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Vegetation Management Plan

Lot 2 // DP 1233392

579 Mamre Road, Orchard Hills, NSW, 2784

Proposed watercourse realignment

Prepared for: HB+B Property

28 August 2018

PROJECT NUMBER	2018-085		
PROJECT NAME	Vegetation Management Plan		
PROJECT ADDRESS	Lot 2 // DP 1233392, 579 Mamre Road, Orchard Hills, NSW		
PREPARED FOR	HB+B Property		
AUTHOR/S	Thomas Hickman		
REVIEW	Bruce Mullins		
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Glossary and abbreviations

Abbreviation	Description
BC Act	*Biodiversity Conservation Act 2016*
DPI	Department of Primary Industries
EEC	Endangered Ecological Community
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
ha	Hectares
LGA	Local Government Area
OEH	Office of Environment and Heritage
ToB	Top of Bank
VMP	Vegetation Management Plan
VRZ	Vegetated Riparian Zone
WoNS	Weeds of National Significance
*	Denotes exotic species

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1. Introduction

1.1 Description of project and purpose of Vegetation Management Plan

This Vegetation Management Plan (VMP) has been prepared to accompany a Section 96 modification under the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the realignment of a 1st order tributary of South Creek in the north west of Lot 2 // DP 1233392, 579 Mamre Road, Orchard Hills (the 'study area') (**Figure 1.1**). The proposed works will require:

- Decommissioning and filling of the existing channel with site won material
- Realignment of the existing channel to the north of its current position

The relocated watercourse will run in a north westerly direction until it coincides with the northern perimeter of Lot 2 // DP 1233392. The watercourse will then run to the west adjacent with Lot 209 // DP 1013539 and Lot 208 // DP 1013539 until it meets with South Creek in the north western corner of Lot 2 // DP 1233392. The filling of the existing channel will require modification to land at the confluence of the 1st order watercourse and South Creek.

The purpose of the VMP is to address the comments made by the Office of Environment and Heritage (OEH) (SSD-7173 – MOD 3 – Notice of Modification dated 9 August 2018) for the Section 96 modification application for the watercourse realignment. The comments recommend that a condition of consent is included to prepare a VMP for the filling of the existing channel and the construction of the new channel. The primary aims of this VMP have been guided by the OEH comments, and include:

- Revegetation of the riparian corridor along South Creek where the existing channel is proposed to be filled
- Reconstruction of a fully revegetated riparian corridor along either side of the reconstructed channel, measured from Top of Bank (ToB)
- Installation of native grass and shrub species along the batters of the reconstructed watercourse to increase soil stability and improve habitat value
- Recommendations to facilitate the long-term protection and maintenance of the reconstructed channel
- Methods to increase soil stability and the establishment of a permanent physical batter to prevent inadvertent damage to the riparian vegetation

The VMP subject site will be specific to the constructed watercourse in the north of Lot 2 // DP 1233392 and any areas disturbed along South Creek as result of the decommissioning of the existing 1st order watercourse (**Figure 1.1**). The subject site will be the focus of all works outlined under this VMP. This report includes a proposal for staging of works to guide the revegetation and maintenance of the reconstructed 1st order watercourse and riparian zone of South Creek.

