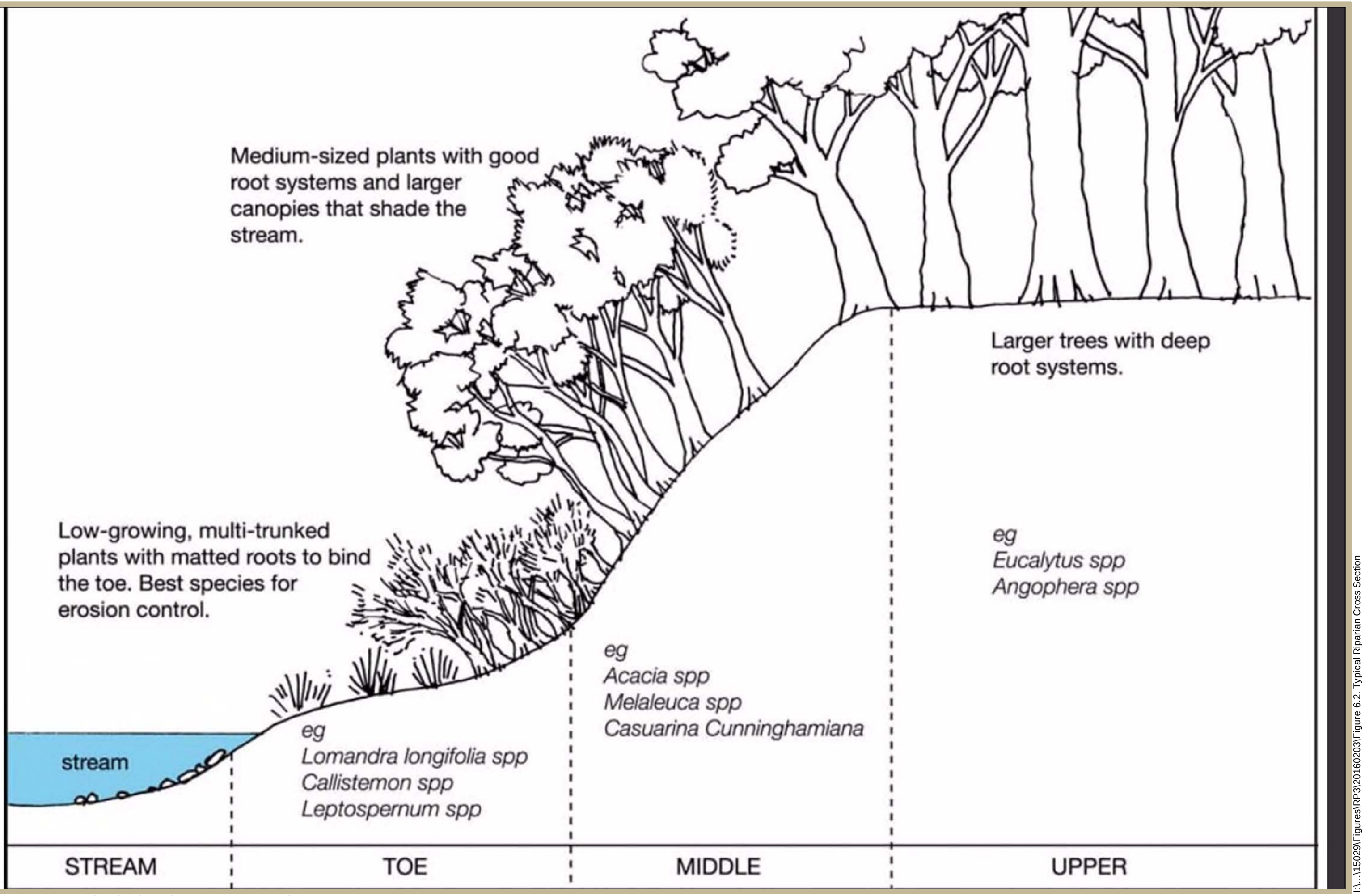
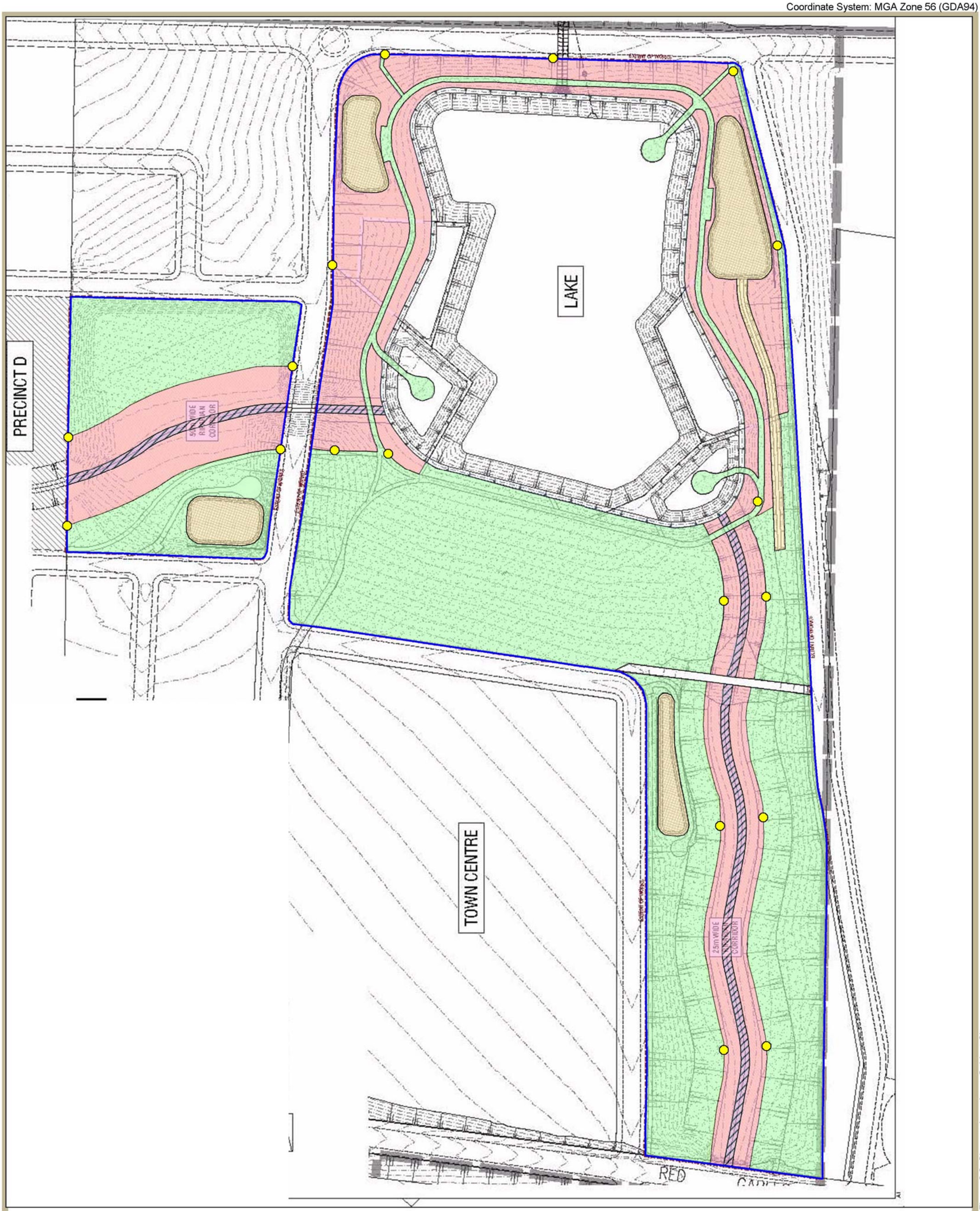


Figure 6.2. Typical Riparian Cross Section

Image Source: NSW Office of Water (2012). (Adapted from Rivercare: Guideline for Ecological Sustainable Management of Rivers and Riparian Vegetation: Raine and Gardiner 1995. Land and Water Resources Research and Development Corporation, Canberra).

