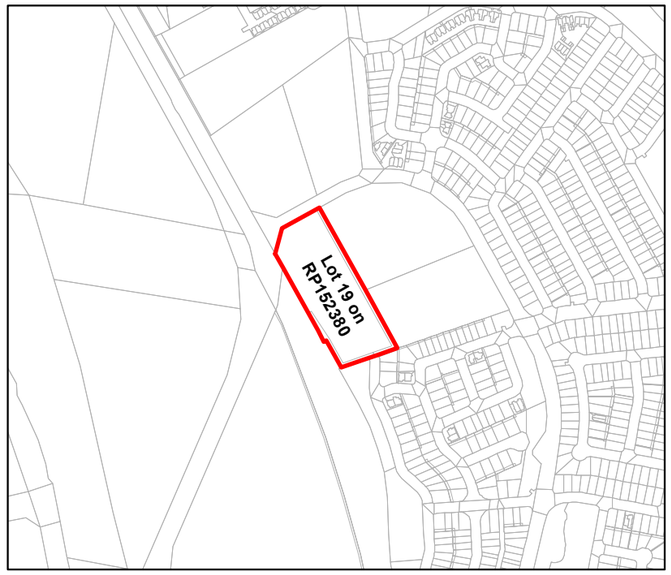
REHABILITATION MANAGEMENT PLAN
2 KARINGAL DRIVE, PIMPAMA







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PROJECT TITLE
Rehabilitation Management Plan
2 Karingal Drive, Pimpama

CLIENT
Brian Johnston

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Cover Page

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INTRODUCTION

This Rehabilitation Management Plan ('RMP') has been prepared for a site located at 2 Karingal Drive, Pimpama (Lot 19 on RP152380), hereafter referred to as 'the site'. The RMP provides the details of rehabilitation works to be undertaken within the waterway corridor as shown on the proposed plan of development. The location of the Rehabilitation Areas is shown on Drawing No. 20024-1_RMP_003.

REHABILITATION AREAS – EXISTING VALUES AND CONDITION

ABIOTIC VALUES

Site topography is characterised by gently inclined slopes with a predominantly south-easterly aspect. The site has extremely low relief, with elevation ranging from approximately 10 m AHD in the north-western extents of the site, to approximately 3 m AHD in the eastern extents.

The site forms part of the Pimpama River catchment and Yawalpah Road sub-catchment, with the surrounding landform being primarily defined by undulating plains. City Plan mapping shows a waterway traverses the sites western and eastern boundaries. Field investigations confirmed that dams have been historically constructed in the waterway alignment.

According to the Atlas of Australian Soils, soils in the north-eastern extents of the site are Friable pedal gley duplex soils with a duplex gley, non hard setting A horizon, no A2 horizon, acid pedal mottled B horizon. Whereas soils in the south-western extents are Hard pedal mottled-yellow duplex soils with a duplex yellow-grey, hard setting A horizon, A2 horizon conspic bleached, acid pedal mottled B horizon.

VEGETATION COMMUNITIES

One (1) vegetation community occurs within the Rehabilitation Areas on site – Vegetation Community A: Non-remnant Vegetation A description of this community is provided in the following sections.

VEGETATION COMMUNITY A: NON-REMNANT VEGETATION

Vegetation Description

Vegetation structure and floristics are heterogeneous throughout the community, which has been heavily degraded by historical disturbances and weed invasion. Although there is – in some areas – a canopy layer consisting of irregularly sized and distributed patches and copses of native and exotic trees, these are absent throughout much of the community. Overall, the vegetation is characterised as a non-native grassland with a mixture of native canopy trees and exotic landscape trees. Common species include: *Eucalyptus tereticornis* (forest red gum), *Eucalyptus siderophloia* (grey ironbark), *Corymbia intermedia* (pink bloodwood), *Lophostemon confertus* (brush box), *Lophostemon suaveolens* (swamp box), *Elaeocarpus grandis* (blue quandong), **Syagrus romanzoffiana* (cocos palm) and **Roystonea regia* (Cuban royal palm).

There are no consistent heights or cover to define a sub-canopy or low tree layer. Similarly, the shrub layer does not exhibit any consistency in terms of height or cover. Consequently, the vegetation that would normally occur in these strata in a functional native community has been broadly encompassed within the term 'understorey'.

Common understorey species include: **Archontophoenix alexandrae* (Alexander palm), *Acacia concurrens* (late-flowering hickory), *Acacia disparrima* (hickory wattle), *Glochidion ferdinandi* var. *ferdinandi* (cheese tree), **Lantana camara* (lantana), **Senna pendula* var. *glabrata* (Easter cassia), **Delonix regia* (poinciana), **Schefflera actinophylla* (umbrella tree), **Solanum torvum* (devil's fig) and **Tipuana tipu* (tipuana) and *Melaleuca quinquenervia* (broad-leaved paperbark). Vine species were noted to be smothering and causing tree failure along the mapped waterway.