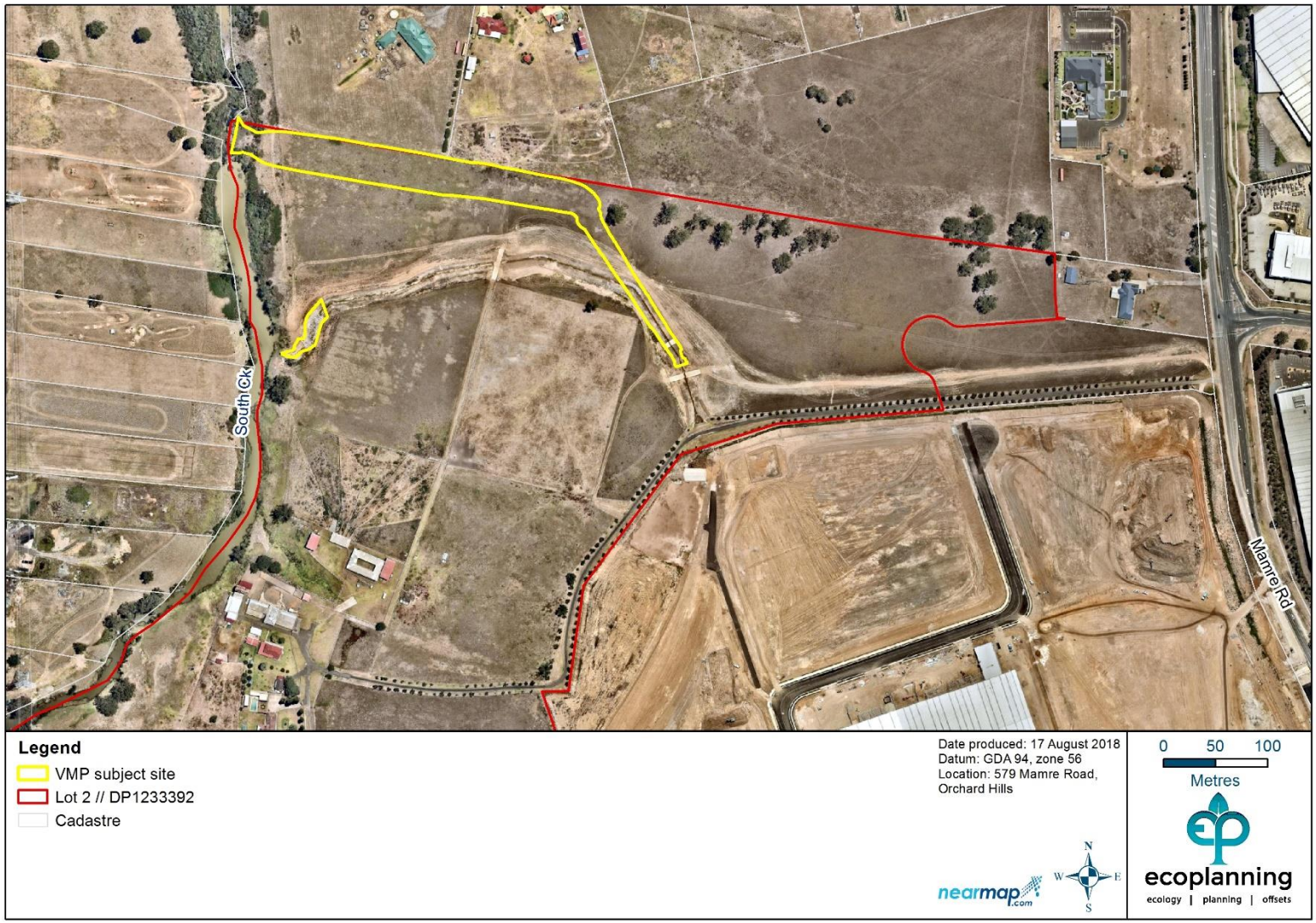

Figure 1.1: VMP subject site.

1.2 Site description

The study area is situated in the suburb of Orchard Hills within the Penrith Local Government Area (LGA). South Creek flows in a northerly direction and traverses the western perimeter of the study area. South Creek is a 4th order watercourse, situated on E2 – Environmental Conservation zoned land. The reach of South Creek adjacent to the study area has been subject to past vegetation clearing, hence has a low cover of native shrub and canopy species. A 1st order tributary of South Creek traverses the study area in a south westerly direction.

The VMP subject site incorporates all land below ToB of the realigned 1st order watercourse, including the channel and channel batters. The VMP subject site also includes the Vegetated Riparian Zone (VRZ) of South Creek, which is 40 m from ToB based on the riparian corridor specified in the *Guidelines for Riparian Corridors on Waterfront Land* (DPI 2012) for a 4th order watercourse. The subject site consists of cleared land that is dominate by exotic grasses and herbaceous weeds, including *Cenchrus clandestinus** (Kikuyu Grass), *Nassella neesiana** (Chilean Needle Grass), *Paspalum dilatatum** (Paspalum), *Phalaris aquatica** (Phalaris), *Taraxacum officinale** (Dandelion) and *Verbena bonariensis** (Purpletop). Woody weeds, such as *Cestrum parqui** (Green Cestrum) and *Lycium ferocissimum** (African Boxthorn), were scattered across the subject site in low cover and abundance.

Several small patches of native vegetation are situated to the east of the subject site. The dominant canopy species in these patches is *Eucalyptus amplifolia* (Cabbage Apple), which is a diagnostic species of Alluvial Woodland (MU11) (NPWS 2002). *Eucalyptus amplifolia* and *Casuarina glauca* (Swamp Oak) are also found within the subject site at the confluence with the 1st order watercourse and South Creek. It is likely that Alluvial Woodland occurred extensively across the land between South Creek and Mamre Road, which would have been subject to regular flooding.

