SEPP SENIORS LIVING DEVELOPMENT: 24-28 HOLFORD CRESCENT, GORDON

Vegetation Management Plan

For:

Mr. Bin Xu

February 2017

Final Report

PO Box 2474
Carlingford Court 2118

Report No. 16062RP3

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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Approved by: Dr David Robertson

Position: Director

Signed: David Robertson

Date: *28 February, 2017*

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Glossary of Terms

BRC	Bushland Regeneration Contractor
CESDF	Coastal Enriched Sandstone Dry Forest
EEC	Endangered Ecological Community
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FFA	Flora and Fauna Assessment
Ku-ring-gai LEP 2015	*Ku-ring-gai Local Environmental Plan 2015*
LGA	Local Government Area
Locality	The area within a 5 km radius of the centre of the Study Area
NSW	New South Wales
NW Act	NSW *Noxious Weeds Act 1993*
OEH	NSW Office of Environment and Heritage
PPE	Personal Protective Equipment
the proposed development	The SEPP Seniors Living Development proposed for the Study Area
Study Area	24-28 Holford Crescent, Gordon (Lot 4 DP16691)
VMP Area	Area in which the VMP applies which will not be subject to the proposed development (see **Figure 1.1**)
TSC Act	NSW *Threatened Species Conservation Act 1995*
VMP	Vegetation Management Plan
WONS	Weeds of National Significance

Executive Summary

S1 Background, Purpose and Objectives

Cumberland Ecology has been commissioned by Crawford Architects on behalf of Mr. Bin Xu to prepare a Vegetation Management Plan (VMP) to support a Development Application (DA) for 24-28 Holford Crescent, Gordon. The area that is the subject of this VMP comprises the vegetation around the perimeter of the Study Area which will not be subject to the building development. The purpose of this VMP is to provide guidelines for the rehabilitation, conservation and management of this vegetation.

The primary aims of the plan are as follows:

- To improve the ecological condition of the VMP Area;
- To re-establish and improve native vegetation that is broadly representative of the original plant community at the VMP Area (being Coastal Enriched Sandstone Dry Forest comprising four strata including canopy trees, understorey trees, shrubs and groundcovers);
- To vegetate the proposed Dry Creek Area with suitable local native species;
- To establish and enhance habitat for local fauna species with the potential to occur or known to occur within the VMP Area; and
- To enhance the ecological character of the site by systematic staged removal and routine control of weed and exotic species within the VMP Area and Dry Creek Area.

A separate Flora and Fauna Assessment (FFA) report has been prepared by Cumberland Ecology (document 16062RP1) to assess the impacts of the development on threatened species and communities and a summary of the relevant contents of this report describing the ecological character of the VMP Area are provided in this VMP.

S2 Methodology

Cumberland Ecology previously surveyed the Study Area during the preparation of the FFA in March-May 2016. Random meander surveys were undertaken to detect flora species occurring within this area. Targeted searches were also conducted for threatened flora species known, or considered likely to occur, within the Study Area. Surveys also included a general fauna habitat assessment.

S3 Previous Survey Results

Vegetation within the Study Area consists of Coastal Enriched Sandstone Dry Forest with Exotic Understorey, Planted/Exotic vegetation and Exotic Dominated Grassland. None of these are listed threatened ecological communities under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

No naturally occurring threatened flora species, as listed under the TSC Act or EPBC Act were detected within the Study Area.

S4 Restoration Actions

The overall objectives of this VMP are to maintain, protect and enhance the vegetation and habitat values of the VMP Area. In order to achieve these objectives a range of measures are prescribed. In summary, these include:

- Removal of existing exotic groundcover;
- Re-establishment of native trees, shrubs and groundcover indicative of the previous vegetation communities that would have occurred naturally at the site;
- Re-establishment of endemic flora species within the VMP area;
- Initiation of routine maintenance of the VMP area, including systematic and routine control of weed species; and
- Initiation of monitoring of the VMP area to measure the success of measures prescribed within this VMP.

Methodologies to achieve the aforementioned objectives, as well as specific weed control procedures are also provided.

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Chapter **1**

Introduction

1.1 Introduction

Cumberland Ecology has been commissioned by Crawford Architects on behalf of Mr. Bin Xu to prepare a Vegetation Management Plan (VMP) to support a Development Application (DA) for 24-28 Holford Crescent, Gordon (hereafter referred to as the "Study Area") (see **Figure 1.1**). The area that is the subject of this VMP comprises the vegetation around the perimeter of the Study Area which will not be subject to the building development (and is hereafter referred to as the "VMP Area"). Within the VMP Area is a drainage line which is proposed to be upgraded to create a rocky dry creek bed (hereafter referred to as the "Dry Creek Bed". A Flora and Fauna Assessment (FFA) for the Study Area was prepared by Cumberland Ecology in 2016 (16062RP1).

In the interim between this document and the preparation of the FFA, a number of trees within the Study Area fell during a storm. This has resulted in changes to the vegetation mapping for the site and is addressed in **Section 1.5**.

1.2 Purpose

The purpose of this VMP is to provide guidelines for the revegetation and management of vegetation associated with the VMP Area. The VMP has been prepared to allow revegetation of one native vegetation community, Coastal Enriched Sandstone Dry Forest (CESDF) using bushland regeneration techniques. This community is not a threatened ecological community.

The aims of the plan are as follows:

- To improve the biodiversity values of the VMP Area;
- To re-establish native vegetation that is broadly representative of the original plant community in the VMP Area (being CESDF), comprising four strata including canopy trees, understorey trees, shrubs and groundcovers;
- To establish the Dry Creek Area with suitable native species;
- To establish and enhance habitat for local fauna species with the potential to occur or known to occur within the VMP Area; and

- To enhance the ecological character of the Study Area by removal and routine control of weed and exotic species within the VMP Area and Dry Creek Area.

1.3 Responsibilities for VMP Implementation

Management actions outlined in this VMP related to site establishment, including initial weeding and revegetation will be funded by the site developer. Ongoing maintenance costs for the VMP area such as maintenance weeding and plant replacement will be funded by the owners corporation for the community title lot and incorporated into strata fees.

1.4 Background

1.4.1 Study Area Description

The Study Area comprises 24-28 Holford Crescent, Gordon (Lot 4 DP16691) in the Ku-ring-gai Council Local Government Area (LGA). The Study Area is zoned as R2 – Low Density Residential, while a strip along the eastern border is zoned as SP2 – Infrastructure: Local Road, under the Ku-Ring-Gai Local Environment Plan 2015. The Study Area is bound by residential properties in all directions and is accessed from Holford Crescent in the south and Ryde Road in the west via a linear section of the property, which currently exists as an old driveway, and mown grass. The Study Area currently contains a residential dwelling and swimming pool, driveways in the south and west, and areas of trees and open grassland.

1.4.2 VMP Area Description

The VMP Area contains all areas of the Study Area in which native revegetation and retention of CESDF is to be undertaken. Other vegetated areas of the Study Area which are currently maintained as landscaped garden and lawn areas are to be managed under the landscape plan for the Study Area and are not the subject of this VMP. The VMP Area as mapped in **Figure 1.1** includes areas in which the stems of CESDF trees occur only within the Study Area and does not include trees which are to be retained and situated in lawn areas or in narrow garden areas. The Dry Creek Bed area is located in the north of the VMP Area.

1.4.3 Proposed Development

The proposed development is for the construction of senior housing as per *State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004* under the EP&A Act. The development will entail a mix of one, two, and three bedroom apartments (Crawford Architects 2016). Vehicle access to the property will be from Holford Crescent in the south while pedestrian access is to be constructed in the linear strip of the Study Area in the west to Ryde Road, in which a degraded driveway is currently present. The existing residential dwelling and pool will be dismantled and removed from the site.

1.5 Relevant Legislation

Legislation relevant to this VMP includes:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- NSW *Environmental Planning and Assessment Act 1979* (EP&A Act);
- NSW *Noxious Weeds Act 1993* (NW Act);
- NSW *Pesticides Act 1999*; and
- NSW *Threatened Species Conservation Act 1995* (TSC Act).

1.5.1 State and Local Government Planning Instruments

Planning instruments that relate to the development of the Study Area include the Ku-ring-gai Local Environmental Plan 2015 ('Ku-ring-gai LEP 2015'). The Study Area is located within the Ku-ring-gai Council LGA and falls under the Ku-ring-gai LEP 2015. The Study Area is zoned as R2 – Low Density Residential and SP2 – Infrastructure: Local Road.

A description of the objectives and permitted activities within the zone are detailed below.

i. R2 – Low Density Residential

Objectives of the zone are:

- *To provide for the housing needs of the community within a low density residential environment.*
- *To enable other land uses that provide facilities or services to meet the day to day needs of residents.*
- *To provide for housing that is compatible with the existing environmental and built character of Ku-ring-gai.*

Permitted actions with consent within the zone are:

- *Bed and breakfast accommodation; Boarding houses; Building identification signs, Business identification signs; Child care centres; Community facilities; Dwelling houses; Environmental protection works; Exhibition homes; Flood mitigation works; Group homes; Health consulting rooms; Home-based child care; Home businesses; Home industries; Hospitals; Neighbourhood shops; Places of public worship; Recreation areas; Respite day care centres; Roads; Secondary dwellings.*

ii. SP2 – Infrastructure: Local Road

Objectives of the zone are:

- *To provide for infrastructure and related uses.*

- *To prevent development that is not compatible with or that may detract from the provision of infrastructure.*

Permitted actions with consent within the zone are:

- *The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose; Environmental protection works; Flood mitigation works; Recreation areas; Roads.*

1.6 Changes to Vegetation Mapping and Council Greenweb Mapping

Since the preparation of the FFA for the Study Area in May 2016 four *Angophora costata* (Smooth Barked Apple) individuals within the Study Area fell during a storm in June 2016 into an adjoining residential property (**Photograph 1.1**). A further two trees were removed due to safety concerns. These trees represented an occurrence of the vegetation community Coastal Enriched Sandstone Dry Forest (exotic understorey) (see **Section 3.1.1**). As such an updated vegetation map has been included in this report (**Figure 3.1**) which reflects the current extent of the community within the Study Area.

The extent of these trees which no longer occur within the Study Area are mapped under the Ku-Ring-Gai Council Greenweb mapping as Category – Landscape Remnant (Ku-ring-gai Council 2016). This category includes fragmented native vegetation with remnants of key vegetation communities.

As the trees occurred over exotic dominated grassland and not in association with other native species, the loss of the trees has resulted in the loss of the remnants of the key vegetation community within the specific area the trees occupied. The biodiversity objectives of the Landscape Remnant category under the Greenweb mapping are:

- To maintain smaller key vegetation communities remnants as 'stepping stones', providing habitat, seedbank and pollination resources (facilitating gene flow) and supporting flora and fauna resilience;
- To maintain and restore smaller remnants of key vegetation communities across a range of topographies; and
- To protect trees within key vegetation communities that provide food, shelter or nesting resources for native fauna, or that are of exceptional aesthetic value.

Due to the loss of these trees and the key vegetation remnant represented by them within the specific location within the Study Area they occupied, these objectives can no longer be applied. For this reason the inclusion of this area within Ku-ring-gai Council's Greenweb should no longer apply, and the area should be excluded from future iterations of the Greenweb mapping.

Photograph 1.1 Fallen Trees along Study Area Boundary

Coordinate System: MGA Zone 56 (GDA 94)

Legend

- Study Area
- VMP Area
- Dry Creek Bed
- Proposed Pathway Adjoining VMP Area

Grid North

Image Source:
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I:\...\16062\Figures\RP3\20170201\Figure 1.1. Study Area and VMP Area

Figure 1.1. The Study Area and VMP Area

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Chapter 2

Methodology

2.1 Literature Review

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

Cumberland Ecology previously prepared a FFA in March-May 2016 for the Study Area. The existing field data and vegetation descriptions were utilised for the purpose of this VMP. Previous flora surveys involved a random meander survey to record native and exotic species present within the Study Area.

In order to prepare species planting lists, and revegetation strategies for CESDF to be planted within the VMP Area, survey data from the previous site inspection (30 March 2016) was reviewed, along with the description of the vegetation community under broad scale mapping for the locality (OEH 2013).

The species list prepared for revegetation within the VMP Area includes species listed as diagnostic for the CESDF vegetation community, but has been tailored from the described community to include only species known to occur locally (OEH 2017). The species list for the Dry Creek Area include species that have been recorded within the locality which naturally occur in damp areas with sandstone soils such as drainage lines and creeks (OEH 2017).

2.2 Flora Survey Effort

2.2.1 Previous Assessment

Cumberland Ecology previously surveyed the Study Area during the preparation of the FFA in March-May 2016. Random meander surveys were undertaken to detect flora species occurring within this area.

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Chapter 3

Existing Biodiversity Values

This chapter presents the results of previous surveys and describes the flora of the VMP Area and Study Area.

3.1 Vegetation Communities of the Study Area

The vegetation within the Study Area has already been impacted by previous and current land uses, including existing residential dwellings. Historically, the vegetation of the Study Area would have comprised native forest communities and would have included CESDF which occurs in the Study Area.

The Study Area comprises the following:

- Coastal Enriched Sandstone Dry Forest with Exotic Understorey;
- Planted/Exotic; and
- Exotic Dominated Grassland.

Descriptions of each of the vegetation communities are provided below, and distributions shown in **Figure 3.1**. A full flora list is provided in **Appendix A**.

3.1.1 Coastal Enriched Sandstone Dry Forest with Exotic Understorey

TSC Act Status: Not listed.

EPBC Act Status: Not Listed.

This community within the VMP Area consists of predominately canopy only of the community Coastal Enriched Sandstone Dry Forest (CESDF) (**Photograph 3.1**) (OEH 2013). Species present in the canopy include the natives *Angophora costata* (Smooth-barked Apple), *Syncarpia glomulifera* (Turpentine), and *Eucalyptus pilularis* (Blackbutt). A single occurrence of the non-endemic native *Grevillea robusta* (Silky Oak) is present in this layer. Small trees present are juveniles of the canopy species, along with an occurrence of the exotic *Jacaranda mimosifolia* (Jacaranda).