The ground layer varies throughout the community in terms of height, cover and floristic composition. However, common species include: **Setaria sphacelata* (South African pigeon grass) – which is dominant throughout much of the site – **Asparagus aethiopicus* cv. *Sprengeri* (asparagus fern), **Melinis minutiflora* (molasses grass), **Megathyrsus maximus* (Guinea grass), **Melinis repens* (red natal grass), **Monstera deliciosa* (monstera). *Typha orientalis* (cumbungi) and *Sphagneticola trilobata* (Singapore daisy) occurs more frequently in proximity to dams and low-lying areas opposite the trainline.

Disturbance

Disturbance throughout the community primarily consists of historical clearing, residual horticultural infrastructure and weed incursion. The community includes various infrastructure (e.g. fencing, dams, tracks and easements). Historical disturbances and ongoing maintenance have also resulted in a community that exhibits uneven vertical structure and age classes throughout the canopy.

In addition to the being significantly degraded – i.e. compared to a functional native community – as a result of structural disturbances and highly open and exposed character, the community is heavily degraded by environmental weeds. In particular, **Setaria sphacelata* (South African pigeon grass) is abundant throughout much of the community, forming a dense monoculture ground layer across large parts of the site.

The impact of the weed incursions on ecological resilience was noted to be significant. Although there are isolated tracts and patches of juvenile to semi-mature native understorey species (interspersed with woody environmental weeds), the spatial extent and severity of existing weed infestations has excluded natural regenerative processes throughout much of the site. From the density, extent, dominance and abundance of environmental weeds it is expected a native seedbank is absent throughout the majority of the site – including areas along the mapped waterway.

Based on this finding, there is only considered to be a low likelihood of success for rehabilitation works relying on the existing soil profile. This is owing to the relative abundance/dominance of environmental weeds within the seedbank, which would continue to out-compete native recruitment/plantings over the longer term without significant and prolonged management input.

Representative photographs of Vegetation Community A are provided in Figure 1.



Figure 1 Vegetation Community A – Typical Vegetation Composition in Rehabilitation Areas

CLASSIFICATION AND CONSERVATION STATUS

The DNRME Regulated Vegetation Management Map identifies Vegetation Community A as predominantly Category X (non-remnant). Very small areas of vegetation that are mapped as Category B (remnant) are located along the site's eastern boundary and have been historically cleared for easements. The field survey has confirmed that vegetation on site is consistent with non-remnant vegetation.

VEGETATION CONDITION

A total of 66 weed species were identified on site during a site visit undertaken by Element Ecology in January 2021 to inform the preparation of this plan. A number of the weed species that were recorded at the site are scheduled under legislation, strategies or management documentation endorsed by Local, State or Federal Governments. These include:

- Eight (8) species scheduled under Council of the City of Gold Coast's *Biosecurity Management Plan 2019-2024*;
- Eight (8) species listed as restricted matters under the Queensland *Biosecurity Act 2014*;
- 40 species that are identified in the ranked list of 200 invasive naturalised plants in south-east Queensland (Batianoff and Butler, 2002); and
- Two (2) species that are weeds of national significance (WoNS).

There is a very high biomass of exotic weed species within the Rehabilitation Areas which are suppressing juvenile recruitment of native species. The proposed development presents an opportunity to remediate the existing seed bank and restore the pre-clearing regional ecosystem. Given that environmental weeds have the potential to re-colonise the Rehabilitation Areas from the upstream catchment, after plant establishment, targeted weed control and ongoing monitoring and maintenance is required to ensure that native strata establish without suppression from invasive species.

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Rehabilitation Management Plan
2 Karingal Drive, Pimpama