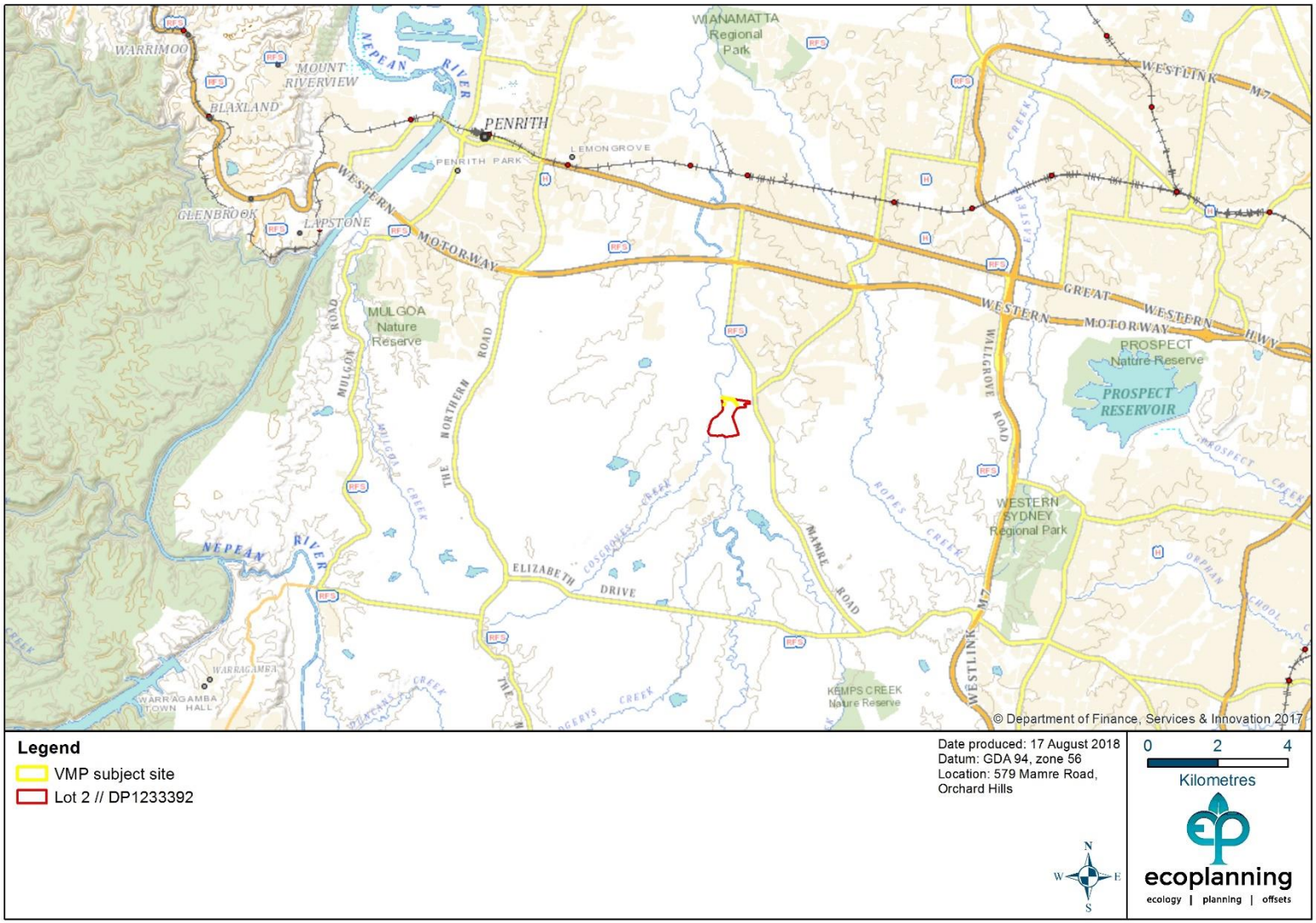

Figure 1.2: Locality of the VMP subject site depicting surrounding suburbs and landscape features.

2. Site assessment

2.1 Methods

A field survey was undertaken on 16 May 2018 by Thomas Hickman (Ecologist). The current location of the 1st order watercourse and the location of its proposed realignment were traversed by foot. The weather conditions on the day were cool – warm with clear skies (**Table 2.1**).

Table 2.1. Daily weather observation at Penrith Lakes – station 067113 (8.5 km north west of the development site).

Date	Temp (°C)		Rainfall (mm)[1]	Max wind	
	Min	Max		Direction	Speed (km/h)
16/05/2018	9.1°C	20.4°C	0 [1]	SSE	26

The success of reconstruction and revegetation works along the existing channel were assessed during field assessment to guide the management of the new channel. The success of soil stabilising techniques (i.e. jute matting and sandstone rip-rap), revegetation and fencing where assessed. The resilience of the vegetation surrounding the subject site was considered to determine whether natural succession of native species was likely to occur in the constructed watercourse. Field assessment determined the problematic exotic species onsite and aimed to identify all priority weeds and Weeds of National Significance (WoNS).

2.2 Results

2.2.1 Plant communities

Field assessment determined that the vegetation in the subject site is highly degraded and consisted exclusively of other vegetation 'pasture' (**Figure 2.1**). Dominant exotic grasses and herbaceous weeds in the subject site included *Cenchrus clandestinus**, *Nassella neesiana**, *Paspalum dilatatum**, *Phalaris aquatica**, *Taraxacum officinale** and *Verbena bonariensis** (**Figure 2.2**). A patch of Alluvial Woodland in an 'underscrubbed' condition is situated to the east of the subject site along the northern perimeter of Lot 2 // DP 1233392. A small amount of Alluvial Woodland was also identified within the VRZ of South Creek at the confluence with the former 1st order watercourse (**Figure 2.3**). Alluvial Woodland is listed as an Endangered Ecological Community (EEC) under the *Biodiversity Conservation Act 2016* (BC Act) as '*River-Flat Eucalypt Forest on Coastal Floodplains of Sydney Basin and South East Corner Bioregions*'. It is likely that Alluvial Woodland once occurred extensively across the land between South Creek and Mamre Road.

2.2.2 Site resilience

Resilience is a measure of a sites capacity to respond to restoration works, and often is an indication of the extent and severity of past disturbance. Field assessment determined the subject site to have low resilience, due to past clearing, grazing, soil disturbance and nutrient enrichment. As such the soil seedbank is likely to have a high proportion of exotic grasses and herbaceous weeds with a low likelihood of native seed being present.

The watercourse realignment will require substantial earth works and re-grading works to achieve a desired width of the channel and associated batters. It is advised that all topsoil in the subject site is disposed of and not utilised to reconstruct the realigned watercourse. This will reduce the weed seed bank in the constructed channel and reduce the likelihood of exotic grasses and herbaceous weeds from becoming established following construction works. Topsoil should be sourced and imported into the subject site for the construction of the channel batters and should contain minimal weed seed content.

2.2.3 Flora species

A total of 26 flora species were opportunistically identified within the study area, of which 21 are exotic and five are native species (**Appendix A**). Four priority weeds listed under the NSW *Biosecurity Act 2015* in accordance with the Penrith LGA are known within the study area, three of which are WoNS (**Table 2.2**).

Table 2.2. Priority weeds and Weeds of National Significance (WoNS).

Common name	Scientific name	WoNS	Duty
African boxthorn	*Lycium ferocissimum*	Y	**Prohibition on dealings** *Must not be imported into the State or sold*
Chilean needle grass	*Nassella neesiana*	Y	
Fireweed	*Senecio madagascariensis*	Y	
Green cestrum	*Cestrum parqui*	N	**Regional Recommended Measure** *Land managers should mitigate the risk of new weeds being introduced to land used for grazing livestock. Land managers should mitigate spread from their land. Plant should not be bought, sold, grown, carried or released into the environment.*

No threatened flora species listed under the BC Act or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were recorded in the study area or subject site.