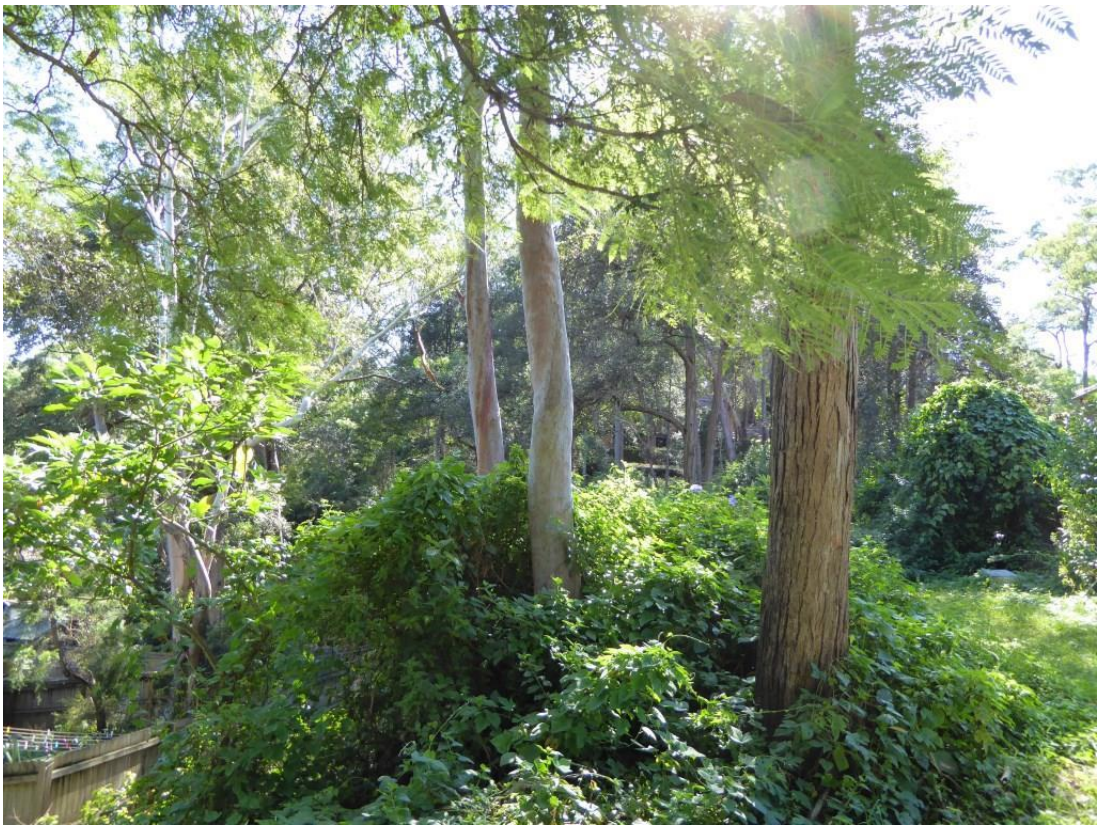
The understorey across most of the site is nearly entirely exotic, and shrub species present include *Lantana camara* (Lantana), *Senna pendula*, *Ligustrum lucidum* (Large-leaved Privet), *Ligustrum sinense* (Small-leaved Privet), and *Solanum mauritianum* (Wild Tobacco Bush)

(**Photograph 3.2**). Native shrubs are confined to the northern corner of the VMP Area, with *Homalanthus populifolius* (Bleeding Heart) the most commonly occurring. Several other species of shrub occur in this corner with most species confined to only one or two juvenile individuals. These species include *Zieria smithii* (Sandfly Zieria), *Dodonaea triquetra* (Hop Bush), *Leucopogon juniperinus* (Prickly Beard-heath), and *Acacia linifolia* (White Wattle). The non-endemic native *Leptospermum petersonii* (Lemon-scented Tea-tree) is also present in this corner.

The ground layer is dominated by exotic species, almost exclusively in the patches along the north-western and south-western boundaries. Dominant exotic species include *Ipomoea indica* (Morning Glory) and *Tradescantia fluminensis* (Wandering Trad). Other common species include *Alstroemeria pulchella* (Peruvian Lily), *Phyllanthus tenellus* (Hen and Chicken), *Plantago lanceolata* (Lamb's Tongues), and *Ageratina adenophora* (Crofton Weed). Common exotic grasses include *Digitaria sanguinalis* (Summer Grass), and *Ehrharta erecta* (Panic Veldtgrass).

The most common native species in the ground layer are the grasses *Microlaena stipoides* (Weeping Grass), and *Oplismenus aemulus* (Basket Grass). Native grasses occurring less frequently, predominately in the northern corner of the Study Area in small abundances, include *Imperata cylindrica* (Blady Grass), *Poa labillardierei* (Tussock Grass), and *Entolasia stricta* (Wiry Panic). The most common forbs are *Commelina cyanea* (Scurvy Weed), and *Cyperus gracilis* (Slender Flat-sedge), with other species that occur less frequently, and mostly in the northern corner including *Geranium homeanum* (Native Geranium), *Pratia purpurascens* (Whiteroot), and *Lomandra longifolia* (Spiny Mat-rush) (**Photograph 3.3**).

The majority of the Study Area is likely to have undergone extensive soil disturbance and historic landscaping throughout its residential development and use. CESDF along the north-eastern boundary of the Study Area is likely to be situated on a relatively unmodified land form as it exists in association with sandstone outcroppings. The CESDF trees along the north-western boundary are likely to be entirely regrowth of the former community, on an artificial landform. Lawn areas across the majority of the site are relatively flat, and along the north-west occurrences of CESDF appear to be at the edge of this artificially flattened area, and in association with an artificial gradient sloping down to residential properties below. Two of the *Syncarpia glomulifera* individuals within the Study Area occur in an old landscaped garden area as evidenced by artificial, landscaped rock walls, and a dilapidated, overgrown staircase.



Photograph 3.1 CESDF canopy species along north-western boundary

Photograph 3.2 CESDF with exotic understorey along north-eastern boundary

Photograph 3.3 CESDF ground layer in the northern corner

3.1.2 Planted/Exotic

TSC Act Status: Not listed

EPBC Act Status: Not listed

Vegetation within these areas consists of woody exotic vegetation that does not occur under a canopy of remnant CESDF trees (**Photograph 3.4**). Vegetation in these areas includes exotic woody weed species of a shrub size such as *Ligustrum lucidum* and *Lantana camara* and planted exotics such as *Phoenix canariensis* (Phoenix Palm) and *Triadica cochinchinensis.*

Photograph 3.4 *Ligustrum lucidum* and *Lantana camara* to the north of the residential dwelling

3.1.3 Exotic Dominated Grassland

TSC Act Status: Not listed

EPBC Act Status: Not listed

This community consists of mown grassland lawn areas (**Photograph 3.5**) and is comprised predominately of the exotic grasses *Pennisetum clandestinum* (Kikuyu) and *Cynodon dactylon* (Couch). Lesser occurring exotic grasses include *Paspalum dilatatum* and *Sporobolus africanus* (Parramatta Grass). Lawn weeds present include the exotic *Veronica persica* (Creeping Speedwell), *Taraxacum officinale* (Dandelion), and *Plantago lanceolata* (Lamb's Tongues). Towards the edges of the lawns in areas where the grassland meets degraded CESDF, some common native species are present including the grasses *Microlaena stipoides* (Weeping Grass) and *Oplismenus aemulus* (Basket Grass), and the herbs *Cyperus gracilis* (Slender Flat-sedge) and *Dichondra repens* (Kidney Weed).

Photograph 3.5 Exotic dominated grassland

3.2 Flora Species

3.2.1 General Flora Species

A total of 115 flora species were recorded within the Study Area during the survey. These included 77 exotic weed species, 35 endemic native species, and 3 non-endemic native species were recorded during the site survey. A full list of species recorded is provided in **Appendix A**.

3.2.2 Threatened Flora Species

No threatened flora species were encountered during the Study Area surveys. None would be likely to occur due to historic clearing and disturbance.

3.2.3 Noxious Weeds

Eleven of the exotic plant species recorded on the VMP Area are listed as Declared Noxious Weeds under the NSW *Noxious Weeds Act 1993* in Ku-ring-gai Council LGA. These are *Ligustrum lucidum* (Broad-leaf Privet), *Ligustrum sinense* (Small-leaved Privet), *Ricinus communis* (Castor Oil Plant), *Cinnamomum camphora* (Camphor Laurel), *Ailanthus altissima* (Tree of Heaven), *Celtis sinensis* (Japanese Hackberry), *Lantana camara* (Lantana), *Acetosa sagittata* (Turkey Rhubarb), *Asparagus aethiopicus* (Ground Asparagus), *Lonicera japonica* (Japanese Honeysuckle) and *Ipomoea indica* (Morning Glory). These species are

all classified as Control Class 4 – locally controlled weeds. *Lantana camara* and *Asparagus aethiopicus* are also listed as a Weed of National Significance.

3.3 Fauna

3.3.1 Fauna Habitat

The vegetation within the Study Area provides some potential, albeit sub-optimal habitat for fauna. Habitat is not of high faunal value due to its location in an urban area, and the largely cleared nature of the Study Area. Some habitat potential for tree hollow-dependent fauna is present in the form of small and medium hollows in trees surrounding the perimeter of the Study Area. Although there are many exotic flora species within the Study Area, these can provide potential foraging resources for nectivorous mammals and birds that may use the Study Area from time to time as part of a larger foraging range. Areas of the Study Area with dense exotic species such as *Lantana camara*, and *Ipomoea indic*a (Morning Glory), also provide some nesting habitat for small birds, and the Common Ringtail Possum (*Pseudocheirus peregrinus*). A Ringtail Possum drey was recorded in the northern corner of the site.

No bird nests were sighted during surveys, but fallen logs and rocks are present which may provide microhabitat for reptiles. The existing residential building does not provide suitable roosting habitat for microchiropteran (small insectivorous) bat species as the structure does not provide entry points to potential cavities for roosting.

The drainage line in the northern part of the Study Area provides potential habitat for common frog species such as the Common Eastern Froglet (*Crinia signifera*).

Coordinate System: MGA Zone 56 (GDA 94)

Legend

- Study Area
- VMP Area
- Dry Creek Bed
- Proposed Pathway Adjoining VMP Area

Vegetation Community

- Coastal Enriched Sandstone Dry Forest (exotic understorey)
- Exotic Dominated Grassland
- Planted/Exotic

Grid North

Image Source:
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I:\...\16062\Figures\RP3\20170201\Figure 3.1. Vegetation Communities_Study Area

Figure 3.1. Vegetation Communities within the Study Area

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Chapter 4

Vegetation Management

As discussed in **Chapter 3**, the Study Area has been significantly altered from its pre-European state. Under this VMP, the VMP Area will be revegetated with native, endemic plant species naturally comprising occurrences of CESDF. A dry creek bed is to be installed within the VMP Area to upgrade an existing drainage line and revegetated with suitable locally native species. Works within the VMP Area should commence following completion of construction activities within the Study Area, including the installation of the dry creek bed within the VMP Area.

It is expected that the intensive actions detailed in the VMP will be undertaken over a five year period, with general weed maintenance to prevent re-establishment of exotic species undertaken in perpetuity.

4.1 Management of the VMP Area

The VMP Area contains a remnant and degraded occurrence of CESDF.

i. *Objective*

- Retain and protect the existing CESDF remnant vegetation in the VMP Area;
- Control exotic weed species; and
- Revegetate areas with a diverse array of native canopy, understorey, shrub and ground layer species.

ii. *Actions*

Initial actions within the VMP Area, following installation of the dry creek bed, will be the clearing of all exotic shrubs and groundcover. The first priority is weed management, namely the removal of all exotic shrubs, particularly *Lantana camara* (Lantana), *Senna pendula*, *Ligustrum lucidum* (Large-leaved Privet), *Ligustrum sinense* (Small-leaved Privet), and *Solanum mauritianum* (Wild Tobacco Bush) which are the dominant species. All of the existing native canopy and shrub species will be retained. After the clearance of all exotic shrubs and groundcover has taken place, characteristic CESDF species will be planted, and locally native species that tolerate damp conditions will be planted within the Dry Creek Bed.

4.2 Timing of Actions

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

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

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

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

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Chapter 5

Vegetation Clearing Protocols

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

5.1 Hygiene Protocols

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

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

Recommended disinfectant products include:

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

5.2 Marking Limits of Vegetation Clearing

5.2.1 Protection of Vegetation during Construction Phase

Vegetation clearing will take place within the Study Area and VMP Area, so appropriate measures need to be undertaken to protect adjacent vegetation, particularly during installation of the dry creek bed. Prior to clearing being undertaken, the boundaries of the VMP Area, and the extent of clearing within the VMP Area will need to be delineated. Clearing limits can be marked with high visibility tape, fencing, or other appropriate boundary markers. To avoid unnecessary damage to vegetation or inadvertent habitat removal, disturbance is to be restricted to the delineated area. No stockpiling of equipment, soils, or machinery will occur beyond delineated boundaries within areas of vegetation to be retained.

In any area in which construction machinery is to be used with the potential to damage surrounding vegetation to be retained, temporary construction fencing will be installed to delineate vegetation to be retained. This includes vegetation to be retained within the VMP Area and within the Study Area. Temporary fencing should be of a metal construction fence at least 2 m high so it physically protects vegetation as well as visually delineates vegetation to be retained. This fencing is to remain in place until all works have been finished in adjoining areas. No vehicles or machinery will be permitted to enter areas of vegetation to be retained. Tree Protection Fencing should be installed in the approximate locations indicated in **Figure 5.1**.

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

Sediment control measures will also be required to be installed to prevent run-off carrying soil, weed propagules, and pollutants into adjacent vegetated areas. Sediment fencing should be installed approximately as indicated in **Figure 5.1** to protect the VMP Area. Additional sediment fencing is also likely to be required to prevent offsite soil runoff.

5.3 Weed Management

As vegetation clearance will occur within the Study Area and VMP Area, secondary risks including erosion and spread of weed propagules have the potential to take place if appropriate mitigation measures are not implemented. Sediment fencing should be installed along the boundary of the VMP Area, and downslope of any activities involving earthworks to prevent the spread of weeds from the Study Area.

The amount of bare soil exposed at any one time should be minimised.

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

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

5.4 Pre-clearance Surveys

Prior to the commencement of any vegetation clearing required for development, a pre-clearance survey needs to be undertaken by a certified ecological consultant. During the survey native fauna and habitat that have the potential to be disturbed during clearing will be identified, and habitat marked out with flagging tape or spray paint. No hollow-bearing trees are proposed to be removed; however vegetation to be removed should be rechecked prior to clearing for hollows.

5.5 Fauna Relocation and Clearing Protocols

5.5.1 All Fauna

On the day of any clearing of any recorded fauna habitat, a licensed fauna ecologist will capture and/or remove fauna that have the potential to be disturbed as a result of clearing activities. These fauna will be relocated into pre-determined habitat identified for fauna release. All fauna handling will be carried out by licensed wildlife carers and/or ecologists.

The fauna ecologist will be present while clearing to rescue animals injured during the clearance operation. Any fauna found will be captured and relocated to nearby remnant vegetation and released after nightfall to minimise the risk of predation by diurnal predators. Any animals that are inadvertently injured will be taken to the nearest veterinary clinic for treatment, or if the animal is unlikely to survive, it will be humanely euthanized.

A fauna ecologist should be present during any earth works during installation of the dry creek bed within the VMP Area. As this is a currently existing drainage line, amphibian species are likely to be present which will need to be relocated.

5.6 Erosion Control

During construction works adequate erosion control measures, such as silt fencing, are to be used to prevent movement of exotic weed seed, and urban, nutrient-enriched soils during rain events. This will prevent nutrient enrichment, and exotic weed dispersal, within on-site revegetation areas, and potentially within local offsite bushland areas.