I:\...\15029\Figures\RP3\20160203\Figure 6.2. Typical Riparian Cross Section

Coordinate System: MGA Zone 56 (GDA94)



Grid North

Legend

- Subject Site
- Signage Location

Vegetation Management Zone

- PrE Zone 1: Vegetated Creek
- PrE Zone 2: Riparian Area
- PrE Zone 3: Rain gardens
- PrE Zone 4: Recreation

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Image Source: Oculus 2016, Drawing No. L-E-BEW-100 Revision C. 28-11-2016.

I:\...\15029\Figures\RP5\20161206\Figure 6.3. Signage Locations_Subject Site

Figure 6.3. Locations of Signage to be installed within the Subject Site

25 0 25 50 75 100 m

Chapter 7

Monitoring, Reporting and Costing

It is recommended that a project manager/supervisor with the BRC be assigned to co-ordinate, supervise and manage all works and correspondence with respect to the reconstruction of the subject site. The project manager must be available for the duration of the project and become familiar with the site and progress of all aspects of works undertaken.

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

7.1 Monitoring Program

The following activities are to be conducted as part of the monitoring program:

- Establish a series of fixed monitoring points within the subject site. Additional points can be established over the life of the VMP for areas with particular weed problems;
- Take photographs annually from each monitoring point. Compare photographs to previous years;
- Use the photograph point to form a corner of a 20 x 20 m quadrat at each monitoring point. Note any weeds occurring in the quadrat and state relative abundance of weed species (using Braun-Blanquet scale), as well as projective foliage cover of native species in each strata. Record numbers of failed plantings in each quadrat; and
- Note any other weed outbreaks in the reconstruction areas. This can be done while walking between monitoring points.

Monitoring will be conducted before weed control commences, then once every month while reconstruction works are undertaken. Once initial plantings are complete, monitoring will be conducted every three months for the next year, then every six months after that for the life of the VMP.

During the period of six-monthly monitoring, if maintenance weeding is conducted, each patch of land where weed control has occurred should be checked approximately a month afterwards, or after rain, in order to determine whether more weeding is required.

The locations of where monitoring points are to be established are identified in **Figure 7.1** and described in **Table 7.1** below.

Table 7.1 Details of fixed monitoring points

Fixed Monitoring Point ID	Easting	Northing	Vegetation Community to be revegetated
1	306011.88	6277839.31	CPW - VRZ
2	306146.75	6277848.79	CPW - VRZ
3	306347.54	6277747.22	CPW - VRZ

7.2 Reporting

A brief and concise report should be submitted every 12 months for the life of the VMP. This report will be forwarded to The Hills Shire Council and will provide a record of the implementation of the VMP. The report will:

- Describe the reconstruction works undertaken;
- State the findings of the monitoring activities including results and analysis of the performance criteria;
- Discuss any problems encountered in implementing the VMP; and
- Recommend any adaptations or additions to the VMP.

The report should contain the photographs, as well as a short description of weeds in each quadrat and a short comparison of the photographs to the previous years. Any other notable occurrences of weeds should also be reported. The report should also recommend and prioritise areas where weed control should be targeted and replanting should occur, based on the performance criteria.

It is recommended to combine monitoring reports between precincts within the broader Box Hill North study area once developed.

7.3 Costing

Table 7.2 provides estimated costings for the implementation and maintenance for the life of this VMP for the VRZ (PrE Zone 1 and PrE Zone 2). The VRZ covers an area of approximately 3.57 ha (PrE Zone 1 = 0.29 ha; PrE Zone 2 = 3.27 ha).

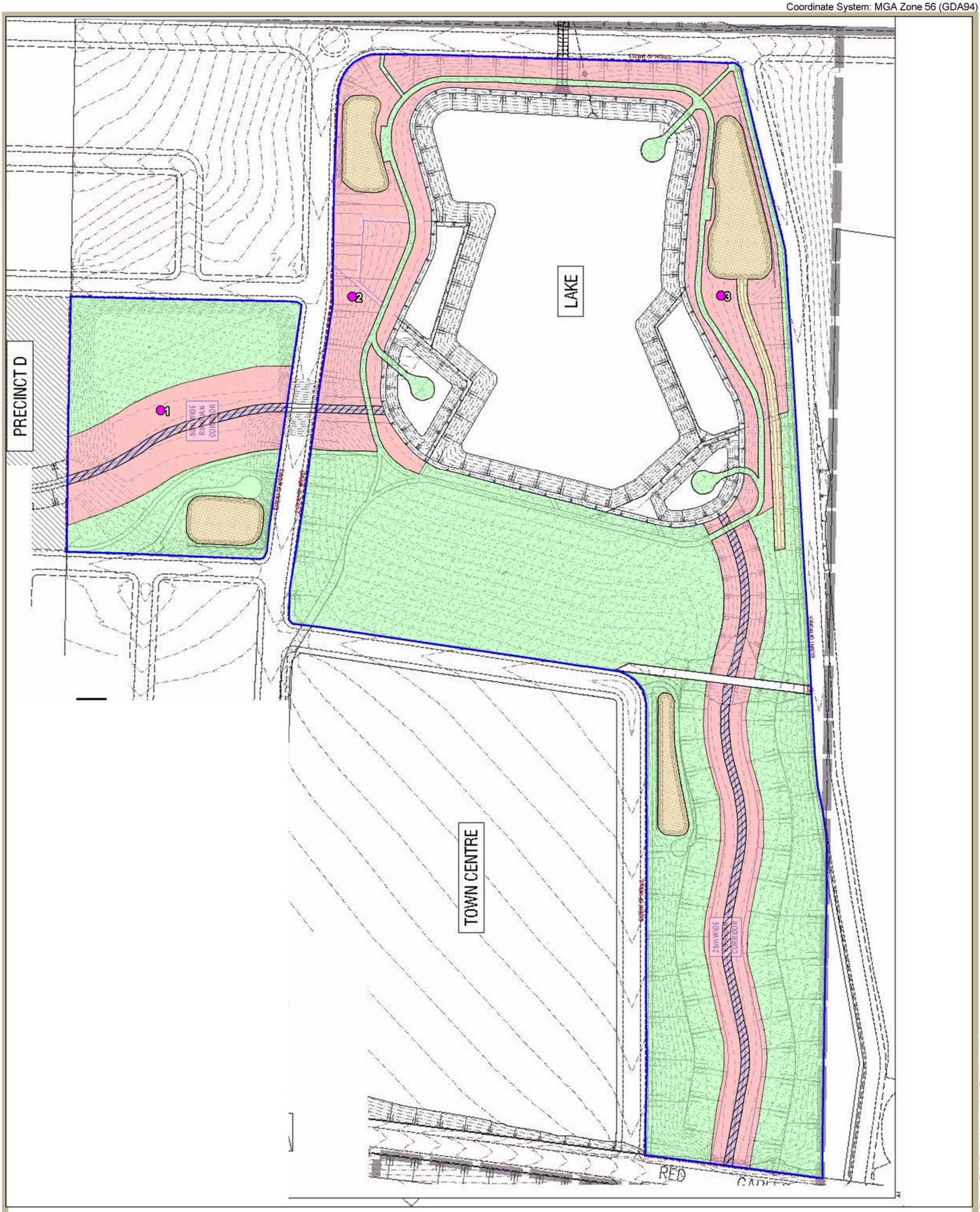
All estimations are based on previous projects and prices quoted during the writing of this report, and are subject to a high degree of variability based on the availability of resources and other unforeseen economic factors. Therefore, the costing provided should be used only as a general guide as totals may vary over the life of the VMP. Costings for seed collection have not included in these estimates as the full extent of area from which seed is to be collected is currently unknown as the collection of an adequate supply of seeds will vary with seasons and plant conditions