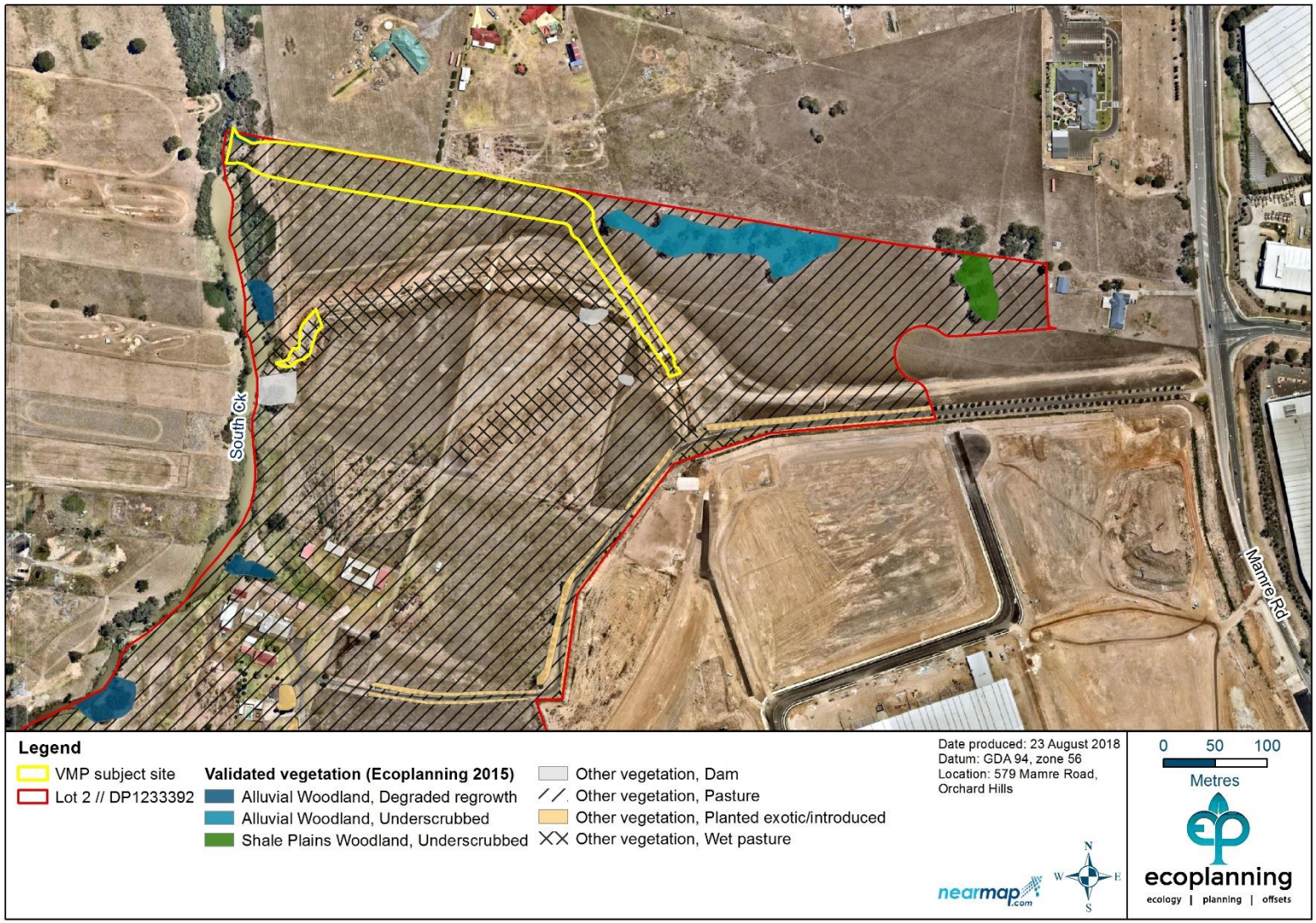

Figure 2.1: Vegetation within the study area (Ecoplanning 2015).

Figure 2.2: Other vegetation 'pasture' in the location of the proposed realigned watercourse.

Figure 2.3: Alluvial Woodland (MU11) along South Creek.

3. VMP weed management and revegetation

Vegetation management works outlined below should be implemented for the subject site. Weed management should begin following the construction of the new channel.

3.1 Preliminary works

Seed collection

Seed collection will be required to ensure indigenous species are available for revegetation works; species identified for revegetation are outlined in **Appendix B**. All plantings should be of local provenance, collected from adjacent patches of vegetation. However, nurseries that supply indigenous seedling stock, (not horticultural varieties), may also be used to supplement the plantings.

Seed collection zones can extend within a radius of 3 km for groundcover, shrubs and trees and up to 10 km for grasses. The collection site should reflect the natural conditions that exist for the area being regenerated. Record keeping of seed collection and planting locations is to be as per the Flora Bank guidelines (Mortlock 2000). A Section 132C licence under the NSW *National Parks and Wildlife Act 1974* will be required to undertake seed collection works.

Fencing

It is recommended that sediment fencing is installed along the ToB of the 1st order watercourse to inhibit the spread of exotic grasses and herbaceous weeds into the subject site. The bottom of the sediment fence should be dug into the ground at an appropriate depth that will prevent the spread of rhizomatous and stoloniferous grasses, such as *Cenchrus clandestinus** and *Cynodon dactylon**. The sediment fence should be regularly monitored for damage and maintained to ensure that is fulfilling its intended purpose.