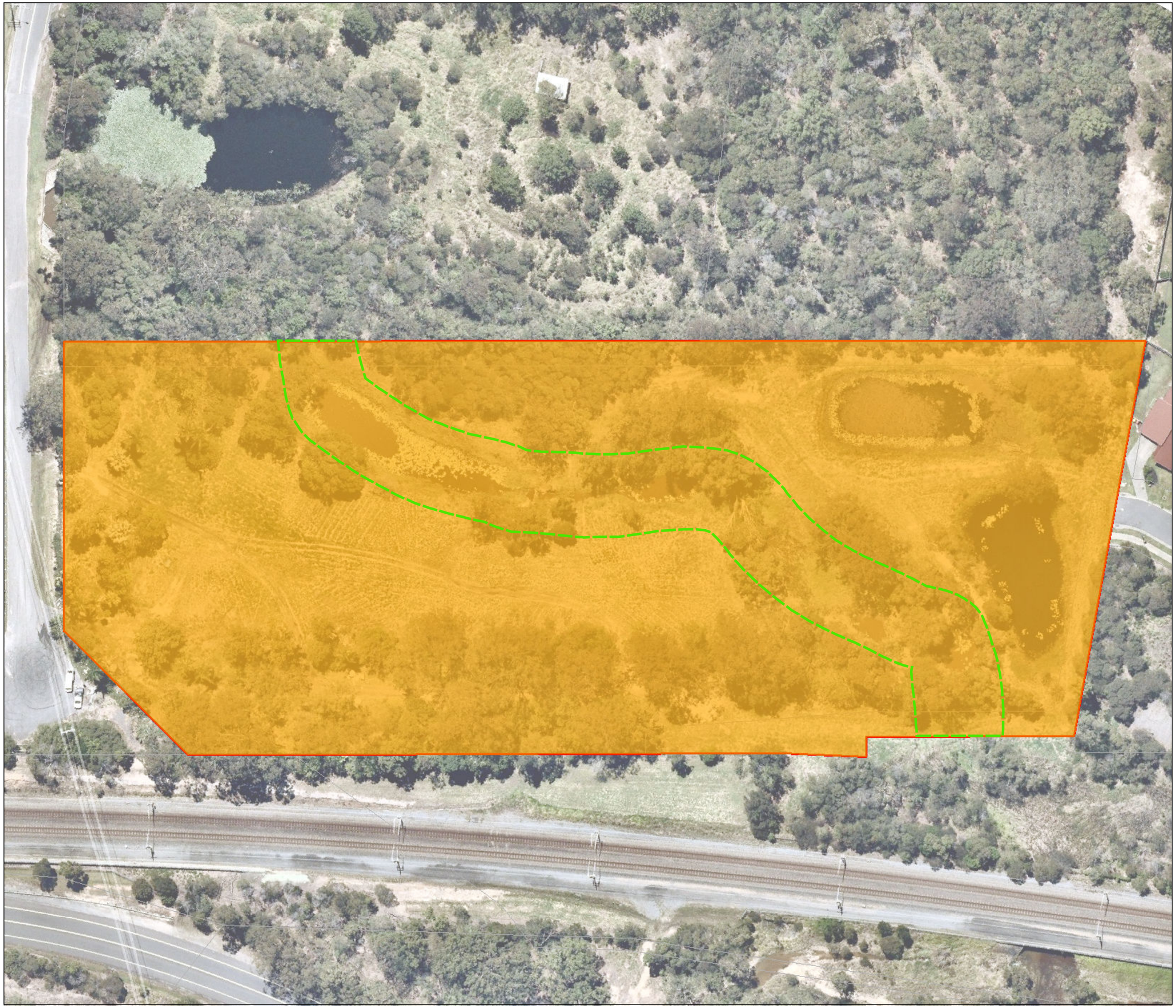
CLIENT
Brian Johnston

DRAWING TITLE
Vegetation Description

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PROJECT TITLE

Rehabilitation Management Plan
2 Karingal Drive, Pimpama

CLIENT

Brian Johnston

DRAWING TITLE

Vegetation Communities

LEGEND

- Rehabilitation Areas
- Vegetation Community A - Non-remnant vegetation
- Site boundary
- Cadastral boundary

DRAWING No: 20024-1_RMP_003
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REHABILITATION STRATEGY

The overall rehabilitation strategy has been developed with consideration of the existing ecological values and their current condition, in addition to future development outcomes for the site. The primary rehabilitation objective is to remediate highly modified areas, reinstate the pre-clearing vegetation community and enhance waterway functionality through the site.

The rehabilitation management zones and specifications have been based on the results of a targeted field assessment undertaken with the Rehabilitation Areas on site to inform the preparation of this plan. This assessment identified key ecological factors including: ecological resilience, vegetation composition, health and structure; habitat values; ecological function; connectivity; and disturbances such as weed infestations. The rehabilitation strategy includes actions designed to protected and enhance ecological values whilst minimising threatening processes associated with the establishment and proliferation of exotic flora and future land uses. The implementation of these management actions will facilitate the long term improvement of ecological values and function in designated Rehabilitation Areas.

There is a high likelihood that localised infestations from environmental weeds in the upstream catchment could recolonise Rehabilitation Areas. Therefore, ongoing weed control and monitoring will be required to ensure weed biomass is sustainably managed over the long term on site.