5.7 Disposal of Cleared Vegetation

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

Coordinate System: MGA Zone 56 (GDA 94)

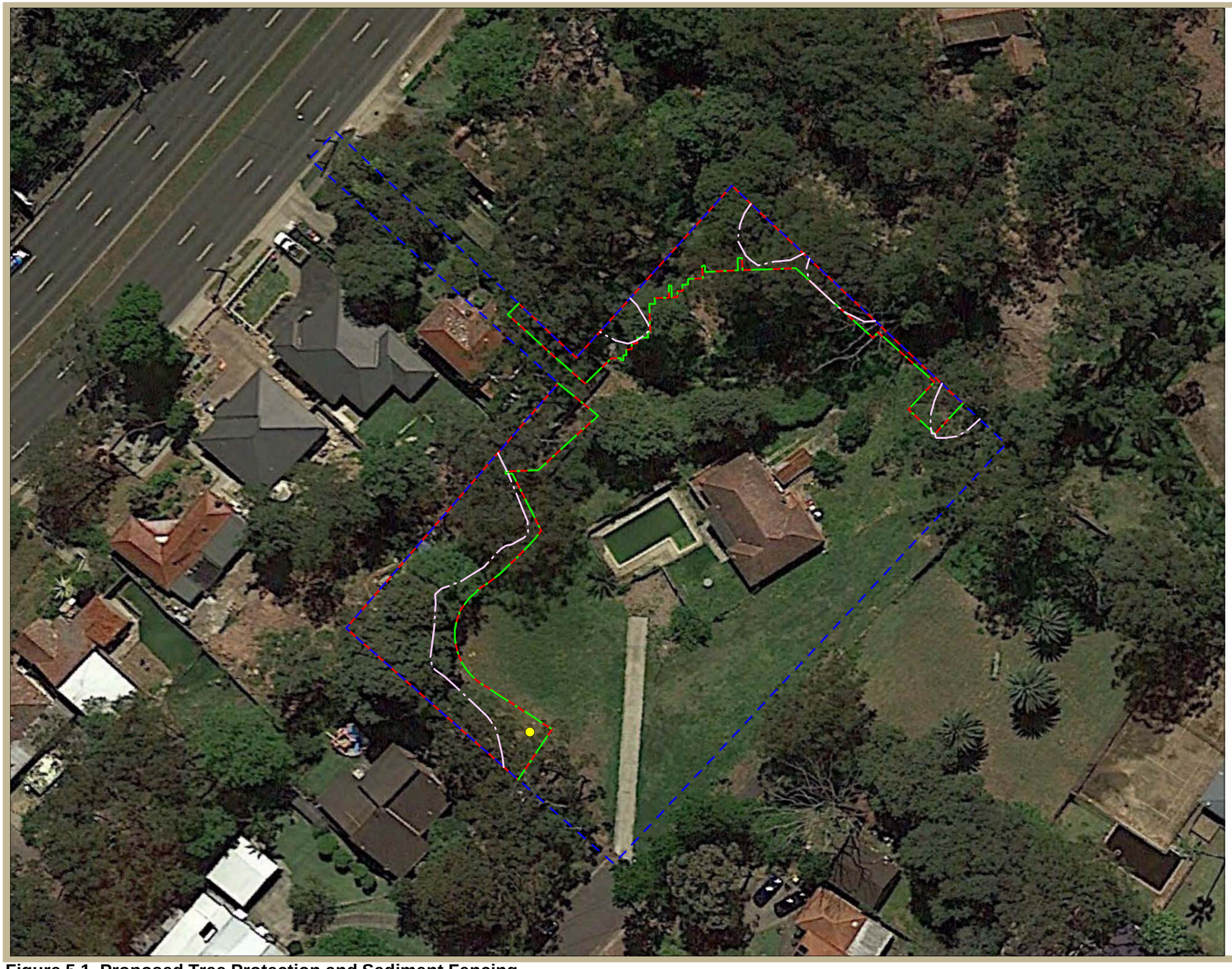

Figure 5.1. Proposed Tree Protection and Sediment Fencing

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Chapter 6

Weed Management Plan

6.1 Species Lists

Weeds identified by Cumberland Ecology as occurring within and adjacent to the Study Area make up the weed species lists used for the basis of this Weed Management Plan (refer to **Appendix A**). A list of control methods for specific weeds recorded is provided in **Appendix C**.

6.1.1 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. Under the NW Act, 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.

6.1.2 Weeds Recorded in the Study Area

Noxious weeds listed in the Ku-ring-gai Council LGA and Weeds of National Significance (WONS) recorded in and adjacent to the Study Area are listed in **Table 6.1** below.

Table 6.1 Noxious weeds and WONS recorded in the Study Area

Species Name	Common Name	Category	Legal Requirements
Acetosa sagittata	Turkey Rhubarb	Control 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
Ailanthus altissima	Tree of Heaven	Control 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
Asparagus aethiopicus	Ground Asparagus	Control Class 4/ WONS	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
Celtis sinensis	Japanese Hackberry	Control 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
Cinnamomum camphora	Camphor Laurel	Control 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
Ipomoea indica	Morning Glory	Control 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
Lantana camara	Lantana	Control	The growth of the plant must be managed in a

Table 6.1 Noxious weeds and WONS recorded in the Study Area

Species Name	Common Name	Category	Legal Requirements
		Class 4/ WONS	manner that continuously inhibits the ability of the plant to spread
Ligustrum lucidum	Broad-leaf Privet	Control Class 4	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread
Ligustrum sinense	Small-leaved Privet	Control Class 4	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread
Lonicera japonica	Japanese Honeysuckle	Control 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
Ricinus communis	Castor Oil Plant	Control Class 4	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread

6.1.3 Best Management Practice

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

- The main principles of the Bradley Method of bush regeneration, i.e. not over clearing (remove only targeted species), employment of minimal disturbance techniques to avoid soil and surrounding vegetation disturbance, and replacement of disturbed mulch/leaf-litter;
- Removal of fruiting/seeding parts of weeds carefully, 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; and
- Presence of native fauna or nesting/breeding sites.

6.1.4 Weed Control Methods

Bush regeneration weed control is to be implemented throughout the VMP Area. Regeneration 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) where practical. All weeds removed by hand will be handled according to best practice bush regeneration techniques to prevent subsequent seed set from the removed weeds.

The Bushland Regeneration Contractor (BRC) can manually clear small plants with mattocks, brushcutters or other suitable equipment. The root structures of exotic shrubs can be retained in order to stabilise the soil if required, and if the plant has been killed with herbicide to avoid re-sprouting.

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 speed 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.

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 C are effective, some will require a permit to be undertaken. The relevant permit number is PER9907. Herbicide permits need to be obtained from the Federal Government body, the Australian Pesticides and Veterinary Management Authority.

6.1.5 Types of Weed Control

i. Primary Weeding

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

- The selective spraying of weeds, with selective and non-selective herbicides;
- Cutting/scraping and painting deep rooted woody weeds and climbers with hand tools, chainsaws and brush cutters and painting cut stumps with herbicides containing Glyphosate or Picloram; and
- Selective hand removal of weeds and wicker wiping of tall herbaceous weeds in situations where damage to proximate, low growing native plants can be avoided.

Primary weeding in areas proposed for planting can be implemented just before plantings are undertaken.

ii. Maintenance Weeding

Follow-up weeding should be undertaken throughout the entire VMP Area in areas that have received past primary weeding treatments in the following months, to treat any regrowth of weeds.

Follow-up weeding involves the selective removal or treatment of weeds, whilst allowing regenerating or planted native plants to increase in size, abundance and percentage cover. All weeds should be targeted during the follow-up weeding phase. The follow-up bushland regeneration works are likely to be required at least every month until weeds are at negligible levels. Site visits may be more frequent if it is determined necessary.

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

Follow-up weeding should be implemented for a recommended period of five continuous years, after primary weeding and erosion control and revegetation works have been completed. Alternatively, the minimum maintenance period must be two years after completion of works or until the time that there is a minimum 80% survival rate of all species planted.

After the five-year follow-up and maintenance period has been completed, a review should be conducted to determine further on-site maintenance requirements.

6.2 Weed Management in the VMP Area

Weed control methods for all weeds recorded as occurring within the VMP Area are provided in **Appendix C**.

The directions under the following headings should be undertaken sequentially during site preparation.

i. Sediment Fencing

The VMP Area would inevitably result in runoff of surface soil after initial weed management works. Temporary silt sediment fencing will need to be installed to prevent soil runoff, especially after heavy rainfall events into adjacent vegetation, including CESDF within the Study Area. Fencing should remain during the construction of the multi-residential development in the Study Area to help prevent weed and soil run off.

ii. Noxious Weeds

The first priority for weed treatment in regeneration areas will be targeting mature individuals of the noxious weed species recorded on the site. These species are perennial and take several years to reach reproductive maturity so are easily controlled providing juveniles are continuously eradicated before reaching maturity.

It is recommended that all noxious woody exotic shrubs and midstorey be cut at the base with a chainsaw, brush cutters or other suitable equipment. Immediately after cutting, the base of the stump should be sprayed with Glyphosate. A marker dye should be used in the herbicide solution to ensure areas are not missed. This and other methods to be used to treat exotic species are outlined in detail in **Appendix C**. Knapsack sprayers with a spray cone to direct the spray towards the ground should be used to prevent herbicide drift into adjacent vegetated areas.

iii. Initial Weed Treatment

Following control of mature individuals of the main noxious weed species, primary weeding should be undertaken throughout the regeneration areas. The aims of primary weeding will be:

- Eliminating any woody weed species; and
- Targeting and eliminating any large, dominant infestations of exotic herbs and grasses. Prior to chemical treatment any seed on mature exotic plants should be bagged to prevent seed fall and addition to the exotic soil seed bank of propagules.

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

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

iv. Laying of Weed Suppression Materials

Several days after the second application of herbicide across the bushland reconstruction areas, weed suppression materials can be installed in areas of the VMP Area. 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 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 in the matting if used, to allow it to be placed around remnant native plant individuals occurring on the site. Holes would also need to be cut to plant tube stock.

Jute matting, or any other form of weed suppressing layer (possibly mulch owing to the relatively small area of the VMP Area) across the ground will inhibit regrowth of weeds, it will also inhibit regrowth of native plants from seed. For this reason, weed suppression matting

should only be used initially to establish the revegetation site while intensive 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 7**.

If native trees removed from the site are to be mulched to be reused in the VMP Area, mulch needs to be cured for three months prior to using. A proposed location for storing of mulch while curing on the periphery of the VMP Area is shown in **Figure 5.1**. The ground layer in this area is dominated by exotic lawn grasses. Exotic trees are not to be used for mulch within the Study Area. Any mulch to be utilised within the VMP Area should comply to the Australian Standard AS 4454-2012 (Composts, soil conditioners and mulches).

v. Ongoing Weed Maintenance

Weed suppression methods such as jute matting will suppress mass regrowth of weeds in reconstruction areas initially, but not entirely prevent regrowth of weeds. The most cost and time effective method of controlling weed regrowth in a revegetation area or weedy bushland area is by spraying a non-selective glyphosate herbicide. A list of effective methods for control of weeds on site is found in **Appendix C**.

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

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 VMP Area should sweep from one end to the other. During this sweep regrowth individuals of harder to manage weeds that require other techniques such as sawing, digging, drilling etc. should be targeted.

2. A member of the team should then sweep the entire area, spraying all regrowth weeds between native plantings 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 weeds as possible are controlled so individuals are not able to achieve maturity and set seed between site visits. Some weed species such as *Bidens pilosa* (Cobbler's Pegs) 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 6.1**) should be prioritised for control. Individual plants of these species on site should not be allowed to achieve a reproductive stage in their life cycles.

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

vi. Long Term Weed Maintenance

Following the completion of the 5 year maintenance period of the VMP, site visits will be quarterly with weeding undertaken as above, in perpetuity.

6.3 Permanent Delineation of VMP Area

As outlined in the Landscape Planting Plan (**Appendix D**) for the Study Area, the interface between the VMP Area and other areas of the site will be permanently delineated with a steel edge that is 150 mm in height. This will prevent lawn grasses and prostrate garden plantings easily spreading into the VMP Area.

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Chapter 7

Revegetation Plan

7.1 Objectives

This chapter provides details of retention and restoration directions specific to CESDF, which has been identified within the Study Area.

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

- Control threats affecting the health of regenerating native vegetation and inhibiting the future regeneration potential of these plant communities;
- Increase species diversity and percentage cover of native vegetation plant species; and
- Use measurable indicators to monitor regeneration responses and to assist in prioritizing bushland regeneration works during the proposed works program.

7.2 Recommended Revegetation techniques

Appropriate plant species for CESDF within the VMP Area are provided in **Appendix B**, and are to be used for selection for re-vegetation of the entire VMP Area.

Plantings will be sourced from local provenance stock. These may come from seed collections or cuttings taken from within existing remnant vegetation in the locality and from additional sources where required or practical.

7.2.1 Species Selection and Planting Densities

i. Species Selection

One of the consent conditions for the VMP specifies that the number of each species of plant to be used for each revegetation area is to be specified. This is to prevent overuse in revegetation of any particular species resulting in monocultures following revegetation. As some nursery stock of local provenance for particular species may not be available at the time of planting a number of alternative species of similar form are proposed in **Table B.1** for the VMP Area, and **Table B.2** for the Dry Creek Bed area. At least one of the species for each choice will be planted at the numbers specified in the table, and all species if stock are

available. In the case where none of the species for a choice are available from the alternatives another species should be chosen from the same stratum.

Species outlined for planting in **Appendix B** for the VMP Area consist of species known to locally occur in CESDF. Species outlined for planting in the Dry Creek Bed area in **Appendix B** are species that occur naturally within a 10km radius of the Study Area (OEH 2017) and naturally occur within creek lines and damp areas with sandstone soils.

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

Trees and small tree species are to be planted as per the instruction of the Landscape Planting Plan and Landscape Planting Schedule prepared by Site Image Landscape Architects (**Appendix D).** Locations of tree and small tree plantings have been selected with regard to proposed buildings within the site and existing canopy, and restoration of natural density. Species to be planted are consistent with the CESDF community.

ii. Planting Densities

The recommended revegetation planting specifications for CESDF shrubs and ground layer plants within The VMP Area are as follows:

- Shrubs @ 5 unit / 20 m^2
- Groundcovers @ 5 units / 1 m^2 planted in clumps/thickets.

The above planting density should be followed in areas in which a stratum is deficient in coverage of native plants, and to be adjusted accordingly based on the presence of remnant native coverage.

The dry creek bed will be planted out with groundcovers only at 5 units / 1 m^2.

Trees and small trees are to be planted as per the Planting Plan and Planting schedule for the site included in **Appendix D**.

7.2.2 Plant Supply

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 obtained from within the Ku-ring-gai LGA, and not more than 10 kilometres from the Study Area. These collected seeds or propagules should be propagated in a local commercial or community nursery.

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 to allow for later planting.

7.2.3 *Re-vegetation Objectives to Maximise Fauna Utilisation*

The following objectives should be followed to maximise fauna utilisation of the site:

- Increase trees and groundcovers favoured by birds and 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.

7.3 Site Preparation

Site preparation activities for the VMP Area should include preliminary weed control as detailed within **Chapter 6**.

Recommended strategies include:

- Initial and ongoing control of weeds and competing grasses using bushland regeneration techniques and conventional best practice chemical and physical strategies;
- Stabilising soils within areas (if required) using square jute fibre mats, or a similar sturdy biodegradable material, in areas following initial weed control;
- Planting of trees, shrubs, and ground cover species; and
- Maintaining regeneration treatments (weeding, replacing dead plantings and repairing / replacing weed mat if need during the planting establishment period), as a part of an ongoing maintenance programme.

7.4 Maintenance of Revegetation Areas

After regeneration site preparation and 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 plantings if needed.

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.

Planting numbers and densities provided above incorporate 20% additional plantings to allow for plant loss. Any deceased plantings noted above the 20% threshold for planting loss during maintenance visits should be replaced by a planting of the same stratum during the following maintenance visit.

The native plant densities required for the VMP Area in perpetuity are at least:

- Trees and small trees as advised in Planting Plan and Planting Schedule;
- Shrubs @ 1 Unit / 5 m^2; and
- Ground covers @ 4 units per m^2.

The native plant densities required for the Dry Creek Bed Area in perpetuity are at least:

- Trees and small trees as advised in Planting Plan and Planting Schedule; and
- Ground covers @ 4 units per m^2

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Chapter 8

Monitoring and Reporting

It is recommended that a project manager/supervisor with the BRC be assigned to coordinate, supervise, and manage all works and correspondence with respect to the restoration of the CESDF. 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 such as monitoring results are reported (e.g.: plant losses/re-planting, weed control, irrigation). Regular monitoring and feedback from personnel will assist in the allocation of labour relative to available funds.

8.1 Monitoring Program

The following monitoring activities are to be conducted as part of the monthly site visits:

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

These notes are both to be reported in the annual monitoring report, and to be used to plan priorities for the next month's regeneration works.

Each six months a site inspection will be conducted to survey monitoring quadrats. Monitoring will be undertaken in three 5x5m quadrats within the VMP Area and one 1x5m quadrat within the Dry Creek Bed (**Figure 8.1**). In each monitoring quadrat notes will be made of the following:

- Percentage coverage of exotic species;
- Exotic species present; and
- Percentage survival of native plantings.

