CSR Building Products
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Senior Project Manager – Urban Development
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ELA Ref: 17WOL – 8944

29 August 2019

Dear Claire,

Managed Ecological Zone (MEZ) Planting Plan: 327 – 335 Burley Road, Horsley Park

This Planting Plan has been prepared by Eco Logical Australia Pty Ltd (ELA) on behalf of CSR Building Products, care of Calibre Group for the Managed Ecological Zone (MEZ) adjoining the conservation area at 327 – 335 Burley Road, Horsley Park.

Background

A Vegetation Management Plan (VMP) was prepared by Travers Bushfire and Ecology in June 2016, for the area of identified Cumberland Plain Woodland (CPW) in the conservation lot and the adjoining Asset Protection Zone and Managed Ecological Zone. This Planting Plan is required to satisfy Condition 5d of the EPBC Approval (2016/7744), as identified below:

d. prepare and implement a Planting Plan for the managed ecological zone (MEZ) adjoining the conservation area to achieve the quality metrics specified in the VMP, including but not limited to:

i. at least six native groundcover / grass plants characteristic of EPBC Act listed CPW per square metre within the MEZ.

The MEZ is to act as a vegetated buffer running along the western edge of the conservation area. The MEZ occupies the same area as the 25 m Asset Protection Zone. The MEZ and APZ will include batters between the conservation area and the development footprint. The Department of Environment and Energy has confirmed that the purpose of the APZ / MEZ is to act as a vegetated buffer (consistent with APZ requirements) and that any hardstand surfaces are not permissible. Revegetation of the APZ / MEZ will need to incorporate final batter designs.

All plantings within the MEZ are to be of Cumberland Plain Woodland species to achieve guidelines for the APZ's as specified in the VMP (Travers 2016) and as per NSW Rural Fire Service (RFS) guidelines.

The plan aims to achieve the quality metrics specified in the VMP (Travers 2016) for revegetation of Cumberland Plain Woodland (CPW) in the conservation area.

Methodology

Site preparation and revegetation

The batter encompassing the MEZ is understood to have a slope of no more than a 1:4. The batter will require a minimum of 150 mm of topsoil and is to be mulched to a minimum depth of 50mm, with clean eucalyptus mulch. The top soil is to be a loose friable consistency to ensure root penetration can occur.

Once top soiled and mulched, the MEZ is to be revegetated using tubestock at the density specified in the conditions of 6 / m². Revegetation works will be undertaken as per the methods specified in **Appendix C**, using CPW groundcover / grass species as per the planting list provided in **Appendix D**. Planting is to utilise a minimum of at least six species identified in **Appendix D**, with no species comprising more than 20% of the mix.

Direct seeding using CPW native grasses within an integrated mulch product such as ecoblanket®, is a viable alternative to revegetating with tubestock, providing that the final density of CPW grasses / groundcovers are achieved. As direct seeding is an emerging technique, initial success is not guaranteed, and several applications may be required to achieve required results. If direct seeding is to be undertaken, no separate mulch is to be laid down following top soiling.

Planting densities must be consistent with the VMP, which states:

- One canopy and one sub-canopy species planted at each planting location
- Two to three native shrub species planted at each planting location

The Travers (2016) VMP also specifies:

Trees are to be planted and maintained to ensure:

- 76 multi-species trees shall be established at 15% of total foliage cover to a maximum density planting of 1 tree every 25m (25m centres). This may include two tree species one canopy and one sub-canopy planted in the same location. If tree density falls below 1 tree every 30m then additional planting will be undertaken to achieve the density of 1 tree every 25m;

Shrubs are to be planted and maintained to ensure:

- Large gaps in shrubs are to be created – therefore multispecies clump planting of shrubs (2-3 plants) are to be planted at 25-30m centres;
- Shrubs shall not be located under trees – as above;
- 115 shrubs shall be planted to achieve 15% of total cover consisting of discontinuous small clump plantings to a density of 2-3 shrubs at every 25-30m centres. If total shrubs surviving falls below 115 plants then additional planting will be required

Grasses and groundcovers are to be planted and maintained to ensure:

- A height of 10cm or less – by regular slashing of the planted native grass layer;
- If within any nominated areas, groundcovers are less than 70% total cover then planting or seeding will be undertaken to enhance groundcover to 85% cover;
- Leaves and debris is removed – to be achieved by regular landscape maintenance; and
- A minimum of 5 grasses/groundcovers per m_2 are to be planted or established.