Accordingly, the rehabilitation strategy consists of reconstruction planting and weed control. The location of the rehabilitation management zones are shown on Drawing No. 20024-1_RMP_005-006.

REHABILITATION OBJECTIVES

Rehabilitation objectives within the Rehabilitation Areas on site include:

- Rehabilitation of the pre-clearing vegetation community – Regional Ecosystem (RE) 12.3.11.
- Removal of localised environmental weed infestations with ongoing maintenance to ensure no significant weed infestations occur on site.
- Improvement in habitat values and ecological connectivity through the site.
- Maintenance of essential infrastructure within Rehabilitation Areas (e.g. fencing and maintenance access) to delineate and protect values, and to facilitate management activities.

RECONSTRUCTION ZONE

Reconstruction will involve tubestock planting within 10 metres either side of the remediated waterway to restore the pre-clearing vegetation community. The objective of reconstruction in the Rehabilitation Area is to reinstate Of Concern RE 12.3.11.

The DNRME pre-clearing mapping for the site indicates that Of Concern RE 12.3.11 historically occurred in land zone 3 areas of the site. Consequently, in order to restore this vegetation community, the planting palette for the waterway corridor has been prepared using species that naturally occur within RE 12.3.11.

The planting palette also includes a focus on preferred koala feed tree species that are known to occur in this regional ecosystem. The planting palette and planting densities to be used for the Reconstruction Zone is provided on Drawing No. 20024-1_RMP_009.

Weeds are to be managed throughout the Reconstruction Zone in accordance with Drawing No. Drawing No. 20024-1_RMP_007-008.

PLANTING MODULE

All reconstruction plantings are to achieve an overall density of 1 plant per square metre. Planting is to be undertaken in a randomised manner to ensure that strata are distributed in a mixed pattern to reflect the species distribution that would naturally occur in the community being reinstated in Figure 2.

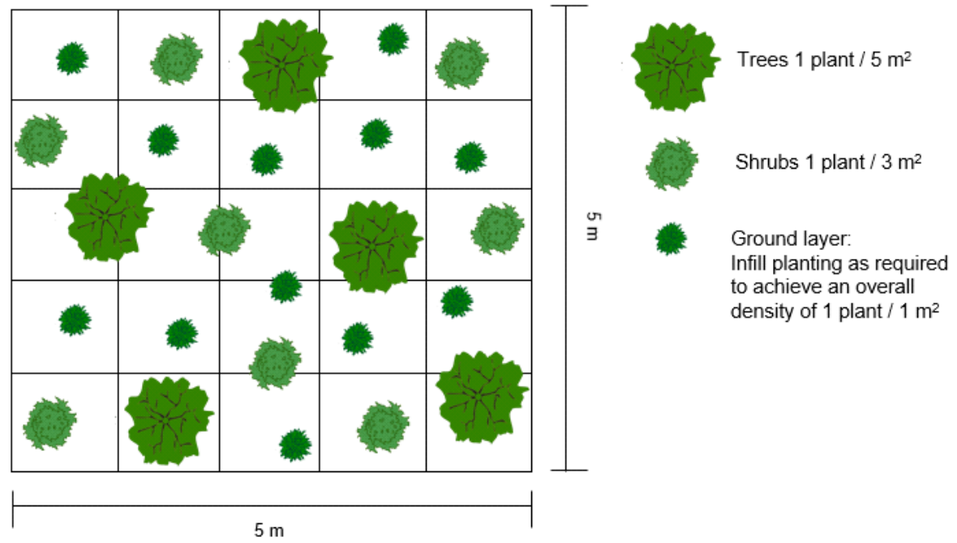


Figure 2 Reconstruction Planting Module

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PROJECT TITLE
Rehabilitation Management Plan
2 Karingal Drive, Pimpama

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DRAWING TITLE
Rehabilitation Strategy

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PROJECT TITLE

Rehabilitation Management Plan
2 Karingal Drive, Pimpama

CLIENT

Brian Johnston

DRAWING TITLE

Rehabilitation Areas

LEGEND

- Waterway alignment
- Reconstruction Zone - RE 12.3.11
- Development footprint
- Stormwater infrastructure
- Site boundary
- Cadastral boundary

DRAWING No: 20024-1_RMP_005
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PROJECT TITLE

Rehabilitation Management Plan
2 Karingal Drive, Pimpama

CLIENT

Brian Johnston

DRAWING TITLE

Rehabilitation Areas - Focussed

LEGEND

- Waterway alignment
- Reconstruction Zone - RE 12.3.11
- Development footprint
- Stormwater infrastructure
- Site boundary
- Cadastral boundary

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WEED CONTROL

The weed control methodology provided for the Rehabilitation Areas on site is primarily based upon the use of chemical control, supplemented by hand control for seedlings and smaller plants. Chemical control will be undertaken through the use of sensitive techniques including: spot spraying; cut, scrape and paint; stem injection; and a broad spectrum herbicide mix designed to be effective for multiple weed species. This approach has been selected to restrict impacts to target species by reducing the potential for off-target damage to native species and to minimise disturbance to the remediated native seed bank and juvenile recruitment.