Table 7.2 Estimated Costs of the VMP for the VRZ area

		High Level Cost Estimate				
Task	*Establishment*	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Year 5*
Site Preparation (Initial Weeding)	$4,400.00					
35,700m^{2}Jute matting	$249,900.00					
3 Star Pickets (Photo reference points)	$53.64					
Hiko Planting Ground Cover (6 units/m^2 for 35,700m^2)	$428,400.00					
Hiko Planting Shrub (1 unit/3m^2 for 32,700m^2)	$21,800.00					
Hiko Planting Canopy (1unit/16m^2 for 32,700m^2)	$4,087.50					
Sediment Fence (~2875 m)	$31,625.00					
Tree guards	$4,7000					
Signage	$900.00					
Direct Seeding of Native Grasses (per m2)	$107,100.00					
Maintenance Visits (Weeding and Plant Replacement) with associated Photomonitoring and reporting		$ 79,381.46	$ 40,205.73	$ 25,750.00	$ 19,570.00	$ 13,390.00
Total Establishment Costs	$852,966.14	24 Visits	12 Visits	12 Visits	12 Visits	12 Visits

**Maintenance visits includes watering until establishment, plant replacement at 5% of total plant costs in first year and 2.5% in second year. Also includes CPI increases based on 3% each year. Number of hours labour is assumed to decrease overtime as less maintenance is likely to be required*

Coordinate System: MGA Zone 56 (GDA94)



Grid North

Legend

Subject Site

Vegetation Management Zone

- PrE Zone 1: Vegetated Creek
- PrE Zone 2: Riparian Area
- PrE Zone 3: Rain gardens
- PrE Zone 4: Recreation

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Image Source: Oculus 2016, Drawing No. L-E-BEW-100 Revision C. 28-11-2016.

Figure 7.1. Locations of Fixed Monitoring Points to be installled

25 0 25 50 75 100 m

I:\...\15029\Figures\RP5\20161206\Figure 7.1. Fixed Monitoring Point Locations

Chapter 8

Timing and Responsibilities

The study area is to be managed in a series of phases as follows:

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

Timing and responsibilities at each phase of management within the subject site are shown within **Table 8.1**. These tables assign each activity for the subject site within each phase to those responsible.

Table 8.1 Timing and Responsibilities

Action	Responsibility	Performance Criteria	Performance Measure	Action Required if Performance Criteria is Not Met	Timing
Phase 1 Site Preparation					
Seed Collection	Bush Regeneration Contractor	Seed collected from native plants and germinated	Species list of all seeds collected includes all species present on site prior to clearing.	Increase seed collection or source additional seed from local nursery if seed isn't available on-site.	Immediately
Delineation of clearing boundary	Property Owner or Subcontractor	Marking using GPS and high visibility tape, fencing and boundary markers.	All clearing boundaries have been clearly marked and photographs taken for documentation.	Delineate all clearing boundaries.	Before construction works commence
Establish fixed monitoring points	Bush Regeneration Contractor or Ecologist	Using star pickets and GPS establish a series of monitoring sites that can be used for photograph comparison, measuring weed and plant retention.	All monitoring points have a star picket installed and photographs taken for documentation.	Install star picket at all monitoring points.	Prior to commencement of Reconstruction and Weeding works
Flora Pre-clearing Surveys	Ecologist	Identify any threatened plant species within areas. If encountered, Threatened plants will be counted and/or population estimated and considered for	Pre-clearing surveys are completed and results are documented.	Undertake pre-clearance surveys.	Prior to any vegetation clearing

Table 8.1 Timing and Responsibilities

Action	Responsibility	Performance Criteria	Performance Measure	Action Required if Performance Criteria is Not Met	Timing
		Translocation. All records will be reported to OEH and DotE.			
Salvage Habitat Features	Subcontractor	Tree hollows, Log hollows, other woody material and bushrocks will be salvaged and stockpiled for future use in revegetation areas and for habitat complexity	Salvage habitat features have been stockpiled. Details on the number of items and type are recorded.	Stockpile all salvage habitat features and record the number and type of items stockpiled.	1-2 weeks after Clearing
Installation of signage identifying areas of bushland reconstruction	Property Owner or Subcontractor	All areas adjacent to native vegetation to be planted have signage installed.	Signs have been installed and locations documented.	Install signs in appropriate area.	Prior to commencement of Phase 2
Implementation of appropriate sediment/erosion controls	Property Owner or Subcontractor	Adequate controls are implemented so no erosion or sedimentation into areas of bush land reconstruction occurs	Photograph at each monitoring point.	Installation of additional sediment/erosion controls and or fix existing controls.	Prior to any vegetation clearing
Phase 2 - Restoration Works Commence					
Fixed Point Monitoring.	Bush Regeneration Contractor	Photographs of fixed monitoring sites before initial weeding	Photographs have been taken.	Take photographs.	Prior to commencement of restoration works
Carry out initial weeding.	Bush	Main weed infestations and noxious	Primary weeding	Targeted weeding	First month of

Table 8.1 Timing and Responsibilities

Action	Responsibility	Performance Criteria	Performance Measure	Action Required if Performance Criteria is Not Met	Timing
	Regeneration Contractor/Botanist	weeds and WONS removed - Reproductively mature plants absent from site.	completed and documented.		restoration works
Fixed Point Monitoring.	Bush Regeneration Contractor	Photographs of fixed monitoring sites prior to weeding each month.	Photographs have been taken.	Take photographs.	Once a month for duration of VMP restoration works
Revegetate reconstruction areas. Canopy, small tree, shrub, and ground cover CPW species are planted according to species list in **Appendix A**.	Bush Regeneration Contractor	Native plants have been planted (species from Appendix D) in all vegetation strata.	Revegetation has occurred and been documented.	Undertake revegetation works.	Immediately upon establishment of reconstruction areas
Fixed Point Monitoring.	Bush Regeneration Contractor	Photographs of fixed monitoring sites to compare the survival and retention of plantings.	Photographs have been taken.	Take photographs.	Every 3 months after the first year of plantings. Every 6 months following the initial year for the life of the VMP.
Carry out maintenance weeding.	Bush Regeneration Contractor	Weed regrowth following primary weeding removed. Work has commenced on control of annual weed species.	Weeding of regrowth following primary weeding completed and documented.	Targeted weeding.	Following primary weeding, site visits monthly.

Table 8.1 Timing and Responsibilities

Action	Responsibility	Performance Criteria	Performance Measure	Action Required if Performance Criteria is Not Met	Timing
Phase 3 - Maintenance					
Carry out maintenance weeding throughout the site	Bush Regeneration Contractor	Noxious weeds are less than 2% cover	Monitoring point 20x20m quadrat data results.	Undertake maintenance weeding.	Monthly for the duration of the 5 year maintenance period under VMP
		Non-noxious weeds are less than 4% cover	Monitoring point 20x20m quadrat data results.		
		No new weed species or infestations, including the encroachment of exotic lawn/vegetation into area of bush land regeneration	Monitoring point 20x20m quadrat data results.		
Maintenance of plantings	Bush Regeneration Contractor	Survival rate of plantings is 100%	Monitoring point 20x20m quadrat data results.	Any dead plantings replaced.	Monthly for the duration of the 5 year maintenance period under VMP
		Species diversity and density equal to or greater than baseline data	Monitoring point 20x20m quadrat data results.	Additional plantings where required due to observed gaps in any strata.	