The ToB along the north of the proposed watercourse abuts with the boundary of Lot 208 // DP 1013539. Cattle proof fencing is established along this boundary and is proposed for retention. This fencing will prevent unwanted access by the cattle and create a permanent physical barrier that will prevent inadvertent damage to the riparian zone. A chain wire fence is proposed along the southern perimeter of the drainage easement, which will be situated along the ToB. A 4 m vegetated buffer will be established using *Casuarina glauca*, around which a steel post and rail fence will be established (**Figure 3.1**).

3.2 Weed management techniques

Weed management will be limited to maintenance works following the construction of the new watercourse. Weed control will include mechanical removal techniques, herbicide application and natural shading techniques to prevent the establishment of exotic grasses and herbaceous weeds and promote the growth of planted native vegetation. Disturbance of the soil during the weed management process should be minimised (see Buchanan 1989, Bradley 2002) once the new watercourse is constructed. Weed control objectives and treatment techniques are outlined below (**Appendix C**) based on the dominant weed species identified in the subject site prior to construction works.

Maintenance

Maintenance is the long-term management of a site to prevent weeds from becoming re-established after primary and secondary work. In this instance primary and secondary weed control will have been achieve during the construction works for the new watercourse. Following

the construction of the watercourse and prior to revegetation, the area will contain minimal vegetation cover. Maintenance works will mostly consist of hand weeding amongst planted native vegetation in preparation for spot spraying with neat Roundup Biactive®. A regular maintenance regime should be in place to remove exotic grasses and herbaceous weeds prior to seeding establishment within the riparian corridor.

Weed Disposal

All seeding herbaceous and grass material should be bagged and removed from site and disposed of at an appropriate green waste facility. Alternatively, the vegetative waste could be removed from the subject site and evenly scattered across the cleared land, where it would quickly shrivel up and break down.

3.3 Vegetation Management Zones

The VMP subject site has been categorised under the one management zone based on the consistency of management actions across the VMP subject site and its small size.

3.3.1 Management Zone 1 – Reconstruction, revegetation and ongoing maintenance

This zone covers 1.51 ha and encompasses the whole subject site, including the channel, channel batters and the VRZ of South Creek. The construction of the new watercourse will require substantial soil modification, within an area consisting of cleared land dominated by exotic grasses and herbaceous weeds. As such, there will be no potential for natural recruitment to occur within the constructed creekline, which will need to be reconstructed and revegetated to assist in improved soil stability and habitat value of the corridor. The reconstruction of the subject site will be achieved using native overstorey, midstorey and groundlayer species representative of the vegetation community Alluvial Woodland (MU11) (see **Appendix B**).

A maintenance program will be established for the subject site focussing on the treatment of herbaceous weeds and exotic grasses. The installation of sediment fencing along the ToB of the 1st order watercourse will prevent the vegetative spread of exotic grasses, such as *Cenchrus clandestinus** and *Cynodon dactylon** and impede the spread of herbaceous weed seed into the subject site. Nevertheless, it is still likely that exotic grasses and herbaceous weeds will become established and require ongoing control. Maintenance works will mostly consist of hand weeding within a 30 cm area of planted native vegetation in preparation for targeted spot spraying with 1-1.5% Roundup Biactive®.