When undertaking weed control within Rehabilitation Areas, the broad spectrum herbicide mix to be used for spot spraying consists of glyphosate at a rate of 1:100 plus metsulfuron methyl at a rate of 1 g/10 L water. Glyphosate at a rate of 1:1.5 is to be applied when implementing the cut, scrape and paint and stem injection control methods. Targeted species-specific weed control methods have been provided in Table 1 below for circumstances in which the broad spectrum herbicide mix is identified as being ineffective, or of limited effectiveness.

Primary weed control will represent the first weed control event for the Rehabilitation Areas. The objective of primary weed control is to either chemically or manually control weed infestations in the Rehabilitation Areas. Although the waterway corridor will be remediated prior to commencement of rehabilitation works, such that future weed control works focus on managing weed regrowth and/or new infestations. At the completion of primary weed control, major weed infestations must be controlled within the Rehabilitation Areas, with ongoing weed control works designed to expand weed control throughout the area by extending the weed control works area further during each control event. This approach will ensure that weed control targets are achieved over time.

Routine weed management will consist of monthly follow up weed control events undertaken subsequent to the completion of primary weed control. The objective of routine weed management is to maintain control of regrowth from existing weed infestations and prevent the proliferation of new infestations. Ongoing control of weeds is to be undertaken in accordance with the approach for weed control outlined in Table 1. However, where the use of the broad spectrum herbicide mix is not effective for particular species, the control methods specified in Table 1 are to be employed.

There may be instances in which new weed species, not identified in Table 1, are recorded within the Rehabilitation Areas. Where this occurs the following general weed control guidelines may be implemented for different weed species growth forms:

- Grasses, vines and herbaceous species: Spot spray with a broad spectrum herbicide mix (i.e. glyphosate at a rate of 1:100 plus metsulfuron methyl at a rate of 1 g/10 L water).
- Shrubs, small trees and vines with woody stems: Cut, scrape and paint with glyphosate at a ratio of 1:1.5.
- Trees: Stem inject with glyphosate at a ratio of 1:1.5.

Control methods specified within the *South East Queensland Ecological Restoration Framework: Manual* (Chenoweth EPLA and Bushland Restoration Services, 2012) and the Big Scrub Rainforest Landcare Group's *Subtropical Rainforest Restoration: A practical manual and data source for landcare groups, land managers and rainforest regenerators (Second Edition)* (Big Scrub Rainforest Landcare Group, 2005) should also be considered.