Table 8.1 Timing and Responsibilities

Action	Responsibility	Performance Criteria	Performance Measure	Action Required if Performance Criteria is Not Met	Timing
		Plants watered when drought stressed	Plants are watered during times of drought and documented.	Water plants in times of drought.	
Phase 4 - Monitoring and reporting					
Biannual inspection of site completed as outlined in Chapter 8	Bushland Management or Ecologist	Survival rate of plantings is 100%	Monitoring point 20x20 m quadrat data results.	Undertake replanting.	Every 6 months for 5 year maintenance period of VMP
		Noxious weeds to be less than 2% cover.	Monitoring point 20x20 m quadrat data results.	Targeted weeding.	
		Non-noxious weeds to be less than 4% cover.	Monitoring point 20x20 m quadrat data results.	Targeted weeding.	
		Species diversity and density equal to or greater than previous inspection.	Monitoring point 20x20 m quadrat data results.	Undertake replanting and/or plant additional species.	
		No encroachment of exotic lawn/vegetation into area of bush land regeneration	Monitoring point 20x20 m quadrat data results.	Targeted weeding and/or installation of physical barrier.	
		No erosion or sedimentation into	Photographic evidence	Installation of further	

Table 8.1 Timing and Responsibilities

Action	Responsibility	Performance Criteria	Performance Measure	Action Required if Performance Criteria is Not Met	Timing
		areas of bush land regeneration.		sediment/erosion controls.	
Progress report preparation.	Bushland Management or Ecologist	Annual Report prepared on progress of restoration works including all data collected in biannual inspections.	Results of data analysis of all data collected in biannual inspections.	Undertake corrective measures including: targeted weeding, replanting or additional species plantings and install additional sediment/erosion controls.	Once a year for the 5 year maintenance period of VMP
Final Inspection of Site carried out at completion of VMP.	Bushland Management or Ecologist	Survival rate of plantings is 100%	Monitoring point 20x20 m quadrat data results.	Extend life of VMP until performance criteria is met.	After 5 years of maintenance under VMP
		Noxious weeds to be less than 2% cover.	Monitoring point 20x20 m quadrat data results.	Extend life of VMP until performance criteria is met.	
		Non-noxious weeds to be less than 4% cover.	Monitoring point 20x20 m quadrat data results.	Extend life of VMP until performance criteria is met.	
		Species diversity and density equal to or greater than previous inspection.	Monitoring point 20x20 m quadrat data results.	Extend life of VMP until performance criteria is met.	
		No encroachment of exotic lawn/vegetation into area of bush land regeneration	Monitoring point 20x20 m quadrat data results.	Extend life of VMP until performance criteria is met.	

Table 8.1 Timing and Responsibilities

Action	Responsibility	Performance Criteria	Performance Measure	Action Required if Performance Criteria is Not Met	Timing
Final Report.	Bushland Management or Ecologist	Final report detailing success of restoration or outlining further works needed.	Results of data analysis of all data collected for the life of the VMP.	Extend life of VMP until performance criteria are met.	After 5 years of maintenance under VMP

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Appendix A

Species Planting List

Table A.1 Species planting list – Cumberland Plain Woodland

Form	Family	Scientific Name	Common Name
Trees	Fabaceae (Mimosoideae)	*Acacia parramattensis*	Parramatta Wattle
Trees	Myrtaceae	*Angophora floribunda*	Rough-barked Apple
Trees	Myrtaceae	*Eucalyptus crebra*	Narrow-leaved Ironbark
Trees	Myrtaceae	*Eucalyptus eugenioides*	Narrow-leaved Stringybark
Trees	Myrtaceae	*Eucalyptus moluccana*	Grey Box
Trees	Myrtaceae	*Eucalyptus tereticornis*	Forest Red Gum
Trees	Myrtaceae	*Melaleuca decora*	
Trees	Santalaceae	*Exocarpos cupressiformis*	Native Cherry
Shrubs	Asteraceae	*Ozothamnus diosmifolius*	Dogwood
Shrubs	Fabaceae (Mimosoideae)	*Acacia falcata*	
Shrubs	Fabaceae (Mimosoideae)	*Acacia floribunda*	White Sally Wattle
Shrubs	Fabaceae (Mimosoideae)	*Acacia implexa*	Hickory Wattle
Shrubs	Fabaceae (Faboideae)	*Bossiaea prostrata*	Creeping Bossiaea
Shrubs	Fabaceae (Faboideae)	*Chorizema parviflorum*	Eastern Flame Pea
Shrubs	Fabaceae (Faboideae)	*Daviesia ulicifolia*	Gorse Bitter Pea
Shrubs	Fabaceae (Faboideae)	*Dillwynia sieberi*	
Shrubs	Fabaceae (Faboideae)	*Indigofera australis*	Australian Indigo
Shrubs	Fabaceae (Faboideae)	*Pultenaea microphylla*	

Table A.1 Species planting list – Cumberland Plain Woodland

Form	Family	Scientific Name	Common Name
Shrubs	Myrtaceae	*Kunzea ambigua*	Tick Bush
Shrubs	Phyllanthaceae	*Breynia oblongifolia*	Coffee Bush
Shrubs	Pittosporaceae	*Bursaria spinosa subsp. spinosa*	Blackthorn
Shrubs	Rosaceae	*Rubus parvifolius*	Native Raspberry
Shrubs	Sapindaceae	*Dodonaea viscosa*	Sticky Hop Bush
Shrubs	Scrophulariaceae	*Eremophila debilis*	Winter Apple
Forbs (Dicot)	Acanthaceae	*Brunoniella australis*	Blue Trumpet
Forbs (Dicot)	Apiaceae	*Centella asiatica*	Indian Pennywort
Forbs (Dicot)	Apiaceae	*Daucus glochidiatus*	Native Carrot
Forbs (Dicot)	Apiaceae	*Hydrocotyle laxiflora*	Stinking Pennywort
Forbs (Dicot)	Asteraceae	*Chrysocephalum apiculatum*	Yellow Buttons
Forbs (Dicot)	Asteraceae	*Cymbonotus lawsonianus*	Bear's Ears
Forbs (Dicot)	Asteraceae	*Euchiton sphaericus*	
Forbs (Dicot)	Asteraceae	*Glossocardia bidens*	Cobbler's Tack
Forbs (Dicot)	Asteraceae	*Senecio diaschides*	
Forbs (Dicot)	Asteraceae	*Senecio hispidulus*	Hill Fireweed
Forbs (Dicot)	Asteraceae	*Senecio linearifolius*	Fireweed Groundsel
Forbs (Dicot)	Asteraceae	*Sigesbeckia orientalis* subsp. *orientalis*	Indian Weed
Forbs (Dicot)	Asteraceae	*Vernonia cinerea*	

Table A.1 Species planting list – Cumberland Plain Woodland

Form	Family	Scientific Name	Common Name
Forbs (Dicot)	Campanulaceae	*Wahlenbergia gracilis*	Small Bluebell
Forbs (Dicot)	Campanulaceae	*Wahlenbergia stricta subsp. stricta*	Australian Bluebell
Forbs (Dicot)	Chenopodiaceae	*Einadia hastata*	Berry Saltbush
Forbs (Dicot)	Chenopodiaceae	*Einadia nutans*	Climbing Saltbush
Forbs (Dicot)	Chenopodiaceae	*Einadia polygonoides*	
Forbs (Dicot)	Chenopodiaceae	*Einadia trigonos*	Fishweed
Forbs (Dicot)	Clusiaceae	*Hypericum gramineum*	Small St Johns Wort
Forbs (Dicot)	Convolvulaceae	*Dichondra repens*	Kidney Weed
Forbs (Dicot)	Crassulaceae	*Crassula sieberiana*	Australian Stonecrop
Forbs (Dicot)	Fabaceae	*Desmodium varians*	Slender Tick-trefoil
Forbs (Dicot)	Fabaceae	*Zornia dyctiocarpa var. Dyctiocarpa*	Zornia
Forbs (Dicot)	Geraniaceae	*Geranium homeanum*	
Forbs (Dicot)	Geraniaceae	*Geranium solanderi*	Native Geranium
Forbs (Dicot)	Goodeniaceae	*Goodenia hederacea*	Forest Goodenia
Forbs (Dicot)	Lamiaceae	*Ajuga australis*	Austral Bugle
Forbs (Dicot)	Lamiaceae	*Mentha satureioides*	Slender Mint
Forbs (Dicot)	Lamiaceae	*Plectranthus parviflorus*	Cockspur Flower
Forbs (Dicot)	Lamiaceae	*Scutellaria humilis*	Dwarf Skullcap
Forbs (Dicot)	Lobeliaceae	*Pratia purpurascens*	Whiteroot