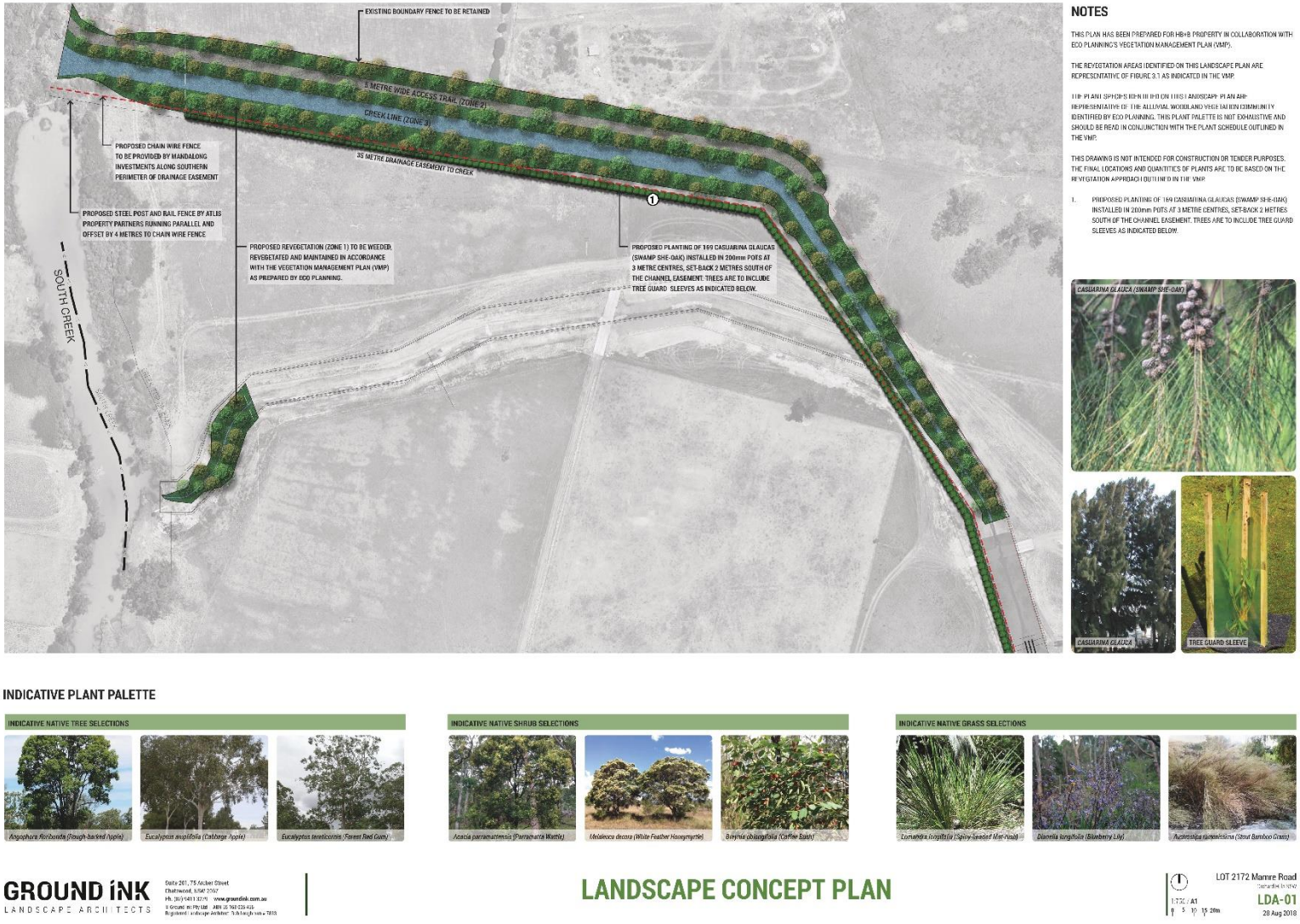

Figure 3.1: Landscape Concept Plan for the VMP subject site, depicting fencing locations and the *Casuarina glauca* revegetation.

3.4 Revegetation

Revegetation will be necessary for the reconstruction of the channel batters within Zone 1 (**Figure 3.2**) and will be conducted from the edge of the channel to the constructed ToB excluding the 5 m access trail. Zone 2 will consist of a 5 m wide road that will facilitate access from the eastern portion of the subject site to South Creek and will not require revegetation. Revegetation is not recommended in Zone 3, which consists of the channel. It is likely that some amount of succession of native sedges, rushes and reeds will occur within the channel, which should be retained where it does result in negative impacts on surface roughness and flooding.

The revegetation works will aim to create a grassy open woodland structure, utilising species that are found within the vegetation community Alluvial Woodland (see **Appendix B**). Native shrub and canopy species should generally be avoided on the toe of the bank, which should be limited to aquatic macrophytes, such as sedges, rushes and reeds. Groundcovers and grasses should dominate bank planting and will be combined with a scattered cover of shrub and canopy species. The ToB should have a tree and shrub cover that reflects natural vegetation structure and densities of Alluvial Woodland. Short lived trees, such as *Acacia* spp. should be avoided, unless they are intended for removal once they have provided cover for the establishment of longer lived canopy species (i.e. *Eucalyptus* spp. and *Casuarina* spp.).

3.4.1 Planting densities and species

The native species used for revegetation should be consistent with the planting palettes provided (**Appendix B**), with the aim of reconstructing the floristics of the site to be representative of Alluvial Woodland. The appropriate location of species within the channel batters will be based on the advice provided above (see **Section 3.4**). Planting numbers will be consistent with **Table 3.1** based on the following densities:

Revegetation Zone 1

- 1 shrub species per 10 m^2
- 1 canopy per 50 m^2
- 2 groundcovers (grass, fern, forb or sedge) per 1 m^2

Table 3.1. Planting density table for revegetation works.

Zone	Area (ha)	No. of plants			Zone total
		G	S	C	
1	1.02	20,400	1020	200	21,620

G = groundcover, S = shrubs and C= canopy.