8.2 Reporting

A brief and concise report should be submitted every year for the life of the VMP. This report will be forwarded to Ku-ring-gai 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;
- 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 the VMP Area and a short comparison of the photographs to the previous years. The report should also recommend and prioritise areas where weed control should be targeted within the VMP Area.

A final report should be prepared at the end of the five year intensive management period of the VMP documenting the success of the works against performance criteria.

Coordinate System: MGA Zone 56 (GDA 94)

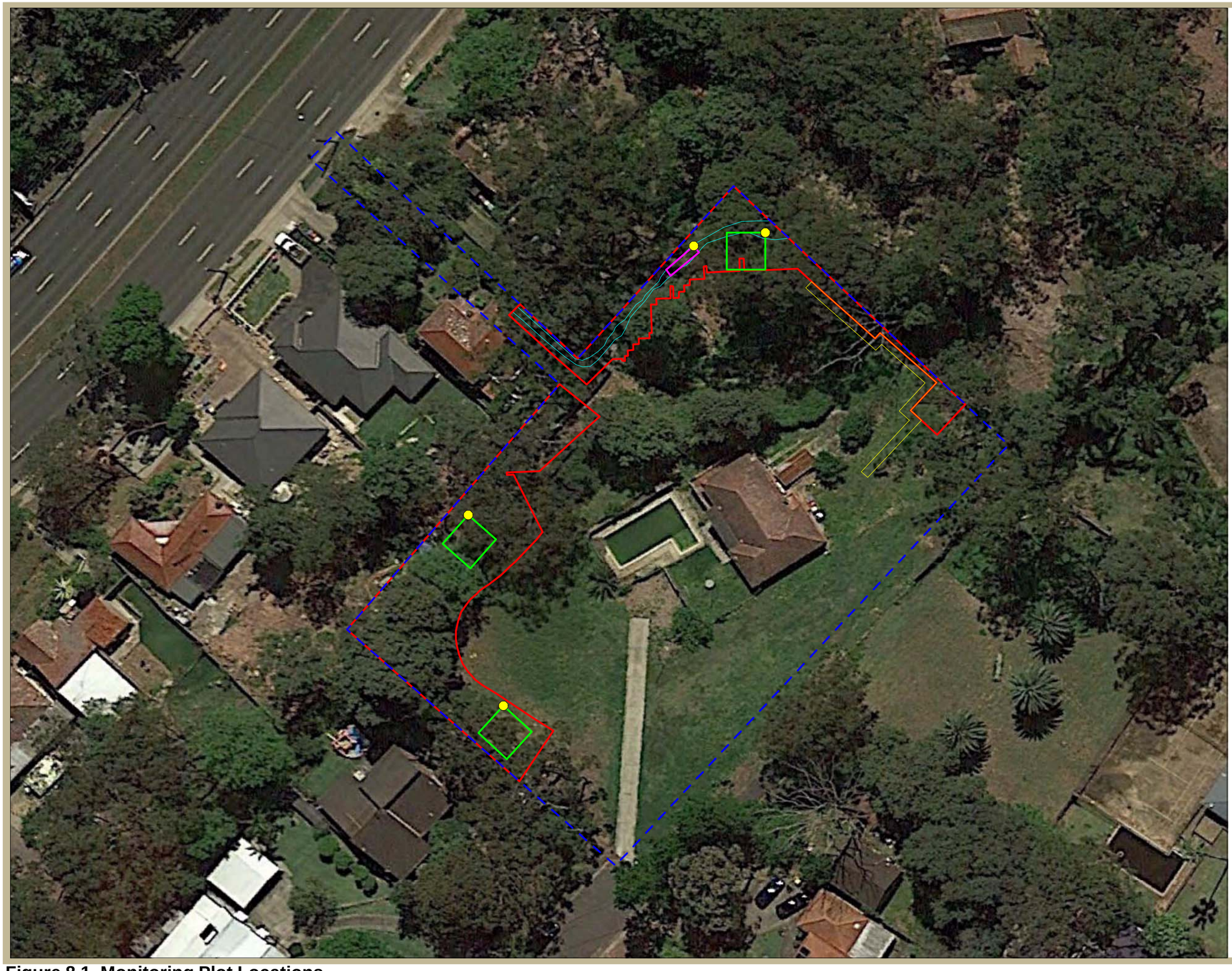

Figure 8.1. Monitoring Plot Locations

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Chapter 9

Timing and Responsibilities

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

- Phase 1 – Site Preparation;
- Phase 2 – Restoration Works Commence;
- Phase 3 – Maintenance;
- Phase 4 – Monitoring and Reporting; and
- Phase 5 – Long Term Maintenance.

Timing and responsibilities at each phase of management within the VMP Area are shown within **Table 9.1**. This table assigns each activity within each phase to those responsible.

Table 9.1 Timing and responsibilities

Management	Action	Responsibility	Performance Criteria	Timing
Phase 1: Site Preparation				
VMP Area and Dry Creek Bed	Seed Collection	Bush Regeneration Contractor	Seed collected from native plants and germinated.	Immediately
VMP Area and Dry Creek Bed	Delineation of clearing boundary	Property Owner or Construction Subcontractor	Marking using GPS and high visibility flagging tape and boundary markers.	Before construction works commence
VMP Area and Dry Creek Bed	Establish fixed monitoring points and quadrats	Bush Regeneration Contractor or Ecologist	Using star pickets (or something smaller like a small stake and pink flagging) and GPS establish a series of monitoring sites that can be used for	Prior to commencement of Bushland Restoration and Weeding works

Table 9.1 Timing and responsibilities

Management	Action	Responsibility	Performance Criteria	Timing
			photograph points ,comparison, measuring weeds and plant retention.	
VMP Area and Dry Creek Bed	Delineate and protect retained native vegetation	Property Owner or Construction Subcontractor	Temporary metal fencing and/or high visibility marking tape with clear signage. All native canopy within these areas will be retained.	Prior to construction works commencing
VMP Area	Vegetation Clearance	Construction Contractor	Planned vegetation clearing completed	During Construction Works
Phase 2: Restoration Works Commence				
VMP Area and Dry Creek Bed	Fixed Point Monitoring.	Bush Regeneration Contractor	Photographs of fixed monitoring sites before initial weeding.	Prior to commencement of restoration works for each area.
VMP Area and Dry Creek Bed	Carry out primary weeding.	Bush Regeneration Contractor	Main weed infestations and noxious weeds and WONS removed - Reproductively mature plants absent from site.	First two months of restoration works for each Zone.
VMP Area and Dry Creek Bed	Fixed Point Monitoring.	Bush Regeneration Contractor	Photographs of fixed monitoring sites prior to weeding each month.	Once a month for duration of VMP restoration works
VMP Area	Revegetation. Canopy small tree, and ground cover CESDF species will need to be planted throughout the VMP Area.	Bush Regeneration Contractor	Native plants have been planted (species from Table B.1 and Planting Schedule) in all vegetation strata.	Immediately upon establishment of reconstruction areas – within first month
Dry Creek Bed	Revegetation with trees and small trees as per	Regeneration Contractor	Native plants have been planted (species from Table B.2 and	Immediately upon establishment of

Table 9.1 Timing and responsibilities

Management	Action	Responsibility	Performance Criteria	Timing
	planting plan and groundcovers.		Planting Schedule) .	dry creek bed area – within first month
VMP Area and Dry Creek Bed	Fixed Point Monitoring.	Bush Regeneration Contractor	Photographs of fixed monitoring sites to compare the survival and retention of plantings.	Every 3 months after the first year of plantings. Every 6 months following the initial year for the life of the VMP.
VMP Area and Dry Creek Bed	Carry out secondary weeding.	Bush Regeneration Contractor	Weed regrowth following primary weeding removed. Work has commenced on control of annual weed species. Weed coverage should be less than 30% at end of first year, less than 20% at end of second year, less than 15% at end of third year, less than 10% at end of fourth year, less than 5% at end of fifth year.	Following primary weeding, site visits monthly.
Phase 3: Maintenance				
VMP Area and Dry Creek Bed	Carry out maintenance weeding throughout vegetation zones.	Bush Regeneration Contractor	Existing weed growth minimised or controlled. Regrowth following secondary weeding controlled. No new weed species or infestations.	Monthly for each zone for duration of 5 year maintenance period under VMP
VMP Area and Dry Creek Bed	Maintenance of plantings.	Bush Regeneration Contractor	Any dead plantings replaced. Plants watered when drought stressed. Additional plantings where required due to observed gaps in any	Monthly for each zone for duration of 5 year maintenance period under VMP

Table 9.1 Timing and responsibilities

Management	Action	Responsibility	Performance Criteria	Timing
			strata.	
Phase 4: Monitoring and reporting				
VMP Area and Dry Creek Bed	Biannual inspection of site.	Bushland Management or Ecologist	Site inspection completed as outlined in Chapter 8.	Every 6 months for 5 year maintenance period of VMP
VMP Area and Dry Creek Bed	Progress report preparation	Bushland Management or Ecologist	Annual Report prepared on progress of restoration works.	Once a year for the 5 year maintenance period of VMP
VMP Area and Dry Creek Bed	Final Inspection of Site.	Bushland Management or Ecologist	Final Inspection carried out at completion of VMP.	After 5 years of maintenance under VMP
VMP Area and Dry Creek Bed	Final Report.	Bushland Management or Ecologist	Final report detailing success of restoration or outlining further works needed.	After 5 years of maintenance under VMP
Phase 5: Long term maintenance				
VMP Area and Dry Creek Bed	Carry out maintenance weeding throughout vegetation zones.	Bush Regeneration Contractor	Existing weed growth minimised or controlled. Regrowth following secondary weeding controlled. No new weed species or infestations. Weed Coverage maintained at less than 5%.	Quarterly or as required for each zone in perpetuity.
VMP Area and Dry Creek Bed	Maintenance of plantings.	Bush Regeneration Contractor	Additional Plantings undertaken if greater than 20% loss of plantings. Plants watered when drought stressed. Additional plantings where required due to observed gaps in any strata.	Quarterly or as required for each area in perpetuity.

Chapter 10

VMP Costing Estimate

Cost estimates for implementation of the management directions under this VMP are included in **Table 10.1** on the next page. The estimates provided are approximate only and accurate costing must be obtained by putting the project to tender with Bushland Regeneration companies. Quotes will vary between companies. The following should be noted regarding the approximate nature of the cost estimates provided:

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

Table 10.1 VMP Costing Estimates

Task	Establishment Cost	Year 1	Year 2	Year 3	Year 4	Year 5	Yearly after year 5
Site Preparation (Initial Weeding)	$2,400.00						
779 m^2 Jute matting (if used)	$5,453.00						
4 Star Pickets (Photo reference points)	$71.52						
Hiko Planting Ground Cover (3964 plants)	$7,928.00						
Hiko Planting Shrub (192 plants)	$384.00						
Hiko Planting Canopy (35 plants)	$70.00						
Sediment Fence (~186 m)	$2,046.00						
Tree guards (if used)	$2,824.00						
Maintenance Costs (weeding, with associated monitoring and reporting)		$12,617.50	$12,617.50	$12,617.50	$ 9,527.50	$ 6,437.50	$ 1,609.38
Total Establishment Costs	$21,176.52	12 Visits	12 Visits	12 Visits	12 Visits	12 Visits	4 visits

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Appendix A

Flora Survey Data

Areas of the Study Area in which flora species were recorded as referred to in **Table A.1** below are:

- Random Meander Transect 1 – Old Driveway in west of Study Area;
- Random Meander Transect 2 – CESDF along western boundary;
- Random Meander Transect 3 – CESDF along southern boundary;
- Random Meander Transect 4 – CESDF in northern corner and along northern boundary; and
- Random Meander Transect 5 – Garden vegetation and exotic mown lawn across Study Area.

Table A.1 Flora species recorded for the Study Area

Family	Exotic	Scientific Name	Common Name	RMT1	RMT2	RMT3	RMT4	RMT 5
Canopy								
Myrtaceae		*Angophora costata*	Smooth-barked Apple			X	X	
Myrtaceae		*Eucalyptus pilularis*	Blackbutt			X	X	
Myrtaceae		*Syncarpia glomulifera*	Turpentine	X	X	X	X	
Proteaceae	NE	*Grevillea robusta*	Silky Oak			X		
Sub-canopy								
Bignoniaceae	*	*Jacaranda mimosifolia*	Jacaranda			X		

Table A.1 Flora species recorded for the Study Area

Family	Exotic	Scientific Name	Common Name	RMT1	RMT2	RMT3	RMT4	RMT 5
Moraceae	*	*Morus alba*	White Mulberry				X	
Myrtaceae		*Eucalyptus pilularis*	Blackbutt				X	
Oleaceae	*	*Ligustrum lucidum*	Large-leaved Privet				X	X
Shrubs								
Arecaceae	*	*Phoenix canariensis*	Phoenix Palm					X
Asteraceae		*Ozothamnus diosmifolius*	Rice Flower				X	
Bignoniaceae	*	*Jacaranda mimosifolia*	Jacaranda			X		
Didiereaceae	*	*Portulacaria afra*	Elephant Bush					X
Elaeocarpaceae		*Elaeocarpus reticulatus*	Blueberry Ash				X	
Ericaceae		*Leucopogon juniperinus*	Prickly-beard Heath				X	
Euphorbiaceae		*Homalanthus populifolius*	Bleeding Heart		X		X	
Euphorbiaceae	*	*Ricinus communis*	Castor Oil Plant				X	
Euphorbiaceae	*	*Euphorbia pulcherrima*	Poinsettia		X			X
Fabaceae (Caesalpinioideae)	*	*Senna pendula*					X	
Fabaceae (Mimosoideae)		*Acacia linifolia*	White Wattle				X	
Fabaceae (Mimosoideae)		*Acacia ulicifolia*	Prickly Moses				X	
Lauraceae	*	*Cinnamomum camphora*	Camphor Laurel				X	
Myrtaceae		*Angophora costata*	Smooth-barked Apple				X	
Myrtaceae	NE	*Leptospermum petersonii*	Lemon-scented Tea-tree				X	

Table A.1 Flora species recorded for the Study Area

Family	Exotic	Scientific Name	Common Name	RMT1	RMT2	RMT3	RMT4	RMT 5
Oleaceae	*	*Ligustrum lucidum*	Large-leaved Privet		X		X	
Oleaceae	*	*Ligustrum sinense*	Small-leaved Privet				X	
Phyllanthaceae		*Glochidion ferdinandi subsp. ferdinandi*	Cheese Tree				X	
Pittosporaceae		*Pittosporum undulatum*	Sweet Pittosporum				X	
Rutaceae		*Zieria smithii*	Sandfly Zieria				X	
Sapindaceae		*Dodonaea triquetra*	Hop Bush				X	
Simaroubaceae	*	*Ailanthus altissima*	Tree of Heaven				X	
Solanaceae	*	*Solanum mauritianum*	Wild Tobacco Bush			X	X	
Ulmaceae	*	*Celtis sinensis*	Japanese Hackberry		X		X	
Verbenaceae	*	*Lantana camara*	Lantana		X	X	X	
Herbs - Dicots								
Asteraceae	*	*Ageratina adenophora*	Crofton Weed	X			X	
Asteraceae	*	*Bidens pilosa*	Cobbler's Pegs	X	X	X	X	
Asteraceae	*	*Cirsium vulgare*	Spear Thistle	X			X	
Asteraceae	*	*Conyza bonariensis*	Flaxleaf Fleabane				X	
Asteraceae	*	*Conyza sumatrensis*	Tall Fleabane	X	X			
Asteraceae	*	*Crassocephalum crepidioides*	Thickhead			X	X	
Apiaceae	*	*Cyclospermum leptophyllum*	Slender Celery					
Asteraceae	*	*Erigeron karvinskianus*	Seaside Daisy				X	