Table A.1 Species planting list – Cumberland Plain Woodland

Form	Family	Scientific Name	Common Name
Forbs (Dicot)	Malvaceae	*Sida corrugata*	Corrugated Sida
Forbs (Dicot)	Oxalidaceae	*Oxalis perennans*	Native oxalis
Forbs (Dicot)	Phyllanthaceae	*Phyllanthus virgatus*	
Forbs (Dicot)	Phyllanthaceae	*Poranthera microphylla*	Small-leaved Poranthera
Forbs (Dicot)	Plantaginaceae	*Plantago debilis*	
Forbs (Dicot)	Plantaginaceae	*Plantago gaudichaudii*	Narrow Plantain
Forbs (Dicot)	Plantaginaceae	*Veronica plebeia*	Trailing Speedwell
Forbs (Dicot)	Polygonaceae	*Persicaria decipiens*	Slender Knotweed
Forbs (Dicot)	Rubiaceae	*Asperula conferta*	Common Woodruff
Forbs (Dicot)	Rubiaceae	*Opercularia diphylla*	
Forbs (Dicot)	Solanaceae	*Solanum cinereum*	
Forbs (Dicot)	Solanaceae	*Solanum prinophyllum*	Forest Nightshade
Forbs (Dicot)	Stackhousiaceae	*Stackhousia viminea*	Slender Stackhousia
Forbs (Monocot)	Anthericaceae	*Arthropodium milleflorum*	Pale Vanilla Lily
Forbs (Monocot)	Anthericaceae	*Arthropodium minus*	
Forbs (Monocot)	Anthericaceae	*Dichopogon fimbriatus*	Chocolate Lily
Forbs (Monocot)	Anthericaceae	*Dichopogon strictus*	Nodding Chocolate Lily
Forbs (Monocot)	Anthericaceae	*Tricoryne elatior*	Yellow Autumn Lily
Forbs (Monocot)	Colchicaceae	*Wurmbea dioica subsp. Dioica*	Early Nancy

Table A.1 Species planting list – Cumberland Plain Woodland

Form	Family	Scientific Name	Common Name
Forbs (Monocot)	Commelinaceae	*Commelina cyanea*	Native Wandering Jew
Forbs (Monocot)	Hypoxidaceae	*Hypoxis hygrometrica*	Golden Weather-grass
Forbs (Monocot)	Phormiaceae	*Dianella longifolia*	Blueberry Lily
Grasses	Poaceae	*Aristida ramosa*	Purple Wiregrass
Grasses	Poaceae	*Aristida vagans*	Three awned Speargrass
Grasses	Poaceae	*Bothriochloa decipiens*	Pitted Bluegrass
Grasses	Poaceae	*Bothriochloa macra*	Red-leg Grass
Grasses	Poaceae	*Chloris truncata*	
Grasses	Poaceae	*Chloris ventricosa*	Plump Windmill Grass
Grasses	Poaceae	*Cymbopogon refractus*	Barbed Wire Grass
Grasses	Poaceae	*Dichanthium sericeum*	Queensland Bluegrass
Grasses	Poaceae	*Dichelachne micrantha*	Shorthair Plume Grass
Grasses	Poaceae	*Dichelachne parva*	Plume Grass
Grasses	Poaceae	*Digitaria diffusa*	Open Summer-grass
Grasses	Poaceae	*Echinopogon caespitosus*	Tufted Hedgehog Grass
Grasses	Poaceae	*Echinopogon ovatus*	Forest Hedgehog Grass
Grasses	Poaceae	*Elymus scaber*	Common Wheatgrass
Grasses	Poaceae	*Eragrostis leptostachya*	Paddock lovegrass
Grasses	Poaceae	*Eriochloa pseudoacrotricha*	Early Spring Grass

Table A.1 Species planting list – Cumberland Plain Woodland

Form	Family	Scientific Name	Common Name
Grasses	Poaceae	*Lachnagrostis filiformis*	Blown Grass
Grasses	Poaceae	*Microlaena stipoides*	Weeping Grass
Grasses	Poaceae	*Panicum effusum*	Hairy Panic
Grasses	Poaceae	*Paspalidium distans*	
Grasses	Poaceae	*Rytidosperma caespitosum*	Ringed Wallaby Grass
Grasses	Poaceae	*Rytidosperma racemosa var. Racemosa*	Wallaby Grass
Grasses	Poaceae	*Rytidosperma tenuius*	Wallaby Grass
Grasses	Poaceae	*Sorghum leiocladum*	Wild Sorghum
Grasses	Poaceae	*Sporobolus creber*	Slender Rat's Tail Grass
Grasses	Poaceae	*Sporobolus elongatus*	Slender Rat's Tail Grass
Grasses	Poaceae	*Themeda australis*	Kangaroo Grass
Sedges and Rushes	Cyperaceae	*Carex inversa*	
Sedges and Rushes	Cyperaceae	*Cyperus gracilis*	
Sedges and Rushes	Cyperaceae	*Fimbristylis dichotoma*	Common Fringe-sedge
Sedges and Rushes	Cyperaceae	*Scleria mackaviensis*	
Sedges and Rushes	Juncaceae	*Juncus homalocaulis*	
Sedges and Rushes	Juncaceae	*Juncus usitatus*	
Sedges and Rushes	Lomandraceae	*Lomandra filiformis*	Wattle Mat-rush
Sedges and Rushes	Lomandraceae	*Lomandra multiflora*	Many-flowered Mat-rush

Table A.1 Species planting list – Cumberland Plain Woodland

Form	Family	Scientific Name	Common Name
Ferns	Pteridaceae	*Cheilanthes distans*	Bristly Cloak Fern
Ferns	Pteridaceae	*Cheilanthes sieberi*	Rock Fern
Vines and Twiners	Fabaceae (Faboideae)	*Desmodium brachypodum*	Large Tick-trefoil
Vines and Twiners	Fabaceae (Faboideae)	*Desmodium varians*	Slender Tick-trefoil
Vines and Twiners	Fabaceae (Faboideae)	*Glycine clandestina*	Twining Glycine
Vines and Twiners	Fabaceae (Faboideae)	*Glycine microphylla*	Small-leaf Glycine
Vines and Twiners	Fabaceae (Faboideae)	*Glycine tabacina*	Twining Glycine
Vines and Twiners	Fabaceae (Faboideae)	*Hardenbergia violacea*	Purple Coral Pea
Vines and Twiners	Ranunculaceae	*Clematis glycinoides*	Headache Vine

Table A.2 Preferred Plant Species for the VRZ area

Form	Scientific Name	Common Name
Trees	*Acacia parramattensis*	Parramatta Wattle
Trees	*Angophora floribunda*	Rough-barked Apple
Trees	*Angophora subvelutina*	Broad-leaved Apple
Trees	*Eucalyptus amplifolia*	Cabbage Gum
Trees	*Melaleuca decora*	
Shrubs	*Breynia oblongifolia*	Coffee Bush
Shrubs	*Bursaria spinosa*	Blackthorn
Shrubs	*Ozothamnus diosmifolius*	Dogwood
Shrubs	*Rubus parvifolius*	Native Raspberry
Forbs	*Brunoniella australis*	Blue Trumpet
Forbs	*Centella asiatica*	Indian Pennywort
Forbs	*Dichondra repens*	Kidney Weed
Forbs	*Einadia hastata*	Berry Saltbush
Forbs	*Einadia trigonos*	Fishweed
Forbs	*Euchiton sphaericus*	
Forbs	*Poranthera microphylla*	Small-leaved Poranthera
Forbs	*Pratia purpurascens*	Whiteroot
Forbs	*Senecio hispidulus*	Hill Fireweed

Table A.2 Preferred Plant Species for the VRZ area

Form	Scientific Name	Common Name
Forbs	*Vernonia cinerea*	
Grasses	*Imperata cylindrica*	Blady Grass
Grasses	*Microlaena stipoides*	Weeping Grass
Grasses	*Oplismenus aemulus*	Basket Grass
Grasses	*Paspalidium distans*	
Sedges/Rushes	*Carex inversa*	
Sedges/Rushes	*Cyperus gracilis*	
Sedges/Rushes	*Juncus homalocaulis*	
Sedges/Rushes	*Juncus usitatus*	
Sedges/Rushes	*Lomandra filiformis*	Wattle Mat-rush
Sedges/Rushes	*Lomandra multiflora*	Many-flowered Mat-rush
Vines/Twiners	*Desmodium varians*	Slender Tick-trefoil
Vines/Twiners	*Glycine clandestina*	Twining Glycine
Vines/Twiners	*Glycine microphylla*	Small-leaf Glycine
Vines/Twiners	*Glycine tabacina*	Twining Glycine
Vines/Twiners	*Hardenbergia violacea*	Purple Coral Pea