Table 1: Revegetation requirements

Zone	Revegetation Area (m^2)	Tree	Shrub	Grasses & Groundcovers
MEZ	21,800	76	115	6 / m^2

Maintenance & irrigation requirements

This planting plan has allowed for 12 months of weed control maintenance post planting. If revegetation does not achieve the densities required, then further revegetation and maintenance will be required

As the MEZ is assumed to be located within individual lots and communal areas the on-going maintenance requirements of these areas is assumed to be the responsibility of the individual lot owners or the community association.

Temporary irrigation lines are to be established along the slope, with plantings to be watered in. Follow up watering will occur for period of at least eight weeks to ensure new plantings / germinating seeds establish depending on climatic conditions at the time.

Costs

Costs associated with the implementation of the Planting Plan will be prepared once the batters have been constructed. The intention of batter construction is to retain as many trees as possible. This would minimise the amount of planting required in the MEZ.

The total cost to implement this planting plan depending on revegetation technique used have been estimated as below and identified in **Table 2**. The following costings may need to be revised following the completion of batter construction. This is because batter construction may leave some canopy and shrub species intact.

- Tube stock planting: **$478,121** ex GST.
- Direct seeding: **$313,757** ex GST

Table 2: Costs

Treatment	Unit Costs for revegetation options	
	Option 1 - Tubestock	Option 2 – Direct seeding
Total Area	*21,800*	*21,800*
Revegetation		
Seed collection, cleaning, storage	$13,097	$13,097
Site preparation	$21,800	$21,800
Jute Matting / Mulch	X	X
Direct Seeding, supply and install	$0	$196,200
Tubestock, supply and install	$327,785	$0
Replacement tubestock, supply and install	$32,788	$0
Irrigation	$32,700	$32,700
Weed control		
Establishment – 12 months post planting	$43,600	$43,600
Maintenance	X	x
Associated costs		
Disbursements	$4,350	$4,360
Monitoring & Reporting	$2,000	$2,000
Total	**$478,121**	**$313,757**

x - assumed to be undertaken by civil contractors

Assumptions and exclusions

Costs provided above make the following assumptions:

- It has been assumed that revegetation works will occur in a single event, and that works will be undertaken in conjunction with VMP implementation works
- Option 2 – includes only a single seeding application. Several applications may be required to ensure the density of CPW grasses / groundcovers is achieved
- A single report has been allowed for at the completion of the establishment phase.