Table A.1 Flora species recorded for the Study Area

Family	Exotic	Scientific Name	Common Name	RMT1	RMT2	RMT3	RMT4	RMT 5
Asteraceae	*	*Gnaphalium americanum*	Cudweed	X				
Asteraceae	*	*Hypochaeris radicata*	Catsear			X	X	
Asteraceae	*	*Sonchus oleraceus*	Milk Thistle	X				
Asteraceae	*	*Taraxacum officinale*	Dandelion	X	X			X
Caryophyllaceae	*	*Cerastium glomeratum*	Mouse-ear Chickweed	X				
Caryophyllaceae	*	*Paronychia brasiliana*	Chilean Whitlow Wort	X				
Caryophyllaceae	*	*Stellaria media*	Chickweed	X				
Chenopodiaceae	*	*Chenopodium album*	Fat Hen				X	
Convolvulaceae		*Dichondra repens*	Kidney Weed			X		
Euphorbiaceae	*	*Euphorbia peplus*	Petty Spurge	X				
Fabaceae (Faboideae)	*	*Trifolium repens*	White Clover	X			X	
Fabaceae (Faboideae)	*	*Vicia sativa*	Wall Fumitory				X	
Geraniaceae		*Geranium homeanum*	Native Geranium				X	
Lobeliaceae		*Pratia purpurascens*	Whiteroot				X	
Malvaceae	*	*Modiola caroliniana*	Red-flowered Mallow	X				
Malvaceae	*	*Sida rhombifolia*	Paddy's Lucerne	X		X	X	
Myrsinaceae	*	*Anagallis arvensis*	Scarlet Pimpernel	X				
Oxalidaceae	*	*Oxalis corniculata*		X				
Oxalidaceae	*	*Oxalis debilis*	Pink Woodsorrel			X		

Table A.1 Flora species recorded for the Study Area

Family	Exotic	Scientific Name	Common Name	RMT1	RMT2	RMT3	RMT4	RMT 5
Oxalidaceae		*Oxalis perennans*				X		
Phyllanthaceae	*	*Phyllanthus tenellus*	Hen and Chicken	X	X			
Plantaginaceae	*	*Cymbalaria muralis*	Ivy Toad-flax	X				
Plantaginaceae	*	*Plantago lanceolata*	Lamb's Tongues	X		X	X	X
Plantaginaceae	*	*Veronica persica*	Creeping Speedwell					X
Polygonaceae	*	*Acetosa sagittata*	Turkey Rhubarb	X	X	X	X	
Polygonaceae		*Rumex brownii*	Swamp Dock	X				
Polygonaceae	*	*Persicaria capitata*		X			X	
Rosaceae	*	*Potentilla indica*	Indian Strawberry		X			
Solanaceae	*	*Physalis peruviana*	Cape Gooseberry		X			
Solanaceae	*	*Solanum nigrum*	Blackberry Nightshade			X		
Urticaceae	*	*Parietaria judaica*	Pellitory				X	
Verbenaceae	*	*Verbena bonariensis*	Purpletop				X	
Violaceae	*	*Viola odorata*	Sweet Violet		X			
Herbs - Monocots (Grass)								
Poaceae	*	*Axonopus fissifolius*	Carpet Grass			X		
Poaceae	*	*Bromus catharticus*	Prairie Grass			X		
Poaceae	*	*Cynodon dactylon*	Couch			X		X
Poaceae	*	*Digitaria sanguinalis*	Summer Grass	X	X	X	X	

Table A.1 Flora species recorded for the Study Area

Family	Exotic	Scientific Name	Common Name	RMT1	RMT2	RMT3	RMT4	RMT 5
Poaceae		*Echinopogon ovatus*	Bushy Hedgehog Grass				X	
Poaceae	*	*Ehrharta erecta*	Panic Veldtgrass	X	X	X	X	
Poaceae	*	*Eleusine indica*	Crowsfoot Grass	X				
Poaceae		*Entolasia stricta*	Wiry Panic				X	
Poaceae		*Imperata cylindrica*	Blady Grass				X	
Poaceae		*Microlaena stipoides*	Weeping Grass	X	X	X	X	
Poaceae		*Oplismenus aemulus*	Basket Grass	X	X	X	X	
Poaceae	*	*Paspalum dilatatum*	Paspalum	X		X	X	X
Poaceae	*	*Pennisetum clandestinum*	Kikuyu	X		X		X
Poaceae		*Poa labillardierei*					X	
Poaceae	*	*Setaria palmifolia*	Palm Grass			X		
Poaceae	*	*Sporobolus africanus*	Parramatta Grass					X
Herbs - Monocots (other)								
Agavaceae	*	*Agave americana*	Century Plant		X			
Alliaceae	*	*Agapanthus praecox subsp. orientalis*	Lily of the Nile				X	
Alliaceae	*	*Nothoscordum gracile*	Onion Weed	X				
Alstroemeriaceae	*	*Alstroemeria pulchella*	Peruvian Lily	X			X	
Anthericaceae	*	*Chlorophytum comosum*	Spider Plant				X	
Araceae	*	*Monstera deliciosa*	Fruit Salad Plant			X	X	

Table A.1 Flora species recorded for the Study Area

Family	Exotic	Scientific Name	Common Name	RMT1	RMT2	RMT3	RMT4	RMT 5
Araceae	*	*Zantedeschia aethiopica*	Arum Lily			X		
Asparagaceae	*	*Asparagus aethiopicus*	Sprenger's Asparagus		X	X	X	
Asteliaceae	*	*Cordyline sp.*						X
Commelinaceae		*Commelina cyanea*	Scurvy Weed	X	X	X	X	
Commelinaceae	*	*Tradescantia fluminensis*	Wandering Trad	X	X	X	X	
Cyperaceae		*Carex inversa*					X	
Cyperaceae		*Cyperus gracilis*	Slender Flat-sedge	X	X	X		X
Iridaceae	*	*Freesia hybrid*	Freesia				X	
Juncaceae	*	*Juncus cognatus*					X	
Lomandraceae		*Lomandra longifolia*	Spiny Mat-rush				X	
Phormiaceae		*Dianella caerulea var. caerulea*	Blue Flax-lily				X	
Phormiaceae		*Dianella caerulea var. producta*	Blue Flax-lily				X	
Zingiberaceae	*	*Hedychium gardnerianum*	Ginger Lily			X	X	
Herbs - Ferns and allies								
Dennstaedtiaceae		*Hypolepis muelleri*	Harsh Ground Fern				X	
Dennstaedtiaceae		*Pteridium esculentum*	Bracken Fern		X	X	X	
Lomariopsidaceae	NE	*Nephrolepis cordifolia*	Fishbone Fern		X		X	
Herbs - Climbers								
Araliaceae	*	*Hedera helix*	English Ivy	X				

Table A.1 Flora species recorded for the Study Area

Family	Exotic	Scientific Name	Common Name	RMT1	RMT2	RMT3	RMT4	RMT 5
Caprifoliaceae	*	*Lonicera japonica*	Japanese Honeysuckle				X	
Convolvulaceae	*	*Ipomoea indica*	Morning Glory	X	X	X	X	
Fabaceae (Faboideae)		*Kennedia rubicunda*	Dusky Coral Pea				X	
Passifloraceae	*	*Passiflora caerulea*	Blue Passion Flower				X	
Pittosporaceae		*Billardiera scandens*	Hairy Apple Berry				X	

*NE = Non-endemic native, * = Exotic species, blank = Endemic native species.*

Appendix B

Species Planting List

Table B.1 VMP Area Planting Species and Planting Numbers

Species	Number
SHRUBS (Total 192)	
Acacia linifolia and/or *Acacia suaveolens* and/or *Acacia ulicifolia*	12
Acacia longifolia subsp. *longifolia* and/or *Acacia terminalis*	12
Micrantheum ericoides and/or *Bossiaea obcordata*	12
Banksia spinulosa and/or *Banksia oblongifolia*	12
Correa reflexa and/or *Epacris longiflora*	12
Myrsine variabilis and/or *Pittosporum revolutum* and/or *Breynia oblongifolia*	12
Grevillea buxifolia and/or *Grevillea linearifolia* and/or *Grevillea sericea*	12
Dodonaea triquetra and/or *Lasiopetalum ferrugineum* and/or *Hovea linearis*	12
Hakea dactyloides and/or *Isopogon anemonifolius*	12
Kunzea ambigua and/or *Leptospermum polygalifolium* and/or *Leptospermum trinervium*	12
Lambertia formosa and/or *Lomatia silaifolia* and/or *Persoonia levis*	12
Leucopogon juniperinus and/or *Leucopogon lanceolatus*	12
Notelaea longifolia and/or *Polyscias sambucifolia* and/or *Ozothamnus diosmifolius*	12
Platylobium formosum and/or *Pultenaea flexilis* and/or *Pultenaea daphnoides*	12
Platysace lanceolata and/or *Platysace linearifolia*	12
Zieria pilosa and/or *Zieria smithii*	12
GROUNDCOVERS (Total 3740)	
Actinotus helianthi and/or *Opercularia aspera*	155
Actinotus minor and/or *Pseuderanthemum variabile*	160
Adiantum aethiopicum and/or *Lindsaea linearis*	155
Anisopogon avenaceus and/or *Aristida vagans*	155
Brachycome angustifolia and/or *Pomax umbellata*	155
Caesia parviflora and/or *Pratia purpurascens*	155
Calochlaena dubia and/or *Pteridium esculentum*	155
Clematis glycinoides and/or *Tylophora barbata*	155
Cyathochaeta diandra and/or *Caustis flexuosa* and/or *Lepyrodia scariosa*	155
Dianella caerulea and/or *Dianella revoluta*	155
Echinopogon caespitosus and/or *Oplismenus imbecillis*	155
Entolasia marginata and/or *Entolasia stricta*	155
Eragrostis brownii and/or *Microlaena stipoides*	160
Eustrephus latifolius and/or *Hibbertia dentata*	155
Glycine clandestina and/or *Hardenbergia violacea* and/or *Kennedia rubicunda*	160

Table B.1 VMP Area Planting Species and Planting Numbers

Species	Number
Hibbertia aspera and/or *Gonocarpus teucrioides*	155
Hibbertia dentata and/or *Pandorea pandorana*	155
Lepidosperma gunnii and/or *Lepidosperma laterale* and/or *Lepidosperma urophorum*	155
Lomandra filiformis and/or *Lomandra glauca* and/or *Lomandra gracilis*	155
Lomandra longifolia and/or *Lomandra multiflora* subsp. *multiflora* and/or *Lomandra obliqua*	155
Panicum simile and/or *Paspalidium distans*	160
Patersonia glabrata and/or *Patersonia sericea*	155
Poa affinis and/or *Themeda triandra* and/or *Imperata cylindrica*	155
Xanthosia pilosa and/or *Xanthosia tridentata*	155

Table B.2 Dry Creek Bed Planting Species and Planting Numbers

Species	Number
Ferns (Total 24)	
Adiantum aethiopicum and/or *Adiantum formosum*	4
Pellaea falcata and/or *Blechnum cartilagineum* and/or *Doodia aspera*	4
Histiopteris incisa and/or *Hypolepis muelleri*	4
Calochlaena dubia and/or *Pteridium esculentum*	4
Gleichenia dicarpa and/or *Gleichenia microphylla*	4
Lindsaea linearis and/or *Lindsaea microphylla* and/or *Asplenium flabellifolium*	4
Herbs (Dicots) (Total 32)	
Alternanthera denticulata and/or *Persicaria decipiens* and/or *Persicaria lapathifolia*	8
Centella asiatica and/or *Hydrocotyle laxiflora* and/or *Hydrocotyle tripartita*	8
Geranium solanderi and/or *Plectranthus parviflorus*	8
Veronica plebeia and/or *Viola hederacea* and/or *Pratia purpurascens*	8
Climbers (Total 24)	
Eustrephus latifolius and/or *Geitonoplesium cymosum*	8
Sarcopetalum harveyanum and/or *Stephania japonica* and/or *Pandorea pandorana*	8
Tylophora barbata and/or *Hibbertia scandens*	8
Grasses (Total 68)	
Dichelachne micrantha and/or *Entolasia marginata*	18
Echinopogon caespitosus and/or *Echinopogon ovatus*	18

Table B.2 Dry Creek Bed Planting Species and Planting Numbers

Species	Number
Eragrostis brownii and/or *Microlaena stipoides*	18
Oplismenus aemulus and/or *Oplismenus imbecillis*	18
Herbs (Monocots) (Total 72)	
Gymnostachys anceps and/or *Lomandra longifolia* and/or *Carex appressa*	8
Commelina cyanea and/or *Dianella caerulea*	8
Lepyrodia scariosa and/or Schoenus apogon and/or Lepidosperma filiforme	8
Baumea nuda and/or Baumea rubiginosa	8
Cyperus difformis and/or Cyperus gracilis and/or Cyperus polystachyos	8
Gahnia clarkei and/or Gahnia sieberiana	8
Schoenus brevifolius or Schoenus melanostachys	8
Juncus continuus and/or Juncus subsecundus and/or Juncus usitatus	8
Juncus planifolius and/or Juncus prismatocarpus	8

Table B.3 CESDF species suitable for planting

SCIENTIFIC NAME	COMMON NAME
CANOPY TREES (> 20 M)	
Angophora costata	Smooth-barked Apple
Corymbia gummifera	Red Bloodwood
Eucalyptus pilularis	Blackbutt
Eucalyptus piperita	Sydney Peppermint
Eucalyptus resinifera subsp. *resinifera*	Red Mahogany
Syncarpia glomulifera	Turpentine
SUB-CANOPY / SMALL TREES & LARGE SHRUBS (> 6 M)	
Allocasuarina littoralis	Black Oak
Allocasuarina torulosa	Forest Oak
Banksia serrata	Old Man Banksia
Ceratopetalum gummiferum	NSW Christmas Bush
Elaeocarpus reticulatus	Blueberry Ash
Homalanthus populifolius	Bleeding Heart Tree
SHRUBS	
Acacia linifolia	White Wattle

Table B.3 CESDF species suitable for planting

SCIENTIFIC NAME	COMMON NAME
Acacia longifolia subsp. *longifolia*	Sydney Golden Wattle
Acacia suaveolens	Sunshine Wattle
Acacia terminalis	Sunshine Wattle
Acacia ulicifolia	Prickly Moses
Banksia spinulosa	Hairpin Banksia
Breynia oblongifolia	Breynia
Bossiaea obcordata	Spiny Bossiaea
Correa reflexa	Common Correa
Dodonaea triquetra	Native Hop Bush
Epacris longiflora	Native Fuschia
Grevillea buxifolia	Grey Spider Flower
Grevillea linearifolia	White Spider Flower
Grevillea sericea	Pink Spider Flower
Hakea dactyloides	Finger Hakea
Hovea linearis	
Isopogon anemonifolius	Broad-leaf Drumsticks
Kunzea ambigua	Tick Bush
Lambertia formosa	Mountain Devil
Lasiopetalum ferrugineum	
Leucopogon juniperinus	White Beard-heath
Leucopogon lanceolatus	
Leptospermum polygalifolium	Tantoon
Leptospermum trinervium	Flaky-barked Tea Tree
Lomatia silaifolia	Crinkle Bush
Micrantheum ericoides	
Myrsine variabilis	Mutton Wood
Notelaea longifolia	Native Olive
Ozothamnus diosmifolius	Dogwood
Pittosporum revolutum	Rough-fruited Pittosporum
Persoonia levis	Broad-leaf Geebung
Persoonia levis	Broad-leaf Geebung
Platylobium formosum	Handsome Flat Pea
Platysace lanceolata	Shrubby Platysace