Appendix B

Weed Control Methods

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
Acanthaceae	*Thunbergia alata*	Black-eyed Susan		- Hand Weed - Spot Spray - Glyphosate 10mL/1L
Amaranthaceae	*Amaranthus caudatus*	Love Lies Bleeding		
Asteraceae	*Aster subulatus*	Wild Aster		
Asteraceae	*Bidens pilosa*	Cobbler's Pegs		
Asteraceae	*Arctotheca calendula*	Cape Weed		
Asteraceae	*Cirsium vulgare*	Spear Thistle		
Asteraceae	*Conyza bonariensis*	Flaxleaf Fleabane		
Asteraceae	*Conyza sumatrensis*	Tall Fleabane		
Asteraceae	*Gnaphalium sp.*	A Cudweed		
Asteraceae	*Hypochaeris microcephala*	White Flatweed		
Asteraceae	*Hypochaeris radicata*	Catsear		
Asteraceae	*Lactuca serriola*	Prickly Lettuce		
Asteraceae	*Senecio madagascariensis*	Fireweed	#	
Asteraceae	*Soliva sessilis*	Bindyi		
Asteraceae	*Sonchus oleraceus*	Milk Thistle		
Asteraceae	*Taraxacum officinale*	Dandelion		
Asteraceae	*Tagetes minuta*	Stinking Roger		

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
Asteraceae	*Xanthium occidentale*	Noogoora Burr		
Boraginaceae	*Echium plantagineum*	Paterson's Curse		
Brassicaceae	*Cardamine hirsuta*	Common Bittercress		
Brassicaceae	*Lepidium africanum*			
Caryophyllaceae	*Cerastium glomeratum*	Mouse-ear Chickweed		
Caryophyllaceae	*Paronychia brasiliana*	Chilean Whitlow Wort		
Caryophyllaceae	*Petrorhagia nanteuilii*	Chiding Pink		
Caryophyllaceae	*Silene gallica var. gallica*			
Caryophyllaceae	*Stellaria media*	Common Chickweed		
Cyperaceae	*Cyperus eragrostis*	Umbrella Sedge		
Cyperaceae	*Cyperus sesquiflorus*	Fragrant Kyllingia		
Cyperaceae	*Isolepis levynsiana*	Tiny Flat Sedge		
Fabaceae (Faboideae)	*Lotus uliginosus*	Greater Bird's Foot Trefoil		
Fabaceae (Faboideae)	*Medicago minima*	Woolly Burr Medic		
Fabaceae (Faboideae)	*Medicago polymorpha*	Burr Medic		
Fabaceae (Faboideae)	*Trifolium dubium*	Yellow Suckling Clover		

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
Fabaceae (Faboideae)	*Trifolium repens*	White Clover		
Fabaceae (Faboideae)	*Vicia hirsuta*	Tiny Vetch		
Fabaceae (Faboideae)	*Vicia sativa*	Common Vetch		
Iridaceae	*Sisyrinchium iridifolium*	Blue Pigroot		
Malvaceae	*Malva parviflora*	Small Flowered Mallow		
Malvaceae	*Modiola caroliniana*	Red-flowered Mallow		
Myrsinaceae	*Anagallis arvensis*	Scarlet Pimpernel		
Oxalidaceae	*Oxalis corniculata*	Yellow Wood Sorrel		
Phytolaccaceae	*Phytolacca octandra*	Inkweed		
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongues		
Plantaginaceae	*Veronica arvensis*	Wall Speedwell		
Poaceae	*Andropogon virginicus*	Whisky Grass		
Poaceae	*Axonopus fissifolius*	Carpet Grass		
Poaceae	*Bromus catharticus*	Brome Grass		
Poaceae	*Briza maxima*	Quaking Grass		
Poaceae	*Briza subaristata*	Chilean Quaking Grass		
Poaceae	*Dactylis glomerata*	Orchard Grass		

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
Poaceae	*Echinochloa crus-galli*	Barnyard Grass		
Poaceae	*Ehrharta erecta*	Panic Veldtgrass		
Poaceae	*Eleusine indica*	Crow's Foot		
Poaceae	*Eragrostis cilianensis*	Stinkgrass		
Poaceae	*Holcus lanatus*	Yorkshire Fog		
Poaceae	*Lolium perenne*	Perennial Ryegrass		
Poaceae	*Paspalum dilatatum*	Dallis grass		
Poaceae	*Paspalum urvillei*	Vasey Grass		
Poaceae	*Pennisetum clandestinum*	Kikuyu Grass		
Poaceae	*Poa annua*	Winter Grass		
Poaceae	*Setaria parviflora*	Pigeon Grass		
Poaceae	*Sporobolus africanus*	Parramatta Grass		
Poaceae	*Stenotaphrum secundatum*	Buffalo Grass		
Polygonaceae	*Persicaria capitata*	Japanese Knotweed		
Polygonaceae	*Rumex crispus*	Curled Dock		
Rubiaceae	*Richardia stellaris*			
Scrophulariaceae	*Verbascum virgatum*	Twiggy Mullein		

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
Solanaceae	*Solanum americanum*	Glossy Nightshade		
Solanaceae	*Solanum linnaeanum*	Apple of Sodom		
Solanaceae	*Solanum nigrum*	Blackberry Nightshade		
Solanaceae	*Solanum pseudocapsicum*	Jerusalem Cherry		
Solanaceae	*Solanum sisymbriifolium*	Sticky Nightshade		
Verbenaceae	*Verbena bonariensis*	Purple Top		
Verbenaceae	*Verbena rigida var. rigida*	Veined Verbena		
Amaranthaceae	*Alternanthera pungens*	Khaki Weed		- Dig deep tap root out with hand tools - Care must be taken to bag and remove all vegetative material from the plant as it will regrow from fragments - Spot spray plant before flowering with Glyphosate 10mL/1L
Apiaceae	*Foeniculum vulgare*	Fennel		- Hand weed or spot spray juveniles with Glyphosate 15mL/L or metsulfuron methyl 7 g/100 L + non-ionic surfactant - Tall, mature individuals can be removed with a mattock, with care taken to sever the tap root as deep below ground as possible - Spot spray mature individuals and regrowth with Glyphosate 15mL/L or metsulfuron methyl 7 g/100 L + non-ionic surfactant - Care needs to be taken to prevent damage to native vegetation when spraying tall individuals
Apiaceae	*Hydrocotyle bonariensis*	Pennywort		- Mechanical - Using a shovel or mattock dig up underground rhizomes - Extremely time consuming and impractical - Use a wick/wand to apply undiluted Glyphosate to leaf surface

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
Apocynaceae	*Araujia sericifera*	Moth Vine		- Hand Weed Juveniles - Spray juveniles with Glyphosate 10mL/1L - Skirt mature vines (cut through plant close to root) and then pull root manually or apply undiluted Glyphosate to cut surface - Scrape and paint vine with undiluted Glyphosate
Apocynaceae	*Gomphocarpus fruticosus*	Narrow-leaved Cotton Bush		- Hand Weed Juveniles - Spot Spray Glyphosate 15mL/1L - Cut and Paint Glyphosate 50mL/100mL
Asparagaceae	*Asparagus aethiopicus*	Sprenger's Asparagus	#	- Any branches profuse with fruit should be cut with secateurs and bagged to prevent further spread of species by birds - Juvenile plants can be eased out of soil with a trowel or knife - care should be taken to remove below ground plant material - 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. - Spray mature and juvenile plants with metsulfuron methyl 6g/100mL + surfactant
Asparagaceae	*Asparagus asparagoides*	Bridal Creeper	#	- Dig out with hand tools - Care needs to be taken to remove all tuberous masses and rhizomes. Tuberous masses need soil excavation around and careful levering with hand tools to remove without leaving plant material behind to resprout. - July-September - Spray foliage with Glyphosate 10mL/1L + surfactant - May to June - Spray foliage with metsulfuron methyl (e.g. Brush Off) 5g/100L + non-