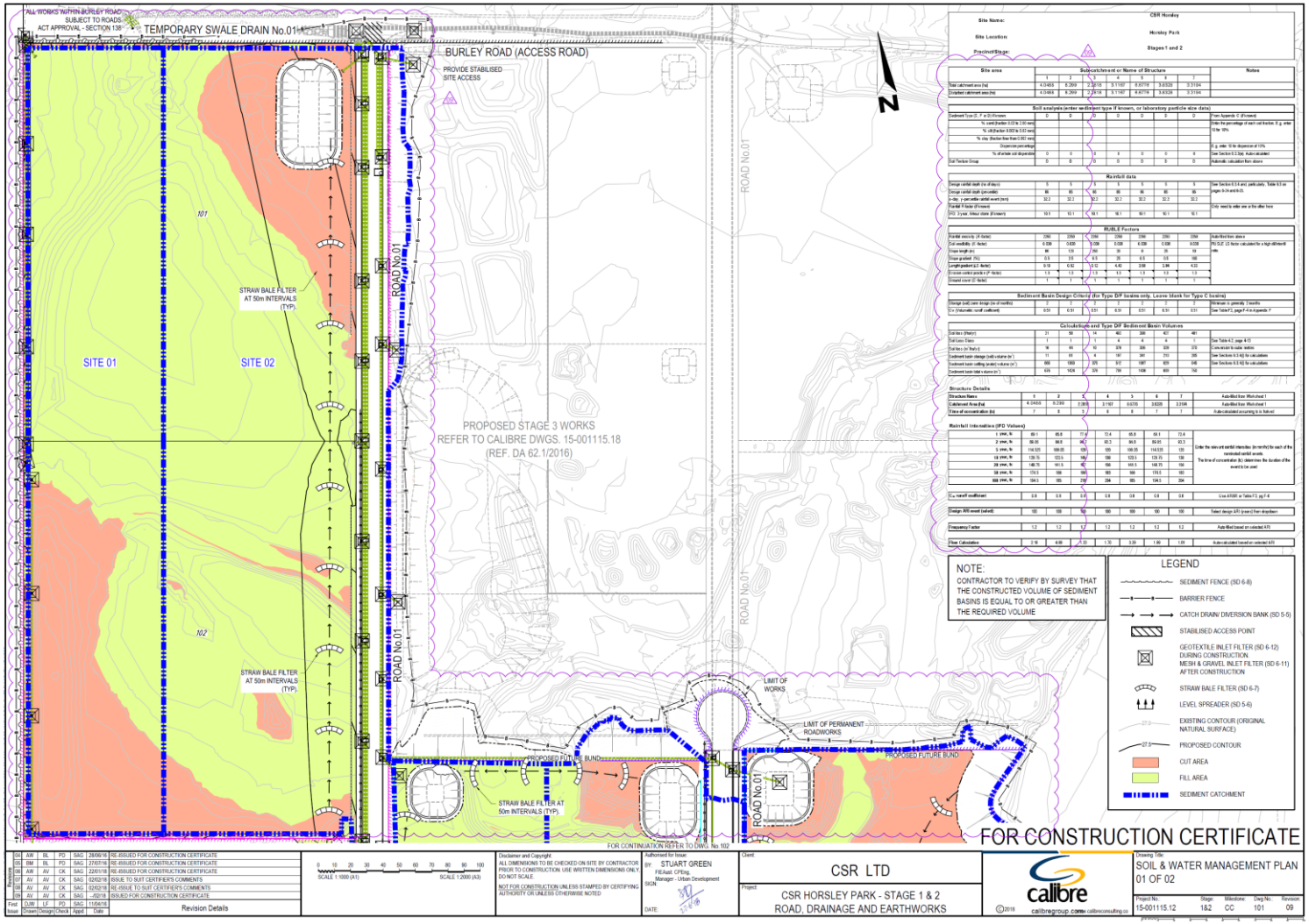
If you have any questions about any aspect of this plan, please do not hesitate to contact me on 9259 3773 or at alexg@ecoaus.com.au