Table B.3 CESDF species suitable for planting

SCIENTIFIC NAME	COMMON NAME
Platysace linearifolia	
Pultenaea daphnoides	Large-leaf Bush Pea
Pultenaea flexilis	Graceful Bush-pea
Polyscias sambucifolia	Elderberry Panax
Zieria pilosa	Hairy Zieria
Zieria smithii	Sandfly Zieria
GROUNDCOVERS	
Actinotus helianthi	Flannel Flower
Actinotus minor	Small Flannel Flower
Adiantum aethiopicum	Common Maidenhair
Anisopogon avenaceus	Oat Speargrass
Aristida vagans	Threeawn Grass
Brachycome angustifolia	Brachycome
Caesia parviflora	Pale Vanilla Lily
Calochlaena dubia	False Bracken Fern
Caustis flexuosa	Curly Wig
Clematis glycinoides	Old Man's Beard
Commelina cyanea	Scurvy Weed
Cyathochaeta diandra	
Dianella caerulea	Blue Flax Lily
Dianella revoluta	
Echinopogon caespitosus	Hedgehog Grass
Entolasia marginata	Bordered Panic Grass
Entolasia stricta	Wiry Panic
Eragrostis brownii	Brown's Lovegrass
Eustrephus latifolius	Wombat Berry
Glycine clandestina	
Gonocarpus teucrioides	Raspwort
Hardenbergia violacea	False Sarsaparilla
Hibbertia aspera	Rough Guinea Flower
Hibbertia dentata	Climbing Guinea Flower
Imperata cylindrica	Blady Grass
Kennedia rubicunda	Dusky Coral Pea

Table B.3 CESDF species suitable for planting

SCIENTIFIC NAME	COMMON NAME
Lepidosperma gunnii	
Lepidosperma laterale	
Lepidosperma urophorum	
Lepyrodia scariosa	
Lindsaea linearis	Screw Fern
Lomandra filiformis	Wattle Mat-rush
Lomandra glauca	Pale Mat-rush
Lomandra gracilis	
Lomandra longifolia	Spiny Mat-rush
Lomandra multiflora subsp. *multiflora*	Many-flowered Mat-rush
Lomandra obliqua	
Microlaena stipoides	Weeping Meadow Grass
Opercularia aspera	Coarse Stinkweed
Oplismenus aemulus	Basket Grass
Pandorea pandorana	Wonga Wonga Vine
Panicum simile	Two-colour Panic
Paspalidium distans	
Patersonia glabrata	Leafy Purple-flag
Patersonia sericea	Silky Purple-flag
Poa affinis	
Pomax umbellata	
Pratia purpurascens	Whiteroot
Pseuderanthemum variabile	Blue Pastel Flower
Pteridium esculentum	Bracken
Themeda triandra	Kangaroo Grass
Tylophora barbata	Tylophora
Xanthosia pilosa	Woolly Xanthosia
Xanthosia tridentata	Rock Xanthosia

Appendix C

Weed Control Methods

C.1 Weed Control Methods

Bush regeneration weed control will be implemented for Management Zones 1 and 2. Regeneration works should be approached using the strategies outlined below. A list of control methods for specific weed species recorded within the Study Area is provided in **Table C.1**.

C.1.1 Manual Weed Removal

Manual removal, or hand weeding, is an effective form of weed control where 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 weed spread from vegetative reproduction.

C.1.2 Use of Herbicides

All herbicides should be used according to recommendations on the herbicide label. Appropriate Personal Protective Equipment (PPE) should be worn and consideration given to time of day, likelihood of rainfall, wind direction and likely impact on native species as per guidelines on the label. Use of glyphosate will be appropriate for most species. Glyphosate is the preferred herbicide for use in environmentally sensitive areas as it is rapidly broken down by microbes in the soil so residue is short lived and will not affect remnant and planted native individuals in the long term following application. 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 two metres of drainage lines. 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 **Table B.1** 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.

Details of appropriate weed control techniques for specific weeds is provided below in **Table C.1**.

C.2 Weed Control Methods – Site Specific Weeds

Table C.1 Weed Control Methods

Family	*	Scientific Name	Common Name	Treatment Methods
Asteraceae		*Conyza bonariensis*	Flaxleaf Fleabane	Hand weed.
Asteraceae		*Cirsium vulgare*	Spear Thistle	Spray with Glyphosate 10mL/1L.
Asteraceae		*Crassocephalum crepidioides*	Thickhead	
Asteraceae		*Conyza sumatrensis*	Tall Fleabane	
Asteraceae		*Bidens pilosa*	Cobbler's Pegs	
Apiaceae		*Cyclospermum leptophyllum*	Slender Celery	
Asteraceae		*Erigeron karvinskianus*	Seaside Daisy	
Asteraceae		*Hypochaeris radicata*	Catsear	
Asteraceae		*Sonchus oleraceus*	Milk Thistle	
Asteraceae		*Taraxacum officinale*	Dandelion	
Caryophyllaceae		*Paronychia brasiliana*	Chilean Whitlow Wort	
Malvaceae		*Sida rhombifolia*	Paddy's Lucerne	
Poaceae		*Axonopus fissifolius*	Carpet Grass	
Poaceae		*Bromus catharticus*	Prairie Grass	
Poaceae		*Ehrharta erecta*	Panic Veldtgrass	Hand weed.
Poaceae		*Paspalum dilatatum*	Paspalum	Spray with Glyphosate 10mL/1L.
Poaceae		*Pennisetum clandestinum*	Kikuyu	

Table C.1 Weed Control Methods

Family	*	Scientific Name	Common Name	Treatment Methods
Poaceae		*Setaria palmifolia*	Palm Grass	
Poaceae		*Sporobolus africanus*	Parramatta Grass	
Fabaceae (Faboideae)		*Trifolium repens*	White Clover	Hand weed.
Fabaceae (Faboideae)		*Vicia sativa*	Wall Fumitory	Spray with Glyphosate 10mL/1L.
Malvaceae		*Modiola caroliniana*	Red-flowered Mallow	
Myrsinaceae		*Anagallis arvensis*	Scarlet Pimpernel	
Plantaginaceae		*Plantago lanceolata*	Lamb's Tongues	
Verbenaceae		*Verbena bonariensis*	Purpletop	
Asteraceae		*Gnaphalium americanum*	Cudweed	
Caryophyllaceae		*Cerastium glomeratum*	Mouse-ear Chickweed	
Caryophyllaceae		*Stellaria media*	Chickweed	
Chenopodiaceae		*Chenopodium album*	Fat Hen	
Euphorbiaceae		*Euphorbia peplus*	Petty Spurge	
Oxalidaceae		*Oxalis corniculata*		
Oxalidaceae		*Oxalis debilis*	Pink Woodsorrel	
Phyllanthaceae		*Phyllanthus tenellus*	Hen and Chicken	
Plantaginaceae		*Cymbalaria muralis*	Ivy Toad-flax	
Plantaginaceae		*Veronica persica*	Creeping Speedwell	Hand weed.
Polygonaceae		*Persicaria capitata*		Spray with Glyphosate 10mL/1L.

Table C.1 Weed Control Methods

Family	*	Scientific Name	Common Name	Treatment Methods
Rosaceae		*Potentilla indica*	Indian Strawberry	Hand weed. Spray with Glyphosate 10mL/1L.
Solanaceae		*Physalis peruviana*	Cape Gooseberry	
Solanaceae		*Solanum nigrum*	Blackberry Nightshade	
Urticaceae		*Parietaria judaica*	Pellitory	
Violaceae		*Viola odorata*	Sweet Violet	
Iridaceae		*Freesia hybrid*	Freesia	Plant is resistant to herbicide. Needs to be dug out with a mattock, or hand mattock, with care taken to remove all rhizomes, bulbs, and tubers (rhizomes, bulbs, and tubers should be bagged and removed from site).
Anthericaceae		*Chlorophytum comosum*	Spider Plant	
Alstroemeriaceae		*Alstroemeria pulchella*	Peruvian Lily	
Alliaceae		*Agapanthus praecox subsp. orientalis*	Lily of the Nile	
Araceae		*Monstera deliciosa*	Fruit Salad Plant	Hand dig with mattock. Cut stems as close to the ground as possible and immediately apply undiluted glyphosate.
Didiereaceae		*Portulacaria afra*	Elephant Bush	Hand weed or remove large individuals with tools such as mattock. Spray juveniles with glyphosate 10mL/1L. Cut large, firmly rooted individuals at the base with secateurs or hand saw and paint with undiluted glyphosate.
Euphorbiaceae		*Euphorbia pulcherrima*	Poinsettia	
Fabaceae (Caesalpinioideae)		*Senna pendula*		
Ulmaceae	*	*Celtis sinensis*	Japanese Hackberry	
Araceae		*Zantedeschia aethiopica*	Arum Lily	Slash tops: Leave on site to rot down - dig out tubers and remove from site.

Table C.1 Weed Control Methods

Family	*	Scientific Name	Common Name	Treatment Methods
				Cut and paint stump: 1g metsulfuron-methyl 600g/kg + 100ml glyphosate + 10ml penetrant /L water. Wipe with 1 g metsulfuron-methyl 600g/kg + 150 ml glyphosate + 10 ml penetrant /L water . Spray with 3g metsulfuron-methyl 600g/kg + 150ml glyphosate + 10ml penetrant /10L water.
Agavaceae		*Agave americana*	Century Plant	Cut plant at base and treat with undiluted glyphosphate – thick gloves and heavy clothing plus eye protection should be worn due to sharp and firm leaf points.
Alliaceae		*Nothoscordum gracile*	Onion Weed	Can be extremely difficult to control due to numerous bulbils sprouting from main bulb which break off underground and form new plants. The plant can be dug out carefully with hand tools; an effort must be made to carefully remove and bag all bulbils formed around the main bulb. Follow up hand weeding for many months is required to remove juvenile plants; control is

Table C.1 Weed Control Methods

Family	*	Scientific Name	Common Name	Treatment Methods
				easier if juvenile plants are carefully dug out, taking care to bag and remove bulbs, before bulbils have formed -Spray with 10mL/1L glyphosate every month; adult plants may take several months to die back. Repeat monthly to control sprouting juvenile plants. Wipe leaves of plants with undiluted glyphosate monthly, without missing juvenile sprouting plants. This can be nearly as time consuming as hand digging plants out Any flowering stem should be cut and bagged, along with any head with seed.
Araliaceae		*Hedera helix*	English Ivy	Hand weed, taking care to remove roots and not break stems Spray with a mixture of 100 mL glyphosate (450g/L) plus 1 g metsulfuron (600g/kg) plus 25 mL surfactant in 10 L water – retreat every 2 – 3 months.
Arecaceae		*Phoenix canariensis*	Phoenix Palm	Hand weed or remove large individuals with tools such as mattock. Remove large trees with small excavator.
Asparagaceae	*/ WONS	*Asparagus aethiopicus*	Sprenger's Asparagus	Any branches profuse with fruit should be cut

Table C.1 Weed Control Methods

Family	*	Scientific Name	Common Name	Treatment Methods
				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.
Asteliaceae		*Cordyline sp.*		
Asteraceae		*Ageratina adenophora*	Crofton Weed	Small areas of plants can be dug out with a mattock. Larger areas can be slashed (if accessible) so root structures can remain to conserve soil stability (as the weed is present within the creek itself and on the banks). Spray with glyphosate 10mL/1L

Table C.1 Weed Control Methods

Family	*	Scientific Name	Common Name	Treatment Methods
Bignoniaceae		*Jacaranda mimosifolia*	Jacaranda	Hand weed or remove large individuals with tools such as mattock. Spray juveniles with glyphosate 10mL/1L. Cut large, firmly rooted individuals at the base with secateurs or hand saw and paint with undiluted glyphosate.
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 Trad	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

Table C.1 Weed Control Methods

Family	*	Scientific Name	Common Name	Treatment Methods
				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 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

Table C.1 Weed Control Methods

Family	*	Scientific Name	Common Name	Treatment Methods
				glyphosate 10mL/1L (will require follow up spraying of regrowth over several months as plant will resprout).
Euphorbiaceae	*	*Ricinus communis*	Castor Oil Plant	Hand weed. Spray with glyphosate 10mL/1L. Cut large, firmly rooted individuals at the base with secateurs and paint with undiluted glyphosate.
Juncaceae		*Juncus cognatus*		
Lauraceae	*	*Cinnamomum camphora*	Camphor Laurel	Hand weed seedlings. Spray seedlings and coppice regrowth with glyphosate 10mL/1L. Drill and inject stem with, or chisel and apply, undiluted glyphosate. Cut and paint stump with undiluted glyphosate (will require an arborist for large trees). Cut and grind stump of large trees (arborist).
Lomariopsidaceae		*Nephrolepis cordifolia*	Fishbone Fern	Hand pull plants taking care to bag and remove all rhizomes and tubers; will need to be repeated over subsequent months to remove regrowth from missed tubers and rhizomes.

Table C.1 Weed Control Methods

Family	*	Scientific Name	Common Name	Treatment Methods
				Large infestations can be sprayed monthly with glyphosate 10mL/1L; fronds will take several months to die back completely, after which repeated monthly spraying is needed to control regrowth juvenile fronds from tubers and rhizomes until infestation is controlled completely.
Moraceae		*Morus alba*	White Mulberry	Cut and paint stump with undiluted glyphosate Spray regrowth monthly with glyphosate 10mL/1L water
Myrtaceae		*Leptospermum petersonii*	Lemon-scented Tea-tree	Cut and paint stump with undiluted glyphosate Spray regrowth monthly with glyphosate 10mL/1L water
Oleaceae	*	*Ligustrum lucidum and Ligustrum sinense*	Large-leaved Privet and Small-leaved Privet	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

Table C.1 Weed Control Methods

Family	*	Scientific Name	Common Name	Treatment Methods
				(or chainsaw) and treat stump with undiluted glyphosate. Spray juveniles and regrowth foliage of cut and painted individuals with glyphosate 10mL/1L.
Passifloraceae		*Passiflora caerulea*	Blue Passion Flower	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.
Poaceae		*Cynodon dactylon*	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 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

Table C.1 Weed Control Methods

Family	*	Scientific Name	Common Name	Treatment Methods
				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 method 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		*Eleusine indica*	Crowsfoot 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
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

Table C.1 Weed Control Methods

Family	*	Scientific Name	Common Name	Treatment Methods
				- 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
Proteaceae		*Grevillea robusta*	Silky Oak	Hand weed seedlings. Spray seedlings and coppice regrowth with glyphosate 10mL/1L. Drill and inject stem with, or chisel and apply, undiluted glyphosate. Cut and paint stump with undiluted glyphosate (will require an arborist for large trees). Cut and grind stump of large trees (arborist).
Simaroubaceae	*	*Ailanthus altissima*	Tree of Heaven	Cut at base and paint with undiluted glyphosate
Solanaceae		*Solanum mauritianum*	Wild Tobacco Bush	When working with this plant additional PPE

Table C.1 Weed Control Methods

Family	*	Scientific Name	Common Name	Treatment Methods
				may be required as some individuals are sensitive to the shedding fine hairs of the species - Recommended PPE is a dustmask, long sleeve shirt and pants + gloves - Hand weed juveniles - Mature individuals can be cut and painted with glyphosate 10mL/1L"
Verbenaceae	*/ WONS	*Lantana camara*	Lantana	Spray juveniles with glyphosate 10mL/1L. Cut mature individuals with saw or loppers near ground level and paint stump with undiluted glyphosate or Triclopyr (600g/L formulation)/diesel at 4L/60L concentration (as per Garlon 600 label).
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 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

Table C.1 Weed Control Methods

Family	*	Scientific Name	Common Name	Treatment Methods
				6g $^{-1}$ L (winter) or 1g $^{-1}$ L (summer)

Appendix D

Landscaping Plans

Gordon Seniors Living
24-28 Holford Crescent, Gordon
Landscape Development Application