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
				ionic surfactant
Asparagaceae	*Asparagus officinalis*	Asparagus		- Remove with secateurs and bag and reproductive material - Plant can be dug out of ground with hand tools, however care needs to be taken to completely remove crown from base of plant as it will resprout - Foliar spray with 10mL/1L Glyphosate can be effective for large infestations however regrowth will need to be resprayed over a number of months upon resprouting from crown
Asteraceae	*Ageratina adenophora*	Crofton Weed		- Hand Weed - Spot Spray with Glyphosate 5mL/1L - Slash large individuals with brushcutter and spray regrowth foliage with Glyphosate 5mL/1L
Asteraceae	*Ageratina riparia*	Crofton Mistflower		- Hand Weed - Spot Spray with Glyphosate 5mL/1L - Slash large individuals with brushcutter and spray regrowth foliage with Glyphosate 5mL/1L
Asteraceae	*Delairea odorata*	Cape Ivy		- Hand weed taking care to bag and remove all stem pieces - Spray with Glyphosate 10mL/1L (spraying of regrowth may be necessary in following site visits) - Cut stem aerial stems at 1m height and hand remove remaining rooted plant parts of treat cut surface with undiluted Glyphosate
Bignoniaceae	*Tecoma capensis*	Cape Honeysuckle		- Spray juveniles with Glyphosate 10mL/1L - Cut mature individuals with loppers near ground level and paint stump with undiluted Glyphosate

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
				- Spray foliage of mature and regrowth individuals with Glyphosate 10mL/1L
Cactaceae	*Opuntia stricta*	Common Prickly Pear	# X(4)	- This weed is difficult to treat with chemicals, and chemicals such as arsenic that do kill the plant are highly toxic to other plants and animals so should not be used in bushland - Due to the introduction of the Cactoblastis moth in 1926, which preys on the species, mature individuals of the plant occur only sporadically and are easily manually removed - As the plant reproduces vegetatively the entirety of the plant must be bagged and removed from the site, including as much root material as possible. As the plant is soft the above ground areas of the plant are easily cut into pieces with a hand saw, and after removal of the upper areas of the plant the root material should be dug out with a hand mattock.
Caprifoliaceae	*Lonicera japonica*	Japanese Honeysuckle		- Cut and scrape vine stems with undiluted Glyphosate - Hand weed seedlings - Spray low lying foliage, regrowth foliage, and seedlings with 20mL/1L Glyphosate & metsulfuron methyl(e.g. Brush-Off) 10.5g/10L + non ionic surfactant - Roots of plant can be dug up with mattock or shovel
Commelinaceae	*Tradescantia fluminensis*	Wandering Jew		- Small infestations can be removed by hand weeding - Care needs to be taken not to leave behind any plant material which will resprout. - Large infestations can be controlled by spraying with Glyphosate 10mL/1L, and the use of a surfactant will increase the efficacy of herbicide. Spraying needs to be repeated during every site visit. It can take several months before the mature plants appear to be affected but a sudden die off will occur after several months of treatment. Any regrowth material following die off of mature plants needs to be sprayed or removed by hand. - Large infestations can be raked up and bagged and removed from site. This is time consuming and labour intensive due to the large mass and weight of heavy infestations

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
				of healthy plants. - Large infestations can be covered with black plastic sheets for several months. The plants will die eventually due to lack of required sunlight. This method is not recommended for bushland regeneration as it also inhibits regrowth form seed of native plant species.
Convolvulaceae	*Ipomoea indica*	Morning Glory		- Hand pull taking care to remove root system and stem - plant will resprout from stem segments not removed from site - Cut vine at 1m or less above ground height and pull remaining plant out of the ground at the roots - Spray any ground hugging vines with Glyphosate 10mL/1L (will require follow up spraying of regrowth over several months as plant will resprout)
Cyperaceae	*Cyperus rotundus*	Nut Grass		- Difficult Weed to control manually as it an has extensive underground root network with tubers from which it will resprout - if manual methods need entirety of underground mass needs to be dug up, bagged, and removed from site - Weed is resistant to most herbicides which will kill foliage though not tubers from which it will resprout - Use of Glyphosate 10 mL/1L will kill tubers eventually if foliage and resprouting foliage is sprayed repeatedly during each site visit - Spraying should occur monthly until no resprouting material is present, and area should be monitored following this for new foliage in the months after
Fabaceae (Caesalpinioideae)	*Senna pendula var. glabrata*			- Hand weed juveniles - Spray juvenile individuals with Glyphosate 10mL/1L - Cut and paint mature individuals with undiluted Glyphosate

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
Fabaceae (Mimosoideae)	*Acacia saligna*	Golden Wreath Wattle		- Hand weed juveniles - Cut mature plants as close as possible to the ground with loppers or a saw and apply undiluted Glyphosate to the stump
Iridaceae	*Gladiolus undulatus*	Wild Gladiolus		- Dig out with hand tools - Care needs to be taken to removal all small cormels present under the main corm - May require bagging and removal of soil around the main corm to remove all cormels - Spray regrowth seedlings with Glyphosate 10mL/1L
Iridaceae	*Romulus rosea*	Onion Grass		- Hand weed - Corms beneath the plant must be removed from the soil to prevent resprouting - This can be done by digging down to the corm with a knife or trowel and carefully levering the corm out of the soil - Foliar spraying of the plant with Glyphosate 10 mL/1L plus non-ionic surfactant at 2mL/1L water or metsulfuron methyl (600g/kg) at 0.14g/L water plus 1ml/1L non-ionic surfactant is effective, though in order to kill corms spraying should take place when plants are 6-8 weeks old after emerging from the soil surface, when the old corm is exhausted and a new corm is developing
Liliaceae	*Lilium formosanum*	Formosan Lily		- Cut, bag, and remove any mature seed heads from site - Dig out with hand tools - Care must be taken to remove bulb and all bulbils from base of plant below soil surface - Dense infestations can be sprayed with Glyphosate 10mL/1L however follow up hand weeding will be needed to dig up bulbs and bulbils of resprouting plants
Malvaceae	*Sida rhombifolia*	Paddy's Lucerne		- Hand weed - Spray with Glyphosate 10mL/1L - Cut large, firmly rooted individuals at the base with secateurs and paint with undiluted

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
				Glyphosate
Meliaceae	*Melia azedarach*	White Cedar	NE	- Native species that is considered a weed outside of rainforest areas. The leaves and fruit are toxic and caution should be used when handling the plant (dust mask and gloves when sawing) - Hand weed juveniles - Drill holes with power drill with thick drill bit into mature trees, around base of trunk and fill holes with undiluted Glyphosate. Once Glyphosate has been absorbed refill holes with undiluted Glyphosate several times. - Cut shrub and mature individuals as close to ground as possible with loppers or hand saw (or chainsaw) and treat stump with undiluted Glyphosate - Spray juveniles and regrowth foliage of cut and painted individuals with Glyphosate 10mL/1L
Ochnaceae	*Ochna serrulata*	Mickey Mouse Bush		- Stems of all juvenile and mature plants should be scraped and painted with undiluted Glyphosate - follow up treatment may be needed on regrowth stems around base of plant in following monthly site visits - Mature fruits on plants should be bagged and removed from site
Oleaceae	*Ligustrum sinense and Ligustrum lucidum*	Small-leaved Privet and Broad-leaf Privet	X(4)	- Hand weed juveniles - Drill holes with power drill with thick drill bit into mature trees, around base of trunk and fill holes with undiluted Glyphosate. Once Glyphosate has been absorbed refill holes with undiluted Glyphosate several times. - Cut shrub and mature individuals as close to ground as possible with loppers or hand saw and treat stump with undiluted Glyphosate - Spray juveniles and regrowth foliage of cut and painted individuals with Glyphosate 10mL/1L