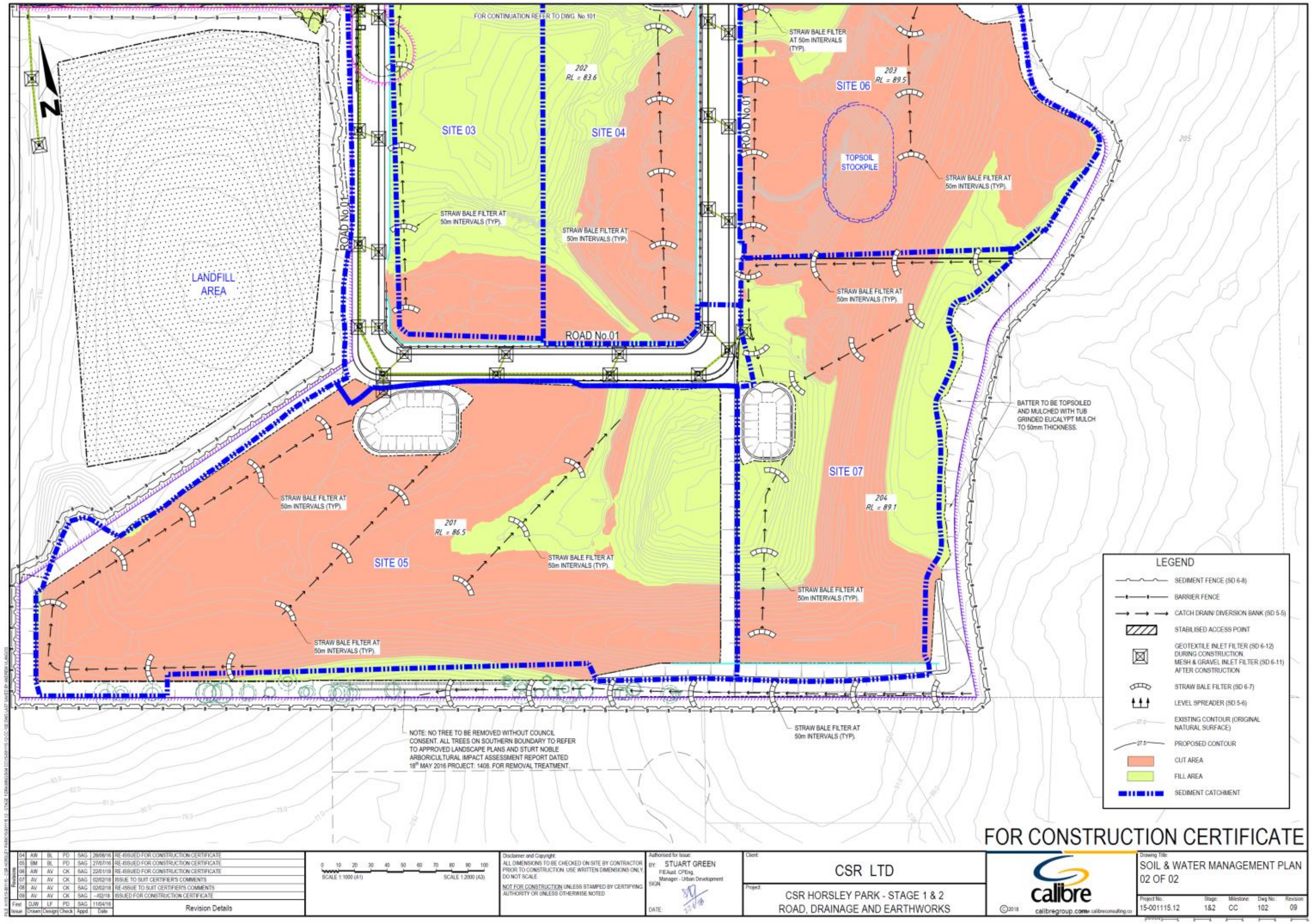
Yours sincerely,

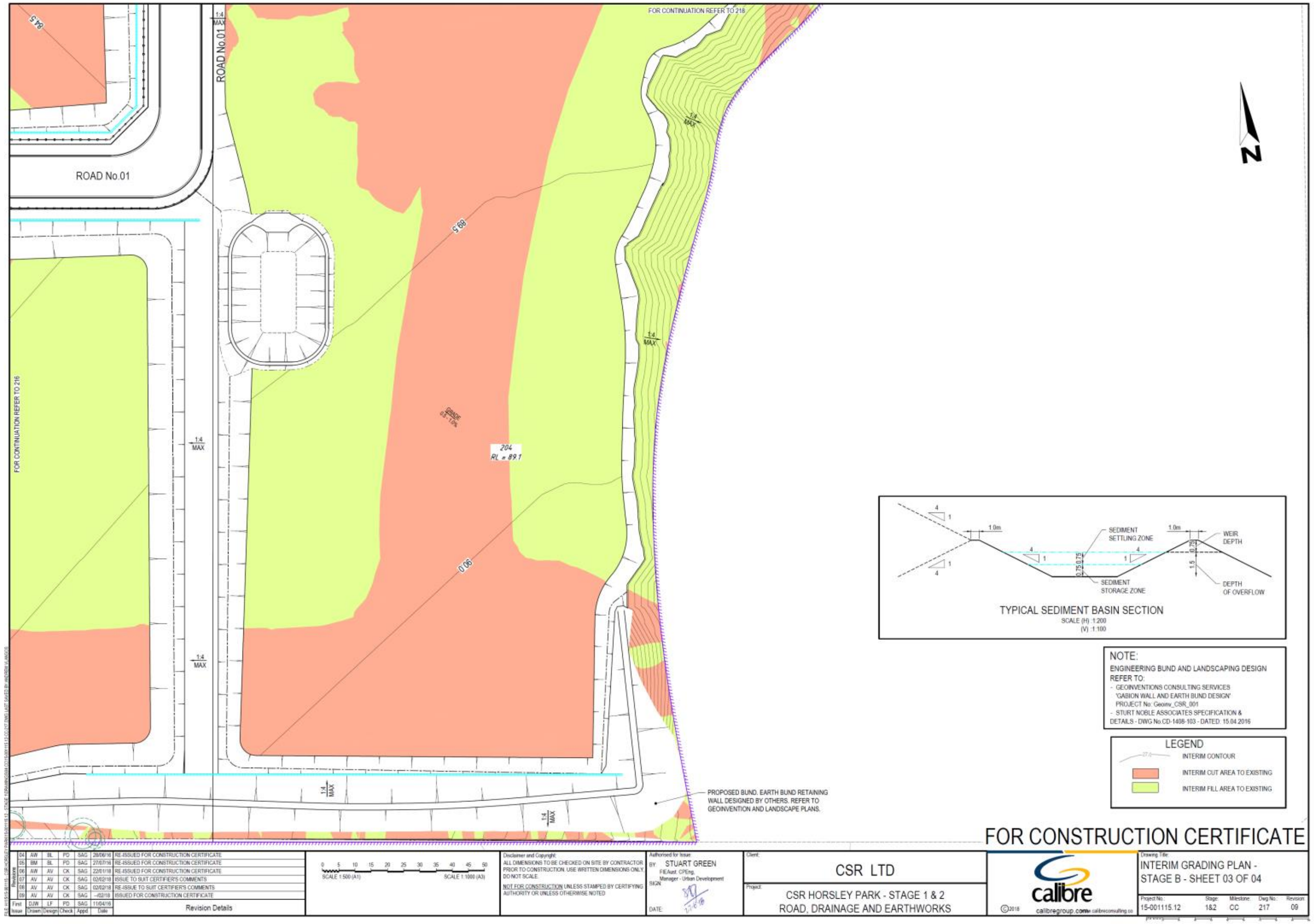
Alex Gorey
Ecologist

Appendix A : Managed Ecological Zone

Appendix B: Construction Certificate designs (Callibre 2018)




FOR CONTINUATION REFER TO DWG. No.101
LANDFILL AREA
SITE 03
SITE 04
SITE 05
SITE 06
SITE 07
ROAD No.01
TOPSOIL STOCKPILE
202 RL = 83.6
203 RL = 89.5
201 RL = 86.5
204 RL = 89.1
STRAW BALE FILTER AT 50m INTERVALS (TYP).
BATTER TO BE TOPSOILED AND MULCHED WITH TUB GRINDED EUCALYPT MULCH TO 50mm THICKNESS.
NOTE: NO TREE TO BE REMOVED WITHOUT COUNCIL CONSENT. ALL TREES ON SOUTHERN BOUNDARY TO REFER TO APPROVED LANDSCAPE PLANS AND STURT NOBLE ARBORICULTURAL IMPACT ASSESSMENT REPORT DATED 18th MAY 2016 PROJECT: 1408. FOR REMOVAL TREATMENT.
LEGEND
SEDIMENT FENCE (SD 6-8)
BARRIER FENCE
CATCH DRAIN/ DIVERSION BANK (SD 5-5)
STABILISED ACCESS POINT
GEOTEXTILE INLET FILTER (SD 6-12) DURING CONSTRUCTION
MESH & GRAVEL INLET FILTER (SD 6-11) AFTER CONSTRUCTION
STRAW BALE FILTER (SD 6-7)
LEVEL SPREADER (SD 5-6)