Table 1 Species Specific Weed Control Methods

Scientific Name	Common Name	Control Method[1]
Ageratina adenophora	crofton weed	Hand pull and hang to dry; spray G1:200 or G1:200 + MM or MM.
Ageratum houstonianum	blue billygoat weed	Hand pull; spray G1:100.
Ambrosia artemisiifolia	annual ragweed	Hand pull; spray G1:100 or G1:100 + MM or MM.
Archontophoenix alexandrae	Alexander palm	Seedlings: Hand pull; crown out; spray G1:200 + MM. Trees: Cut below growing point or SI G1:1.5
Asparagus aethiopicus cv. *Sprengeri*	ground asparagus	Crown then hang up to dry; spray G1:100 + MM or MM. Best results from herbicide application will be obtained when plant is between flowering and berry formation.
Aster subulatus	wild aster	Hand pull; spray G1:100 or G1:100 + MM or MM.
Bidens pilosa	cobbler's pegs	Hand pull; spray G1:100 or G1:100 + MM or MM.
Callisia elegans	striped inch plant	Hand pull, roll or rake, ensure all segments are removed, bag and dispose off-site; spray G1:200 or G1:200 + MM.
Callisia fragrans	purple succulent	Hand pull, roll or rake, ensure all segments are removed, bag and dispose off-site; spray G1:200 or G1:200 + MM.
Cecropia peltata	trumpet tree	Seedlings and regrowth: Hand pull or spray G1:100 + MM. Shrubs: CSP G1:1.5 or SI G1:1.5. Trees: SI G1:1.5.
Chloris gayana	Rhodes grass	Hand pull or dig up; spray G1:100.
Cinnamomum camphora	camphor laurel	Regrowth and seedlings: Hand pull; spray G1:200 or G1:200 + MM. Saplings: CSP G1:1.5 or G100%. Trees: SI G1:1.5 or G100%.
Conyza bonariensis	flax-leaf fleabane	Hand pull; spray G1:100 or G1:100 + MM or MM.
Conyza sumatrensis	fleabane	Hand pull; spray G1:100 or G1:100 + MM or MM; CSP G1:1.5.
Corymbia torelliana	cadaghi	Seedlings: Hand pull; spray G1:200. Saplings: CSP 1:1.5. Trees: SI G1:1.5.
Delonix regia	poinciana	Seedlings and regrowth: Hand pull or spray G1:200 or G1:200 + MM or MM. Shrubs: CSP G1:1.5 or SI G1:1.5. Trees: SI G1:1.5. Where possible, bag seed pods and dispose off-site.
Desmodium uncinatum	silver-leaved desmodium	Seedlings: Hand pull; spray G1:100. Shrubs: CSP 1:1.5. Where practical, collect and bag seeds, dispose off-site.
Duranta erecta	duranta	Seedlings and regrowth: Spray G1:100. Shrubs: CSP G1:1.5; SI G1:1.5.
Dypsis lutescens	golden cane palm	Seedlings: Hand pull; crown out; spray G1:200 + MM. Trees: Cut below growing point or SI G1:1.5
Eragrostis curvula	African lovegrass	Hand pull or dig up; spray G1:100.
Eriobotrya japonica	loquat	Seedlings: Hand pull; spray G1:200 or G200 + MM or MM. Saplings: CSP G1:1.5. Trees: SI G1:1.5.
Eugenia uniflora	Brazilian cherry	Seedlings: Spray G1:200 or G200 + MM or MM. Shrubs: CSP G1:1.5; SI 1:1.5.
Lantana camara	lantana	Seedlings and regrowth: Spray G1:100. Shrubs: Lop into 50 cm pieces and CSP base G1:1.5. Dense and large infestations: Overspray using G1:100. Best results will be obtained when plant is undergoing active growth.
Lepidium bonariense	Argentine peppercress	Hand pull; spray G1:100 or G1:100 + MM.
Leucaena leucocephala	leucaena	Seedlings: Hand pull; spray G1:200 or 1:200 + MM. Saplings: CSP 1:1.5. Trees: SI G1:1.5.
Livistona chinensis	Chinese fan palm	Seedlings: Hand pull; crown out; spray G1:200 + MM. Trees: Cut below growing point or SI G1:1.5
Lotononis bainesii	lotononis	Hand pull, bag and dispose offsite; spray G1:200 + MM or MM.
Macroptilium atropurpureum	siratro	Seedlings: Spray G1:100 + MM or MM. Vines CSP 1:1.5.
Macroptilium lathyroides	phasey bean	Seedlings: Spray G1:100 + MM or MM. Vines CSP 1:1.5.
Macrotyloma axillare	perennial horse gram	Minor infestations: Hand pull or crown; spray G1:200 or G1:200 + MM or MM. Tubers: CSP G1:1.5. Dense infestations: Spray G1:200 or G1:200 + MM or MM. Bag seeds and dispose off-site.

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PROJECT TITLE
Rehabilitation Management Plan
2 Karingal Drive, Pimpama

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DRAWING TITLE
Rehabilitation Specifications (1 of 4)