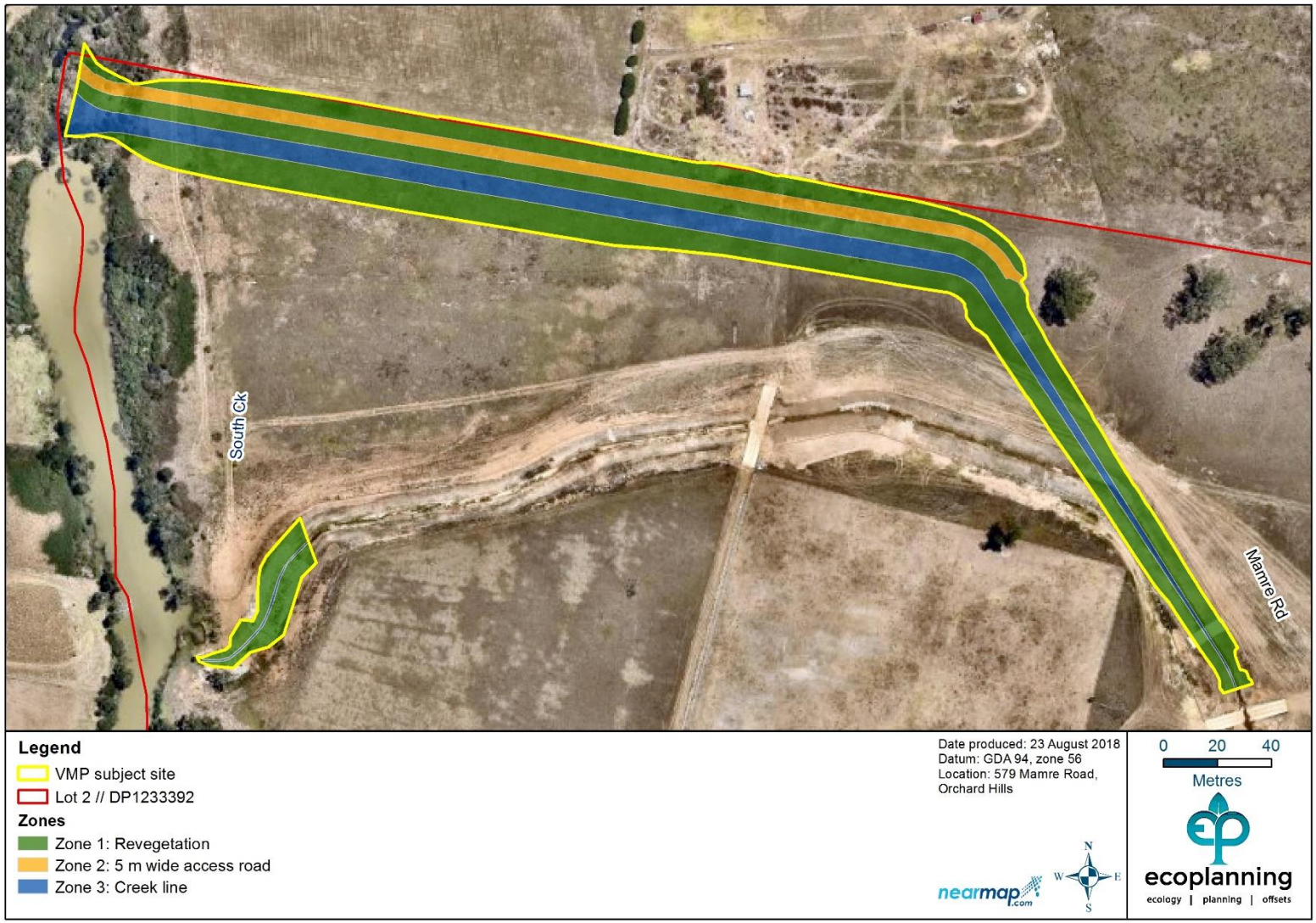

Figure 3.2: Zones requiring revegetation in the VMP subject site.

3.4.2 Equipment, installation and timing

Plantings should be planned for late winter leading up to spring when regular rainfall is naturally occurring, and growth conditions are ideal. Planting of tube-stock (tree and shrub species) and Hiko or Viro cells (grasses and other groundcover species). A water retaining and fertilising product (e.g. Terraform™) should be applied to each hole, to assist in the establishment of the plants. Each plant should be sufficiently watered on the same day as installation and regular watering should continue *in lieu* of rainfall for a period of 6 weeks, or until plantings have taken. The bush regenerator should oversee and assist with watering.

3.5 Maintenance

The maintenance phase should continue for 3 years following the construction of the realigned watercourse. Regular inspections of site condition will be conducted, including general site monitoring for potential new infestation areas and subsequent weed control of any identified weed species.

Weed maintenance works will include:

- Removal of all exotic species prior to establishment and seeding
- Spot spraying of exotic grasses and herbaceous weed
- Hand weeding exotic grasses and herbaceous weeds in close proximity to planted and self recruited native vegetation.

Re-vegetation maintenance works will include:

- Replacement of poorly growing or diseased individuals consistent with the prescribed planting
- Management of insect damage, if necessary
- Watering during dry periods
- Augmenting past planting areas where attenuation has occurred.

4. Performance criteria and monitoring

4.1 Performance criteria

The progress and compliance with the VMP should be monitored and reviewed annually. The performance criteria listed in **Table 4.1** below are considered to be best practice and are not linked with any specific legislation. Based on the success of the management works, further performance criteria may need to be developed for the maintenance phase.

Table 4.1. Revegetation performance monitoring criteria.

Treatment Zones	Year 1	Year 2	Year 3
All	Herbaceous weeds and exotic grasses maintained at <1% cover and treated prior to establishment and seeding.	Herbaceous weeds and exotic grasses maintained at <1% cover and treated prior to establishment and seeding.	Herbaceous weeds and exotic grasses maintained at <1% cover and treated prior to establishment and seeding.

4.2 Monitoring reports

The objective of the monitoring and reporting program is to record changes to the vegetation as a result of vegetation management works. Quarterly monitoring and reporting should be conducted and compiled into an annual report to determine the effectiveness of the works undertaken. Site conditions should be recorded on the work plan template at the beginning and end of on-ground works. This data should be included in the annual report. Monitoring photo points should be established at three permanent reference points.

An example report is detailed in **Table 4.2**, the report should include:

- Works carried out, including weed species targeted and their location;
- Any observations, such as the occurrence of new weed species;
- Rates of regeneration of native species;
- A description of any problems encountered and how they were overcome;
- A summary of how the site-specific objectives have been met (or not);
- Herbicide and other chemicals used, including quantity, dilution rate and other relevant information;
- Weed control mechanisms used during the period;
- Climatic conditions which may have influenced weed germination and growth;
- Performance criteria and success; and
- If required, maps of weed distribution and density.

Table 4.2. Example monitoring report template.

Date			
Name of Contractor:			
Site Condition:	Zone		
	Weed cover %		
	Seedling survival %		
	Planting numbers		
	Herbicide used (in Litres)		
	Other		
Describe relevant weed management techniques:			
Describe problems; e.g. weed invasions, damage to planted material, etc.:			
Photographic evidence:			
Planned work before next monitoring report:			

5. References

Bradley, J. (2002). *Bringing back the bush. The Bradley Method of Bush Regeneration*. New Holland Publishers, Sydney.

Buchanan R.A (1989). Bush regeneration: recovering Australian landscapes. TAFE NSW, Sydney.