EXISTING CONTOUR (ORIGINAL NATURAL SURFACE)
PROPOSED CONTOUR
CUT AREA
FILL AREA
SEDIMENT CATCHMENT
FOR CONSTRUCTION CERTIFICATE
Revision Details
Authorised for Issue: STUART GREEN
Client: CSR LTD
Project: CSR HORSLEY PARK - STAGE 1 & 2 ROAD, DRAINAGE AND EARTHWORKS
calibre
Drawing Title: SOIL & WATER MANAGEMENT PLAN 02 OF 02
Project No.: 15-001115.12
Stage: 1&2
Milestone: CC
Dwg No.: 102
Revision: 09


FOR CONTINUATION REFER TO 216
ROAD No.01
ROAD No.01
1:4 MAX
204
RL = 89.1
TYPICAL SEDIMENT BASIN SECTION
SEDIMENT SETTLING ZONE
SEDIMENT STORAGE ZONE
WEIR DEPTH
DEPTH OF OVERFLOW
NOTE:
ENGINEERING BUND AND LANDSCAPING DESIGN REFER TO:
LEGEND
INTERIM CONTOUR
INTERIM CUT AREA TO EXISTING
INTERIM FILL AREA TO EXISTING
PROPOSED BUND. EARTH BUND RETAINING WALL DESIGNED BY OTHERS. REFER TO GEOINVENTION AND LANDSCAPE PLANS.
FOR CONSTRUCTION CERTIFICATE
STUART GREEN
CSR LTD
CSR HORSLEY PARK - STAGE 1 & 2
ROAD, DRAINAGE AND EARTHWORKS
calibre
INTERIM GRADING PLAN - STAGE B - SHEET 03 OF 04
15-001115.12
217
09
Revision Details