DRAWING SCHEDULE

DWG NO.	*DRAWING TITLE*	*SCALE*
000	Landscape Coversheet	
001	Landscape Tree Masterplan	1:200
002	Colour Landscape Masterplan	1:200
003	Colour Landscape Detail Plan	1:50
101	Landscape Planting Plan	1:150
501	Landscape Details	As Shown
502	Landscape Details & Specification	As Shown

Holford Crescent, Gordon
Plant Schedule

Symbol	Botanic Name	Common Name	Mature Size (h x w) (m)	Pot size	Spacings	Quantity
Large Trees						
Ac	*Angophora costata*	Smooth Barked Apple	20 x 8	100L	As Shown	4
Cg	*Corymbia gummifera*	Red Bloodwood	30 x 10	100L	As Shown	2
Ep	*Eucalyptus pilularis*	Blackbutt	30 x 10	100L	As Shown	3
Epi	*Eucalyptus pipertia*	Sydney Peppermint	30 x 10	100L	As Shown	2
Ere	*Eucalyptus resinfera subsp. Resinfera*	Red Mahogany	25 x 8	100L	As Shown	2
Sg	*Syncarpia gloumulifera*	Turpentine	30 x 15	100L	As Shown	2
Small Trees						
Al	*Allocasuarina littoralis*	Black Oak	10 x 4	75L	As Shown	3
At	*Allocasuarina torulosa*	Forest Oak	10 x 7	75L	As Shown	3
Bs	*Banksia serrata*	Old Man Banksia	10 x 5	75L	As Shown	5
Cgu	*Ceratopetalum gummiferum*	NSW Christmas Bush	4 x 3	75L	As Shown	3
Er	*Elaeocarpus reticulatus*	Blueberry Ash	8 x 4	75L	As Shown	6
Shrubs / Accents						
De	*Doryanthes excelsa*	Gymea Lily	3.0 x 1.5	300mm	As Shown	81
Od	*Ozothamnus diosmifolius*	Rice Flower	2 x 2	300mm	As Shown	51
Pg	*Photinia galabra* 'Rubens'	Japanese Photinia	3 x 2	300mm	As Shown	57
Wf	*Westringia fruticosa*	Coastal Rosemary	1.5 x 1.5	300mm	As Shown	151
Groundcovers / Grasses						
DB	*Dianella caerulea* 'Breeze'	Blue Flax Lily	0.5 x 0.5	150mm	$5m^2$	269
Dre	*Dianella revoluta*	Flax Lily	1 x 1	150mm	$5m^2$	186
Dr	*Dichondra repens*	Kidney Grass	0.2 x spreading	150mm	$5m^2$	148
Hv	*Hardenbergia violacea*	Native Sarsaparilla	0.2 x spreading	150mm	$5m^2$	182
LEG	*Liriope muscari* 'Evergreen Giant'	Lily Turf	0.7 x 0.5	150mm	$5m^2$	345
Pp	*Pandorea pandorana*	Wonga-wonga Vine	0.2 x spreading	150mm	$5m^2$	81

NOT FOR CONSTRUCTION

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LEGEND

Issue	Revision Description	Drawn	Check	Date
E	Ecology Coordination	JM	NM	31.01.2017
D	Architectural Coordination	JM	NM	31.10.2016
C	Council Coordination	JM	NM	21.10.2016
B	For Approval	JM	NM	27.05.2016
A	For Review	JM	NM	06.05.2016

A1

SITE IMAGE
Landscape Architects
Level 1, 3-5 Baptist Street
Redfern NSW 2016
Australia
Tel: (61 2) 8332 5600
Fax: (61 2) 9698 2877
www.siteimage.com.au

Client:
Bin Xu

Project:
Gordon Seniors Living
24-28 Holford Crescent, Gordon

Drawing Name:
Coversheet

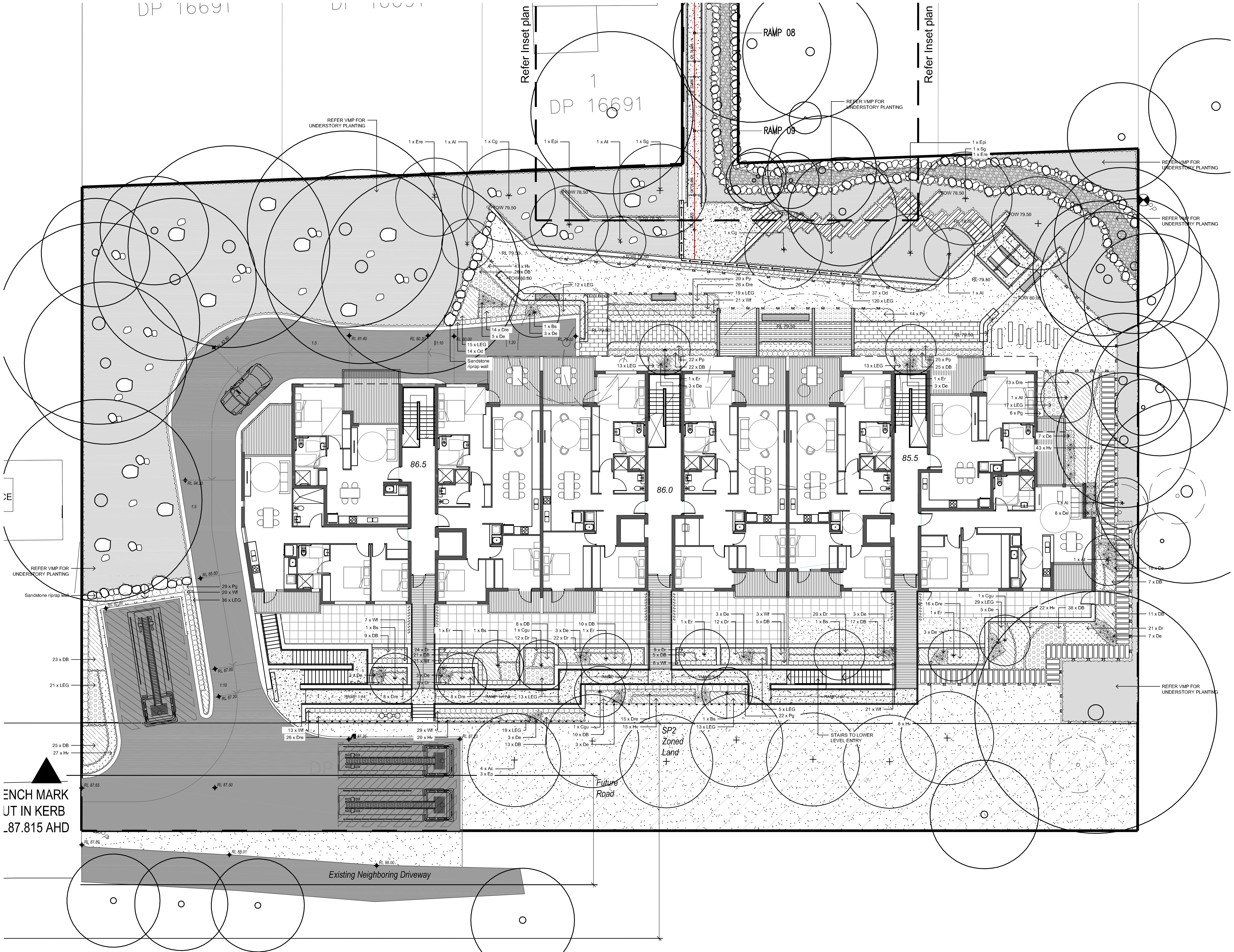
DEVELOPMENT APPLICATION

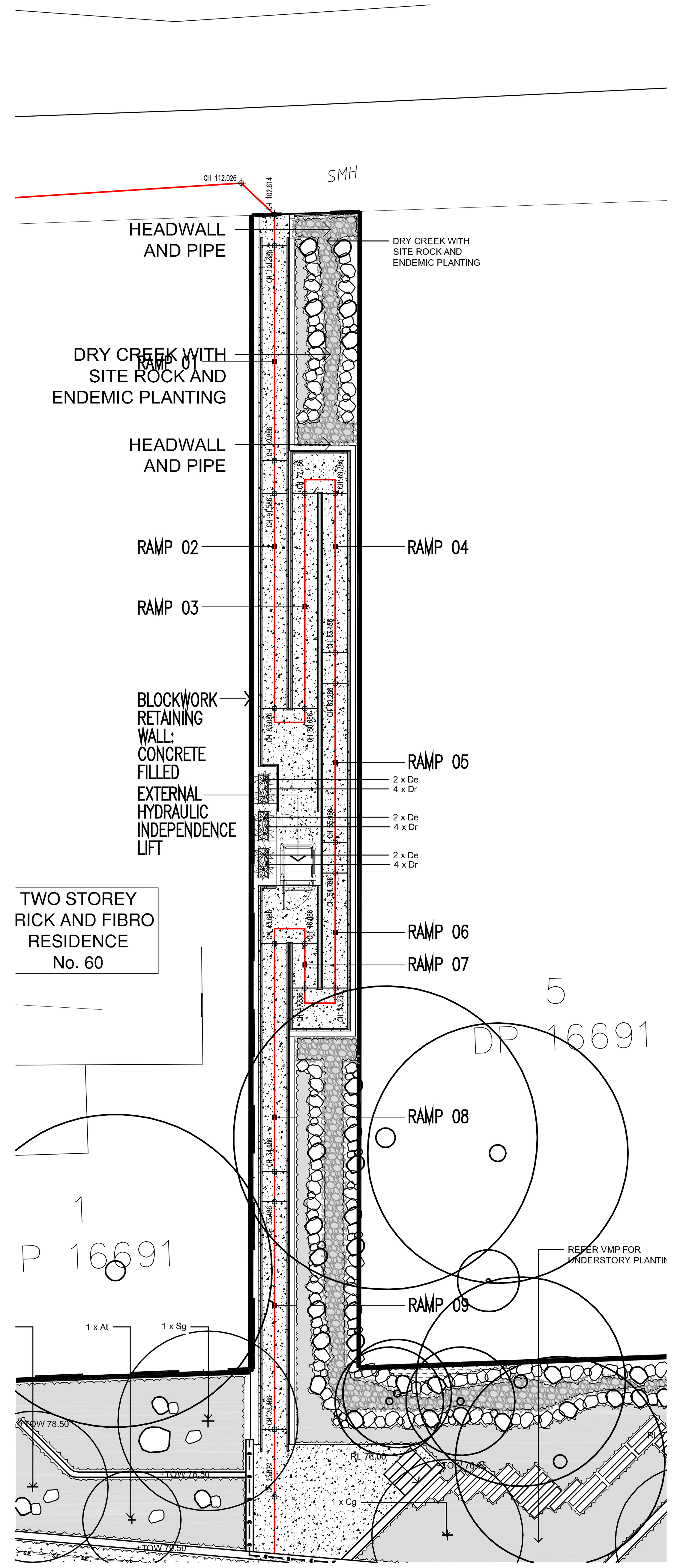
Scale:

Job Number: SS16-3284

Drawing Number: 000

Issue: E





INSET PLAN - SCALE 1:150

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A1

LEGEND

- Site Boundary
- Existing Tree Retained (Refer Arborist Report)
- Existing Tree Removed (Refer Arborist Report)
- Proposed Tree (Refer Detail & Plant Schedule)
- Shrubs & Accents (Refer Detail & Plant Schedule)
- Groundcover/ Grasses (Refer Detail & Plant Schedule)
- VMP Understory Planting (Refer Vegetation Managment Plan)
- Turf (Refer Detail)
- Steel Edge 150mm High (Refer Detail)
- TB Timber Bench / CB Concrete Bench
- Paving Type 1
- Decomposed Granite Gravel
- Concrete Paving
- Timber Sleepers/ stepping stones

SITE IMAGE
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Client: Bin Xu

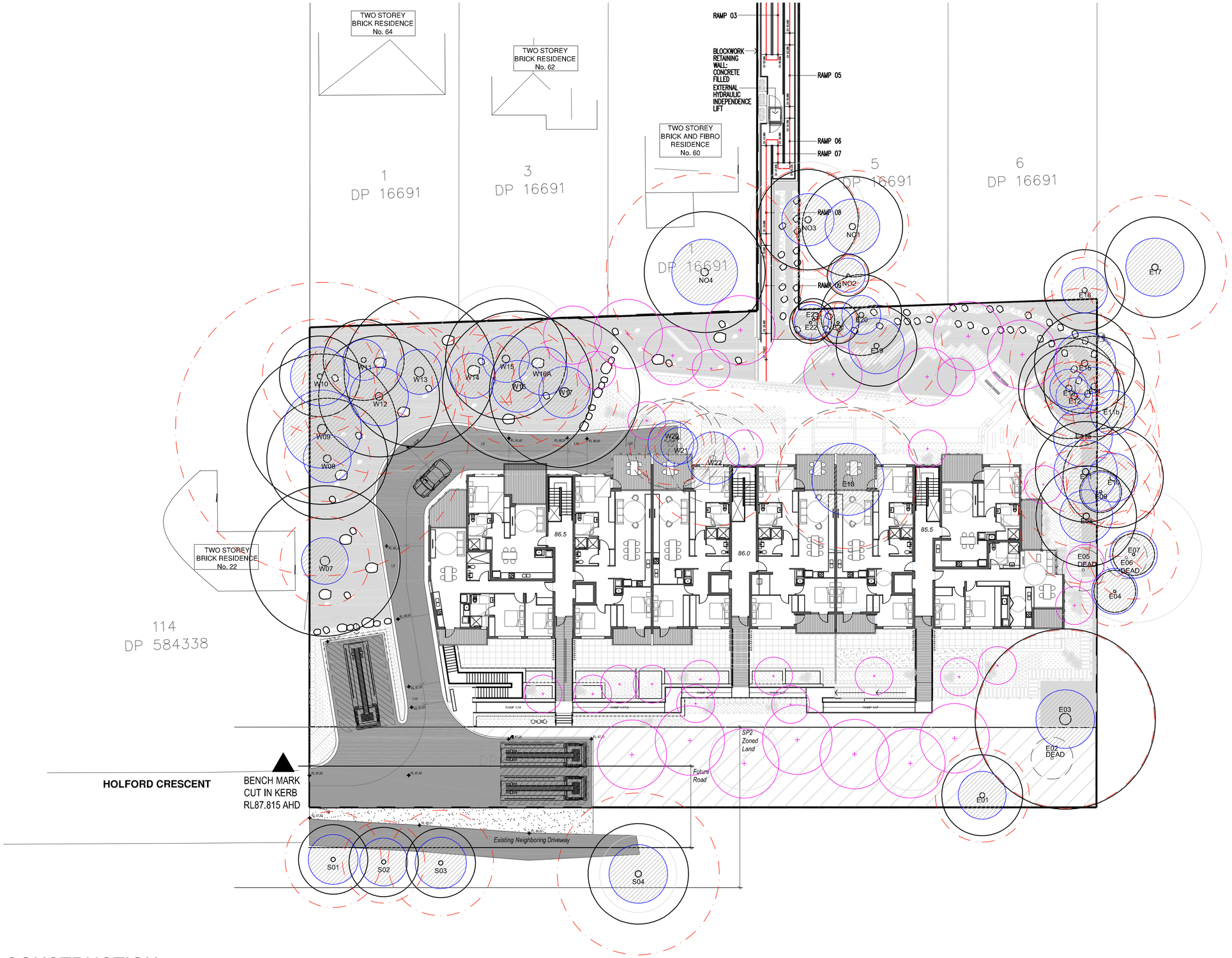
Project: Gordon Seniors Living
24-28 Holford Crescent, Gordon

Drawing Name: Landscape Planting Plan

DEVELOPMENT APPLICATION

Scale: 1:150 @ A1 (0 1 2 3 4 5m)