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
Oleaceae	*Olea europaea subsp. cuspidata*	African Olive		- Spray juveniles with Glyphosate 10mL/1L - Cut mature individuals with saw or loppers near ground level and paint stump with undiluted Glyphosate
Passifloraceae	*Passiflora edulis*	Passion Fruit		- Hand weed Juveniles - Dig roots out of ground for larger individuals or use secateurs to cut the vine near the base and treat cut surface with undiluted Glyphosate
Passifloraceae	*Passiflora subpeltata*	White Passion Flower		- Hand weed - Scrape stems with knife and paint exposed surface with undiluted Glyphosate - Spray foliage with Glyphosate 10mL/1L plus non-ionic surfactant
Poaceae	*Chloris gayana*	Rhodes Grass		- Hand weed juveniles - Remove carefully with secateurs and bag seed plumes of mature plants - Dig mature plants out of the ground with a mattock; or - Brushcut mature plants to near ground level and spray with Glyphosate 10mL/1L - During subsequent site visits spray regrowth foliage with Glyphosate 10mL/1L
Poaceae	*Cortaderia selloana*	Pampas Grass		- Dig out large clumps with mattock - Spot spray with Glyphosate 10mL/1L - Large plants can be mown or brush cut to ground level, then regrowth sprayed with Glyphosate
Poaceae	*Cynodon dactylon*	Common Couch		- Hand Weed - Spot Spray with Glyphosate 10mL/1L - May require monthly treatment of regrowth individuals for up to six months
Poaceae	*Digitaria sanguinalis*	Summer Grass		- This species is present above ground generally only during the warmer months of the year when it grows densely, in large abundances, after seedlings germinate from soil

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
				seed. It seeds profusely and it is important to prevent seed from being deposited in the soil to prevent dense infestations the following year. It is important to control juveniles before they are able to produce and set seed. On any plant that is seeding the seed head needs to be cut off and bagged, with secateurs for individual plants, or use of shears in areas with large amounts of the grass seeding. - The most effective control methods is to spray all patches of juvenile plants with Glyphosate 10mL/1L before they reach maturity. This needs to be repeated during every site visit during the warmer months as germination of new plants will occur throughout this period.
Poaceae	*Eragrostis curvula*	African Lovegrass		- Dig large individuals out with a mattock - Juvenile individuals can be dug out using hand tools - Spot spraying with Glyphosate 10mL/10L is effective during the growth period during Spring and Summer - During this period large individuals can be mown or brushcut to the ground level and regrowth foliage sprayed with Glyphosate
Poaceae	*Hyparrhenia hirta*	Coolatai Grass		- Hand weed - Remove using mechanical means, i.e. Mattock - Spray with 10mL/1L Glyphosate three times in one growth season
Poaceae	*Phalaris aquatica*	Canary Grass		- Spray using 10mL/1L Glyphosate - May need repeat spraying over several months - Hand weed taking care to remove rhizomes - Large plants may be mown or brushcut and regrowth sprayed during following site visits
Polygalaceae	*Polygala virgata*	Broom Milkwort		- Hand weed seedlings - Spray seedlings with Glyphosate 10mL/1L

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
				- Cut mature plants close to ground with secateurs and treat stump with undiluted Glyphosate
Polygonaceae	*Acetosa sagittata*	Turkey Rhubarb		- 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
Polygonaceae	*Acetosella vulgaris*	Sheep Sorrel		- Plant is difficult to control manually due to regrowth and spread from any underground rhizomes not removed. Manual removal of small infestations requires that all underground rhizomes as well as above ground plant material are bagged and removed from site. Insufficient manual removal of rhizomes can lead to larger infestations of the species than to start with. - Species can be controlled with spot spraying of foliage with Glyphosate 10mL/1L, however plants need to be monitored for regrowth and resprayed monthly over at least a six month period. - Any reproductive features of the plant such as seed on mature individuals should be cut off with secateurs, bagged, and removed from site prior to spraying or manual removal
Proteaceae	*Grevillea robusta*	Silky Oak		- Hand weed juveniles or spot spray with Glyphosate 10mL/1L - Cut mature/shrub individuals with loppers or a saw as close to the ground as possible

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
				and paint stump with undiluted Glyphosate
Ranunculaceae	*Ranunculus repens*	Creeping Buttercup		- Hand weed - Care must be taken to remove all plant parts including runners to prevent vegetative reproduction - Spot spray with Glyphosate 10mL/1L - follow up treatment may be needed over subsequent visits to treat any regrowth
Rosaceae	*Rubus fruticosus sp. agg.*	Blackberry complex	# X(4)	- It is possible to spray with 10mL/1L Glyphosate however it will leave dangerous thorned stems - Wearing thick clothing and leather glove uses loppers to cut close to base and apply undiluted Glyphosate to cut stems (remove cut foliage and stems cautiously) - Spray regrowth foliage with Glyphosate 10mL/1L
Rutaceae	*Murraya paniculata*	Orange Jessamine		- Hand weed juveniles or spray with 10mL/1L Glyphosate - Cut mature plants close to the ground with a hand saw and apply undiluted Glyphosate to cut stump surface - Spray any regrowth foliage from cut stumps with Glyphosate 10mL/1L
Sapindaceae	*Cardiospermum grandiflorum*	Balloon Vine		- Hand weed juveniles or spray with Glyphosate 10mL/1L - Hand pull roots of mature vines - Vines growing over trees, shrubs, or other objects should be skirted with shears as close to the ground as possible - Spray remaining ground coverage with Glyphosate 10mL/1L, or treat cut stems with undiluted Glyphosate - Bag and remove seed cases where possible
Solanaceae	*Cestrum parqui*	Green Cestrum		- Hand weed juveniles - Scrape stem and paint with undiluted Glyphosate - Cut all above ground suckering individuals with loppers or saw and paint stumps with

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
				undiluted Glyphosate - Spray regrowth foliage with Glyphosate 10mL/1L
Solanaceae	*Lycium ferocissimum*	African Boxthorn	#	- Heavy PPE such as leather gloves, and caution should be used when working with this plant due to the presence of large thorns - Juvenile individuals can be hand weeded - Mature individuals should be cut at the base with a hand saw and undiluted Glyphosate painted on to the cut stump surface - Alternatively for large individuals a power drill can be used to drill holes 5 cm apart which should be filled with undiluted Glyphosate
Solanaceae	*Solanum mauritianum*	Wild Tobacco Bush		- When working with this plant additional PPE may be required as some individuals are sensitive to the shedding fine hairs of the species - Recommended PPE is a dust mask, long sleeve shirt and pants + gloves - Hand weed juveniles - Mature individuals can be cut and painted with Glyphosate 10mL/1L
Verbenaceae	*Lantana camara*	Lantana	#	- 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
Zingiberaceae	*Hedychium gardnerianum*	Ginger Lily		- Cut, bag, and remove mature seed heads from plants - Dig up with mattock or hand pull mature plants, taking care to remove all fleshy

Table B.1 Weed control methods

Family	Species	Common Name	Status	Treatment Methods
				rhizomes - Rhizomes need to be removed from site, or crushed and piled on site to rot (monitor for regrowth) - Cut plant as close to rhizome as possible and treat with undiluted metsulfuron methyl at 6g -1 L (winter) or 1g -1 L (summer)

Appendix C

Cumberland Plain Woodland Fact Sheet

Box Hill North

[CUMBERLAND PLAIN WOODLAND - FACT SHEET

Environmentally Significant Areas

The Box Hill North development will provide a large number residences within close proximity to environmentally significant areas consisting of threatened ecological communities that are protected under both state and commonwealth legislation. One such community that will be retained and revegetated in areas nearby the development is Cumberland Plain Woodland.

This community is comprised of Australian native plants that occur in Sydney's western suburbs. The native plants unique to this community offer food and shelter for a range of native birds, reptiles and mammals.

Cumberland Plain Woodland was once found throughout western Sydney but now only 6% of its original extent remains. Although mostly only small patches of the community remain, numerous threatened species depend on them for survival.

The protection of existing patches and revegetation of new patches of the community is an important step to ensure threatened and native species continue to persist in western Sydney.

Powerful Owl (source: birdlife.org.au

Threatened Fauna

-Gang Gang Cockatoo
-Powerful Owl
-Turquoise Parrot
-Spotted-tail Quoll
-Squirrel Glider
-Koala

Common Plants

-Grey Box
-Forest Red Gum
-Narrow-leaved Ironbark
-Hickory Wattle
-Kangaroo Grass
-Barbed Wire Grass

Want to learn more?

Visit your local council website @
www.thehills.nsw.gov.au/