Appendix C: Revegetation and maintenace specifcations

Implementation of works

It is expected that these works will align with other management actions undertaken within the conservation area under the VMP (Travers 2016). As such, revegetation and bush regeneration works are to be implemented by experienced bush regeneration contractors with team leaders / site supervisors having a minimum TAFE Certificate IV or Diploma level qualification in Conservation and Land Management and membership of the Association of Australian Bush Regenerators or equivalent. If works are undertaken by landowners or members of the community association, they must be undertaken under the guidance / supervision of an appropriately qualified bush regenerator team leader / supervisor.

Soil preparation

Where topsoil has been modified from its original condition, the soil will need to be prepared prior to revegetation. The following works will be undertaken:

1. Top soil and sub soil, should be removed and stored separately for later to re-use. All weedy pasture grass is to be removed from site
2 Sub-soil is to be replaced first, followed by a minimum of 100 mm of topsoil (from stockpile or imported)
3. Improve as required to achieve a locally appropriate soil (e.g. gypsum, trace minerals, etc.)
4. Rip and cultivate to ensure a soft, friable soil
5. Jute matting or mulch as required

Soil preparation is to be undertaken by the civil contractor in consultation with a suitably qualified ecologist or bush regenerator.

Seed collection

Seed must be collected from local provenance species. Native grasses typically have much larger dispersal mechanisms and are to be collected from within a 20km radius of the site.

Where the species identified in this VMP cannot be sourced, they may be substituted for other CPW species as identified by Tozer (2003). Only wild native species are to be used. Plants are not to be substituted with horticultural varieties under any circumstances.

Record keeping of seed collection and planting locations is to follow the Flora Bank guidelines (Mortlock, 2000). This is important for this site as future revegetation works across surrounding areas are likely to draw on seed sources created through these revegetation works. The bush regeneration contractor is responsible for recording this information and providing it to relevant consent authorities.

Revegetation works

Revegetation will be undertaken across 100% of the MEZ. Revegetation will be undertaken using CPW tubestock with groundcovers / grasses as per the densities shown in as shown in **Table 1**. Plantings will need to be CPW species of local provenance as per the list (**Appendix D**).

Revegetation is only to occur during the shoulder months (i.e. spring and summer) to ensure highest likelihood of planting survival.

All tube stock will be watered after planting to assist with survival and encourage rapid establishment of plants. Watering will occur on the day of planting, then occur as required for a minimum period of eight weeks depending on the rainfall during the period.

Maintenance works

Following revegetation works, ongoing weed management will be required to reduce competition on native plantings and ensure their survival. Hand weeding and spot spray herbicide application using a non-selective herbicide (e.g. Roundup Biactive®) will be used to treat herbaceous weeds and exotic grasses. Weed management specifications will be consistent with those provided in **Section 3.3** of the VMP (Travers 2017) and will be concurrent with the maintenance weeding schedule of the adjacent conservation area.

Appendix D: Planting list

Scientific name	Common name
Acacia implexa	Hickory Wattle
Aristida vagans	Threeawn Speargrass
Asperula conferta	Common Woodruff
Bursaria spinosa	Native Blackthorn
Carex inversa	Knob Sedge
Daviesia ulicifolia	Gorse Bitter Pea
Dianella longifolia	Blueberry Lily
Dichelachne micrantha	Shorthair Plumegrass
Dichondra repens	Kidney Weed
Echinopogon caespitosus var. *caespitosus*	Hedgehog Grass
Entolasia stricta	Wiry Panic
Eucalyptus moluccana	Grey Box
Eucalyptus tereticornis	Forest Red Gum
Lomandra filiformis subsp. *filiformis*	Wattle Matt-rush
Lomandra multiflora subsp. *multiflora*	Many-flowered Mat-rush
Microlaena stipoides var. *stipoides*	Weeping Grass
Paspalidium distans	Shotgrass