Job Number: SS16-3284
Drawing Number: 101
Issue: E



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LEGEND

- Site Boundary
- Existing Tree Removed (Refer Arborist Report)
- Existing Tree Retained (Refer Arborist Report)
- Structural Root Zone - SRZ (Refer Arborist Report)
- Tree Protection Zone - TPZ (Refer Arborist Report)
- Proposed Tree (Refer Detail & Plant Schedule)

SITE IMAGE
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Australia
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Client:
Bin Xu

Project:
Gordon Seniors Living
24-28 Holford Crescent, Gordon

Drawing Name:
Tree Masterplan

DEVELOPMENT APPLICATION

Scale: 1:200 @ A1
0 1 2 4 6 10m
Job Number: SS16-3284
Drawing Number: 001
Issue: E

A1

Swathes of endemic planting on embankment. Potential for site rock to be placed at random to stabilise the landscape embankment

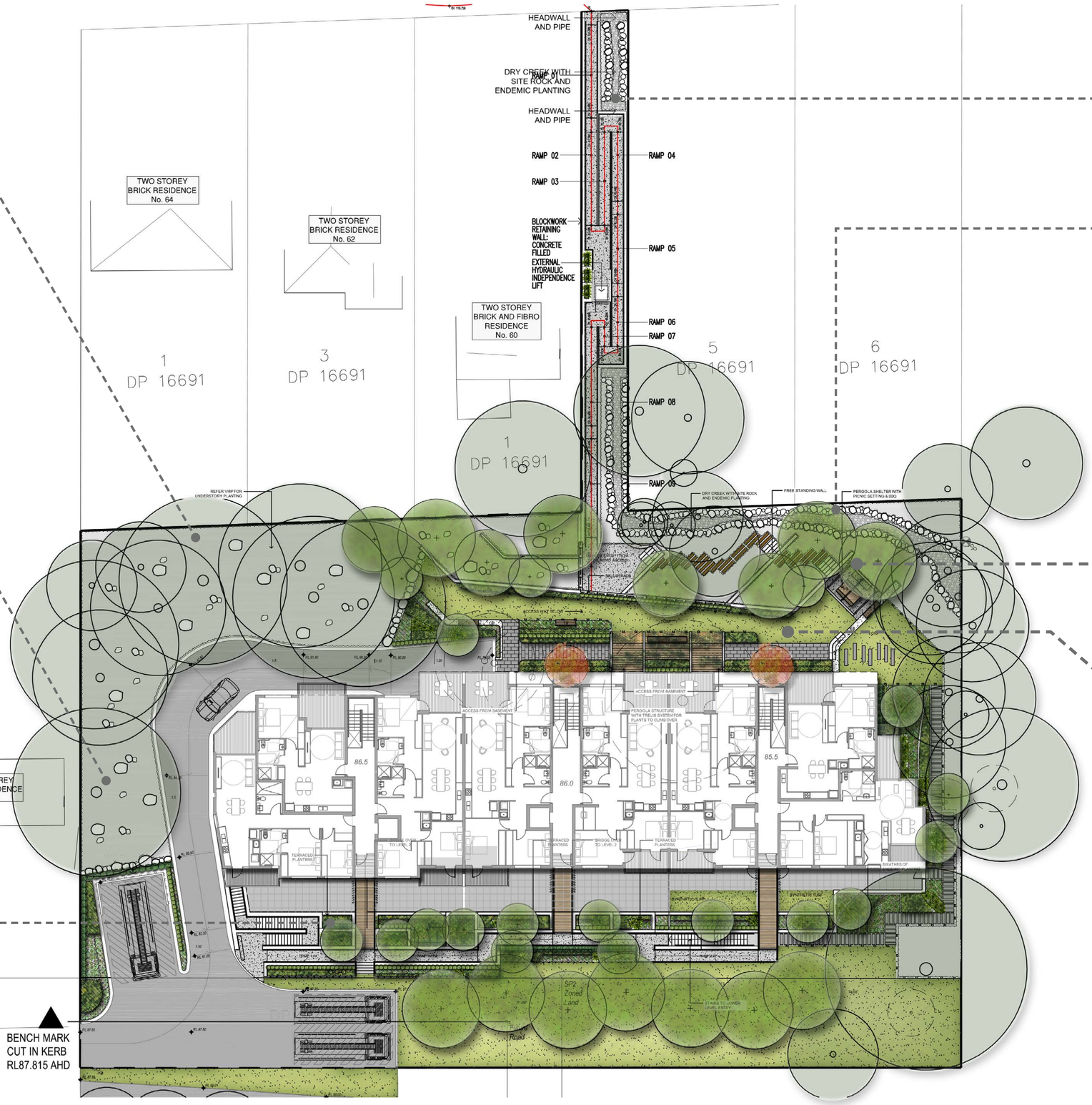
Existing trees to be retained and understory replanted with endemic planting

Terraced landscape to frontage with turf and street trees along Holford Crescent

Dry creek bed with endemic planting

Seating, pergola and BBQs provided in communal open space

Open lawn and seating at a level grade. Privacy planting provided to residents units



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- Paving Type 1
- Decomposed Granite Gravel
- Concrete Paving

SITE IMAGE
Landscape Architects
Level 1, 3-5 Baptist Street
Redfern NSW 2016
Australia
Tel: (61 2) 8332 5600
Fax: (61 2) 9698 2877
www.siteimage.com.au

Client: Bin Xu

Project: Gordon Seniors Living
24-28 Holford Crescent, Gordon

Drawing Name: Colour Landscape Masterplan

DEVELOPMENT APPLICATION

Scale: 1:200 @ A1 (0 1 2 4 6 10m)
Job Number: SS16-3284
Drawing Number: 002
Issue: E

A1

RAMP 09

DRY CREEK WITH SITE ROCK
AND ENDEMIC PLANTING

FREE STANDING WALL

PERGOLA SHELTER WITH
PICNIC SETTING & BBQ

CH 26.486

+TOW 78.50

+TOW 78.50

RL 76.00

LOWER ENTRY FROM
RYDE ROAD ACCESS

BALUSTRADE

+TOW 76.95

RL 77.55

+TOW 78.50

RL 78.50

+TOW 79.50

+TOW 79.50

BBQ

PS

CB

RL 79.50

TB

ACCESS WAY BELOW

TB

CB

+TOW 80.00

TB

TURF

+TOW 80.00

CB

TURF

RL 79.50

RL 79.55

TB

RL 79.50

RL 79.50

ACCESS FROM BASEMENT

ACCESS FROM BASEMENT

PERGOLA STRUCTURE
WITH TRELIS SYSTEM FOR
PLANTS TO CLIMB OVER

NOT FOR CONSTRUCTION

The contractor shall check and verify all work on site (including work by others) before commencing the landscape installation. Any discrepancies are to be reported to the Project Manager or Landscape Architect prior to commencing work. Do not scale this drawing. Any required dimensions not shown shall be referred to the Landscape Architect for confirmation.

Issue	Revision Description	Drawn	Check	Date
D	Ecology Coordination	JM	NM	31.01.2017
C	Council Coordination	JM	NM	21.10.2016
B	For Approval	JM	NM	27.05.2016
A	For Review	JM	NM	06.05.2016

LEGEND

- Site Boundary
- Existing Tree Retained (Refer Arborist Report)
- Existing Tree Removed (Refer Arborist Report)
- Proposed Tree (Refer Detail & Plant Schedule)
- Shrubs & Accents (Refer Detail & Plant Schedule)
- Groundcover/ Grasses (Refer Detail & Plant Schedule)
- VMP Understory Planting (Refer Vegetation Managment Plan)
- Turf (Refer Detail)
- Steel Edge 150mm High (Refer Detail)
- Timber Bench / Concrete Bench
- Paving Type 1
- Decomposed Granite Gravel
- Concrete Paving
- Timber Sleepers/ stepping stones

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Bin Xu

Project:
Gordon Seniors Living
24-28 Holford Crescent, Gordon

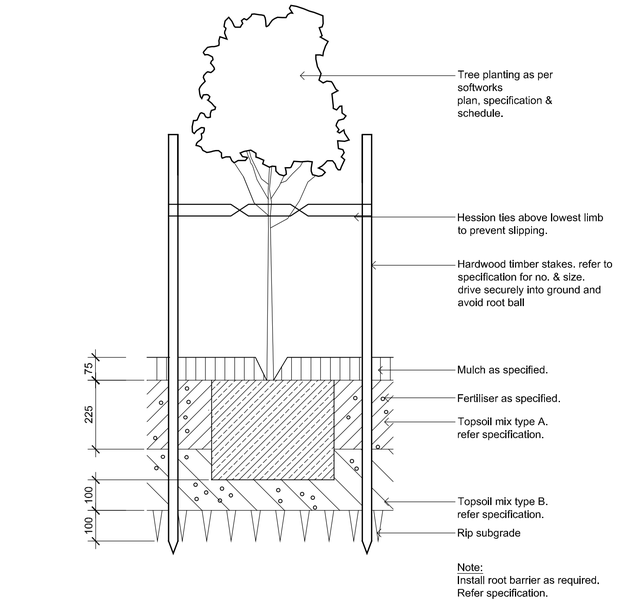
Drawing Name:
Colour Landscape Detail Plan

DEVELOPMENT APPLICATION

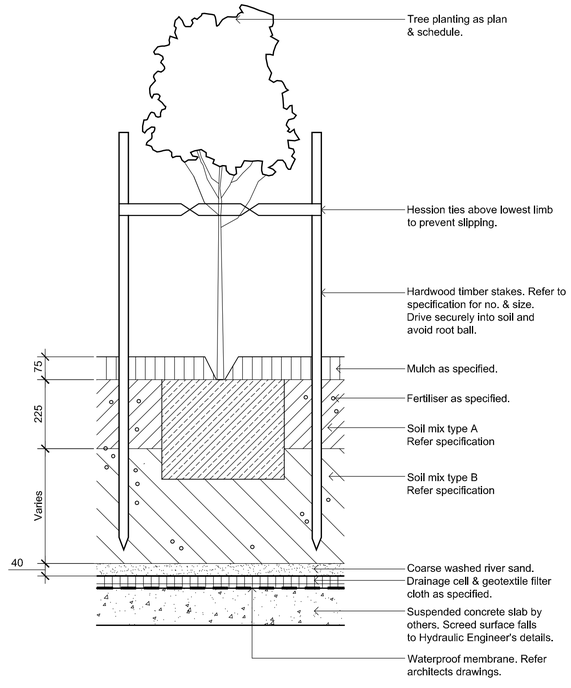
Scale: 1:50 @ A1
0 0.5 1 1.5 2 2.5m

Job Number: SS16-3284
Drawing Number: 003
Issue: D

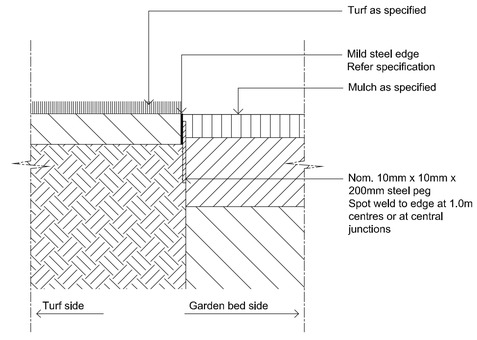
A1



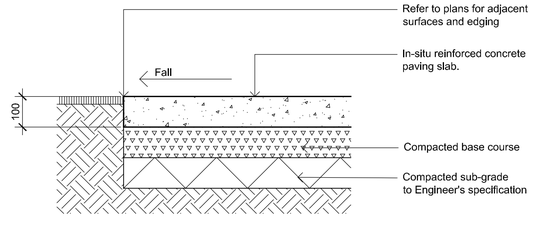
25L-75L TREE PLANTING ON GRADE
SCALE 1:10



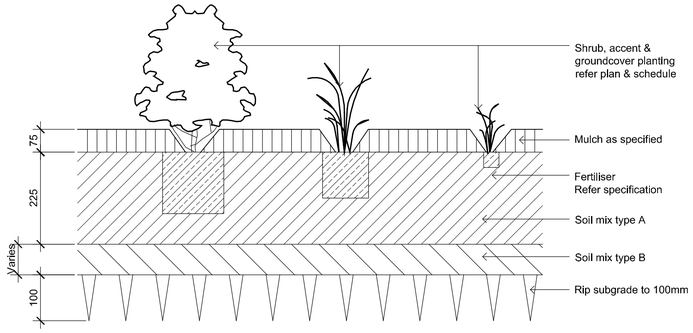
25L-75L TREE PLANTING ON SLAB
SCALE 1:10



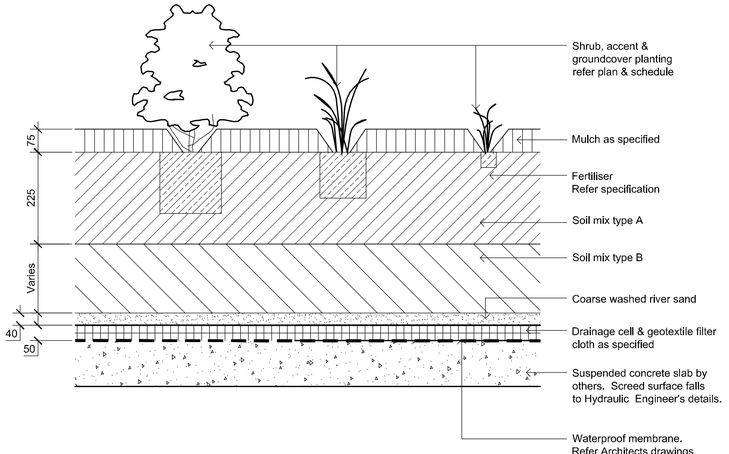
TYPICAL MILD STEEL EDGE
SCALE 1:10



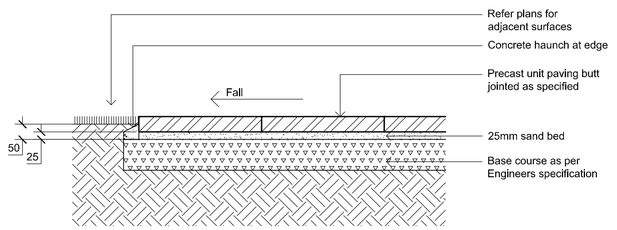
INSITU CONCRETE PAVING
SCALE 1:10



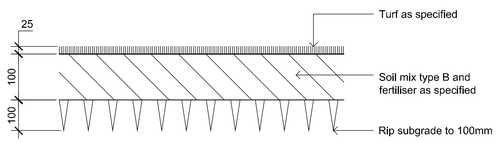
SHRUB, ACCENT & GROUNDCOVER PLANTING ON GRADE
SCALE 1:10



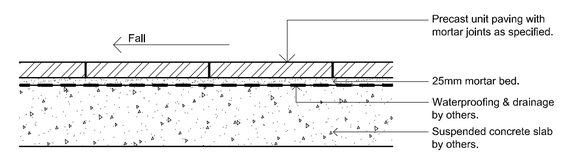
SHRUB, ACCENT & GROUNDCOVER PLANTING ON SLAB
SCALE 1:10



PRECAST UNIT PAVERS ON GRADE



TURF ON EVEN GRADE
SCALE 1:10



PRECAST UNIT PAVERS ON SUSPENDED SLAB
SCALE 1:10

NOT FOR CONSTRUCTION

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LEGEND

Issue	Revision Description	Drawn	Check	Date
C	Council Coordination	JM	NM	21.10.2016
B	For Approval	JM	NM	27.05.2016
A	For Review	JM	NM	06.05.2016

A1

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Project:
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24-28 Holford Crescent, Gordon

Drawing Name:
Landscape Details

DEVELOPMENT APPLICATION

Scale: As Shown

Job Number: SS16-3284

Drawing Number: 501

Issue: C

Appendix E

Timing of VMP Works - Gantt Chart

Timing of VMP Works