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Appendix A: Flora inventory

Flora

Family	Scientific Name	Common name	Native/Exotic	Form
Aizoaceae	*Tetragonia tetragonioides*	New Zealand Spinach	Native	F
Amaranthaceae	*Alternanthera pungens*	Khaki Weed	Exotic	F
Asteraceae	*Aster* sp.		Exotic	F
Asteraceae	*Cirsium vulgare*	Spear Thistle	Exotic	F
Asteraceae	*Senecio madagascariensis*	Fireweed	Exotic	F
Asteraceae	*Sonchus oleraceus*	Common Sowthistle	Exotic	F
Asteraceae	*Taraxacum officinale*	Dandelion	Exotic	F
Casuarinaceae	*Casuarina glauca*	Swamp Oak	Native	T
Cyperaceae	*Baumea articulata*	Jointed Twig-rush	Native	V
Juncaceae	*Juncus usitatus*		Native	R
Malvaceae	*Sida rhombifolia*	Paddy's Lucerne	Exotic	F
Plantaginaceae	*Plantago lanceolata*	Lamb's Tongue	Exotic	F
Poaceae	*Cenchrus clandestinus*	Kikuyu Grass	Exotic	G
Poaceae	*Chloris truncata*	Rhodes Grass	Exotic	G
Poaceae	*Cynodon dactylon*	Couch	Exotic	G
Poaceae	*Hordeum* sp.		Exotic	G
Poaceae	*Lolium* sp.		Exotic	G
Poaceae	*Nassella neesiana*	Chilean Needle Grass	Exotic	G
Poaceae	*Paspalum dilatatum*	Paspalum	Exotic	G
Poaceae	*Phalaris aquatica*	Phalaris	Exotic	G
Poaceae	*Setaria parviflora*	Pigeon Grass	Exotic	G
Solanaceae	*Cestrum parqui*	Green Cestrum	Exotic	S
Solanaceae	*Lycium ferocissimum*	African Blackthorn	Exotic	S
Solanaceae	*Solanum sisymbriifolium*		Exotic	F
Typhaceae	*Typha orientalis*	Broadleaf Cumbungi	Native	V
Verbenaceae	*Verbena bonariensis*	Purpletop	Exotic	F

Form: (T) Tree; (S) Shrub; (G) Grass; (R) Rush; (F) Forb; (V) Sedge.

Appendix B: Planting palettes

Alluvial Woodland (MU11)

Planting palette for the vegetation community Alluvial Woodland, as described in the Interpretation Guidelines for the Native Vegetation Maps of the Cumberland Plain, Western Sydney (NPWS 2002).

Scientific Name	Common Name
Tree	
Angophora floribunda	Rough-barked Apple
Angophora subvelutina	Broad-leaved Apple
Casuarina cunninghamiana	River Oak
Casuarina glauca	Swamp Oak
Eucalyptus amplifolia	Cabbage Apple
Eucalyptus eugenioides	Thin-leaved Stringybark
Eucalyptus tereticornis	Forest Red Gum
Shrub	
Acacia parramattensis	Parramatta Wattle
Bursaria spinosa subsp. *spinosa*	Blackthorn
Breynia oblongifolia	Coffee Bush
Hibbertia diffusa	Wedge Guinea Flower
Leucopogon juniperinus	Prickly Beard-heath
Melaleuca decora	
Melaleuca linariifolia	Flax-leaved Paperbark
Melaleuca styphelioides	Prickly-leaved Tea Tree
Melicytus dentatus	Tree Violet
Olearia viscidula	Wallaby Seed
Ozothamnus diosmifolius	Rice Flower
Trema tomentosa	Native Peach
Grasses, sedges and rushes	
Aristida vagans	Threeawn Speargrass
Austrostipa ramosissima	Stout Bamboo Grass
Bolboschoenus caldwellii	
Carex appressa	Tall Sedge
Carex longebrachiata	
Cyperus trinervis	
Dianella longifolia	Blueberry Lily
Echinopogon ovatus	Forest Hedgehog Grass
Entolasia marginata	Bordered Panic
Entolasia stricta	Wiry Panic
Juncus usitatus	

Scientific Name	Common Name
Lomandra longifolia	Spiny-headed Mat-rush
Lomandra multiflora subsp. *multiflora*	Many-flowered Mat-rush
Microlaena stipoides var. *stipoides*	Weeping Grass
Oplismenus aemulus	Australian Basket Grass
Themeda triandra	Kangaroo Grass
Forbs and scramblers	
Brunoniella australis	Blue Trumpet
Centella asiatica	Indian Pennywort
Commelina cyanea	
Dichondra repens	Kidney Weed
Einadia hastata	Berry Saltbush
Glycine clandestina	
Glycine tabacina	
Persicaria decipiens	Slender Knotweed
Pratia purpurascens	Whiteroot
Veronica plebeia	Trailing Speedwell
Vernonia cinerea	

Appendix C: Weed treatment methods

Zone	Objective	Main Weeds	Method	Key Performance Indicators (KPI)
All	• Control and suppress exotic grasses and herbaceous weeds, which are likely to disperse into the constructed channel from the adjoining exotic grassland	• *Cenchrus clandestinus*, *Paspalum dilatatum*, *Phalaris aquatica*, *Nassella neesiana*, *Taraxacum officinale* and *Verbena bonariensis*	• Exotic grasses and herbaceous weeds will be treated prior to establishment and seeding. Hand weeding will be conducted within 30 cm of all plantings in preparation for spot spraying of exotic grasses and herbaceous weeds with 1-1.5% Roundup Biactive®. • Herbaceous weeds will be treated prior to seeding where possible, bagged, removed from site and disposed of appropriately.	• Herbaceous weeds and exotic grasses maintained at low covers (<1%) following the construction of the watercourse and through the maintenance stage.