LEGEND

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Scientific Name	Common Name	Control Method[1]
Mangifera indica	mango	Seedlings: Hand pull; spray G1:200. Saplings: CSP G1:1.5. Trees: SI G1:1.5.
Megathyrsus maximus	Guinea grass	Hand pull or dig up; spray G1:100.
Melinis minutiflora	molasses grass	Hand pull or dig up; spray G1:100.
Melinis repens	red natal grass	Hand pull or dig up; spray G1:100.
Monstera deliciosa	monstera	Scrape and paint stems G100%
Morus alba	white mulberry	Seedlings: Hand pull, spray G1:200. Saplings: CSP G1:1.5, stack branches above the ground to dry and prevent reshooting. Trees: SI G1:1.5.
Murraya paniculata	orange jessamine	Seedlings: Hand pull, spray G1:200. Shrubs: CSP G1:1.5; SI G1:1.5.
Neonotonia wightii	glycine	Seedlings: Hand pull; spray G1:100 + MM or MM. Vines: CSP G1:1.5.
Nymphaea caerulea subsp. *zanzibarensis*	blue waterlily	Hand pull and/or rake out of water, roll up and hang to dry; spray G1:100 or G1:100 + MM. Bag and dispose safely off site.
Ochna serrulata	ochna	Seedlings and regrowth: Spray G200 + MM or MM. Stems: CSP G1:1.5; scrape and paint G1:1.5; SI G1:1.5. Has very long tap root do not try to hand pull.
Oxalis corniculata	yellow wood-sorrell	Crown out; spray G1:100 or G1:100 + MM.
Passiflora suberosa	corky passionflower	Seedlings: Spray G200 or G200 + MM. Vines: Hand pull; CSP G1:1.5.
Philodendrum bipinnatifidum	tree philodendron	Scrape and paint stems G100% or cut stems high and low. Takes a long time to die and requires repeated monitoring and treatment.
Ricinus communis	castor-oil plant	Seedlings: Hand pull; spray G1:200. Shrubs and small trees: CSP G1:1.5; SI G1:1.5.
Roystonea regia	Cuban royal palm	Seedlings and regrowth: Spray G1:200. Shrubs and thickets: Lop into 50 cm pieces and CSP base G1:1.5. Dense and large infestations: Overspray using G1:200.
Schefflera arboricola	dwarf umbrella tree	Seedlings: Hand pull or spray G1:200 or G1:200 + MM. Saplings: CSP G1:1.5, stack branches above the ground to dry and prevent reshooting. Trees: SI G1:1.5. (Do NOT stem inject when tree is in flower, this can have toxic effects on nectar feeding birds).
Schinus terebinthifolius	broad-leaved pepper tree	Seedlings: Hand pull; spray G1:200. Saplings: CSP G1:1.5. Trees: SI G1:1.5.
Setaria sphacelata	South African pigeon grass	Hand pull or dig up; spray G1:100.
Sida rhombifolia	Paddy's lucerne	Seedlings and small plants: Hand pull; spray G1:100 or G1:100 + MM. Shrubs: CSP G1:1.5.
Sida spinosa	spiny sida	Hand pull; spray G1:100 or G100 + MM.
Solanum chrysotrichum	giant devil's fig	Seedlings: Hand pull or spray G1:200. Shrubs: CSP G1:1.5; SI G1:1.5.
Solanum mauritianum	wild tobacco	Seedlings: Hand pull or spray G1:200. Shrubs: CSP G1:1.5; SI G1:1.5.
Solanum nigrum	black-berry nightshade	Hand pull; spray G1:100.
Solanum seaforthianum	Brazilian nightshade	Seedlings and regrowth: Spray G1:200 or G1:200 + MM. Vines: CSP G1:1.5.
Solanum torvum	devil's fig	Seedlings: Hand pull or spray G1:200. Shrubs: CSP G1:1.5; SI G1:1.5.
Sonchus oleraceus	sow thistle	Hand pull; spray G1:100 or G1:100 + MM or MM.
Spathodea campanulata	African tulip tree	Seedlings: Spray G1:200. Saplings: CSP G1:1.5. Trees: SI G1:1.5.
Sphagneticola trilobata	Singapore daisy	Hand pull, ensure all root nodes are removed, bag and dispose off-site; spray G1:200 + MM.
Syagrus romanzoffiana	cocos palm	Seedlings: Hand pull; crown out; spray G1:200 + MM. Trees: Cut below growing point or SI G1:1.5
Syzygium jambos	rose apple	Seedlings: Hand pull; crown out; spray G1:200 + MM. Trees: Cut below growing point or SI G1:1.5
Tipuana tipu	tipuana	Seedlings: Hand pull; spray G1:200. Saplings: CSP G1:1.5. Trees: SI G1:1.5.
Urochloa decumbens	signal grass	Dig up; spray G1:100.
Verbena bonariensis	purpletop	Hand pull; spray G1:100 or G100 + MM.
Verbena littoralis	common verbena	Hand pull; spray G1:100 or G100 + MM.
Washingtonia robusta	Mexican fan palm	Seedlings: Hand pull; crown out; spray G1:200 + MM. Trees: Cut below growing point or SI G1:1.5
Yucca aloifolia	Spanish bayonet	Dig out plant by hand or machine; cut and paint near ground G1:1.5; spray MM.

[1]Control method:
CSP = Cut scrape and paint; SI = Stem inject or frill;
G100% = Undiluted glyphosate;
G1:1.5 = Glyphosate mixed at 1 part water to 1.5 parts glyphosate;
G1:100 = Glyphosate mixed at 1 part water to 100 parts glyphosate;
G1:200 = Glyphosate mixed at 1 part water to 200 parts glyphosate; and
MM = Metsulfuron methyl mixed at 1.5 grams per 10 litres of water.

Note that use of all chemicals must be undertaken in accordance with manufacturer's instructions and Material Safety Data Sheets where available.

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RECONSTRUCTION

Table 2 provides a list of species that are considered suitable for use in areas to be rehabilitated as RE 12.3.11. This list has been based on native species that have been recorded within Vegetation Community A on site, as well as species that naturally occur within the target community.

Should additional species need to be used (e.g. where species within Table 2 are not in stock in local nurseries), alternative species are to be derived from flora species that have been identified as naturally occurring within RE 12.3.11. Note that no species additions or substitutions are to occur without the prior approval of the Council of the City of Gold Coast.

Table 2 Reconstruction Planting Palette – RE 12.3.11

Stratum	Scientific Name	Common Name	Planting Density
Canopy	*Angophora leiocarpa*	smooth-barked apple	1 per 5 m^2
	Corymbia citriodora	spotted gum	
	Corymbia intermedia	pink bloodwood	
	Corymbia tessellaris	carbeen, Moreton Bay ash	
	Eucalyptus seeana	narrow-leaved red gum	
	Eucalyptus siderophloia	grey ironbark	
	Eucalyptus tereticornis	forest red gum	
	Lophostemon suaveolens	swamp box	
	Melaleuca quinquenervia	broad-leaved paperbark	
Mid-storey	*Acacia concurrens*	late-flowering hickory	1 per 3 m^2
	Acacia disparrima	hickory wattle	
	Acacia maidenii	maiden's wattle	
	Allocasuarina littoralis	black she-oak	
	Alphitonia excelsa	soap tree	
	Banksia integrifolia	coastal banksia	
	Breynia oblongifolia var. *oblongifolia*	coffee bush	
	Casuarina glauca	swamp oak	
	Elaeocarpus obovatus	hard quandong	
	Glochidion ferdinandi var. *ferdinandi*	cheese tree	
	Glochidion sumatranum	umbrella cheese tree	
	Grevillea robusta	silky oak	
	Leptospermum polygalifolium	wild may	
	Notelaea ovata	mock olive	
Ground layer	*Dianella brevipedunculata*	short-flowered flax lily	Infill planting to achieve an overall density of 1 per m^2
	Dianella caerulea	blue flax lily	
	Digitaria parviflora	small-flowered fingergrass	
	Entolasia stricta	wiry panic	
	Imperata cylindrica	blady grass	
	Lepidosperma laterale	variable sword-sedge	
	Lomandra confertifolia	a mat-rush	
	Lomandra hystrix	river mat-rush	
	Lomandra longifolia	long-leaved mat-rush	
	Ottochloa gracillima	graceful grass	

Note: Species selection has been based on the floristic composition of Vegetation Community A and immediate surrounds, and plant species known to occur naturally within RE 12.3.11.

GENERAL PLANTING SPECIFICATIONS

The requirements below are to be implemented in association with any tubestock planting that is undertaken within the Rehabilitation Areas on site:

- Undertake reconstruction planting during periods of higher rainfall (i.e. January to May), where possible, to improve the likelihood of successful establishment and to minimise watering requirements.
- Utilise native species that have been sourced from local provenance (i.e. within a 10 km radius of the site).
- Utilise tubestock wherever possible, with specimens no larger than 140 mm pots to be planted.
- Ensure that all specimens sourced for the Rehabilitation Areas are well established, with no evidence of poor health resulting from root restriction, pests or disease.
- Ensure that specimens are planted on the same day as they are delivered to the site. Where immediate planting is not possible, they are to be stored in a cool, shaded area and periodically watered throughout the day.
- Prepare a planting hole that is approximately 1.5 times the diameter and twice the depth of the rootball of the specimens to be planted.
- Prior to planting, pre-water and then place a suitable quantity of water crystals into each planting hole.
- Place one (1) plant into each planting hole and backfill excavated soil, ensuring that the stem of each plant is upright and not covered in any more than 20 mm of soil.
- Top dress newly planted specimens with a slow release fertilizer.
- Where necessary, install plant guards to protect planted specimens.
- Water plants immediately following planting, with follow up watering to be undertaken on an as needs basis during the Establishment Period and Maintenance Period, dependent upon rainfall.
- Cover the area surrounding newly planted specimens with:
  - 10 cm layer of organic forest mulch (where appropriate) and not likely to be inundated/washed away (e.g. top of bank). This mulch must be free of weeds, rubbish and other non-organic debris, and must be stockpiled for a minimum of six (6) weeks to prevent nitrogen drawdown. Mulch must not be in contact with plant stems.
  - Jute mesh or other stabilisation techniques (e.g. coir logs) in areas that may be subject to temporary inundation and/or have steeper banks to be determined on site by landscape contractor.

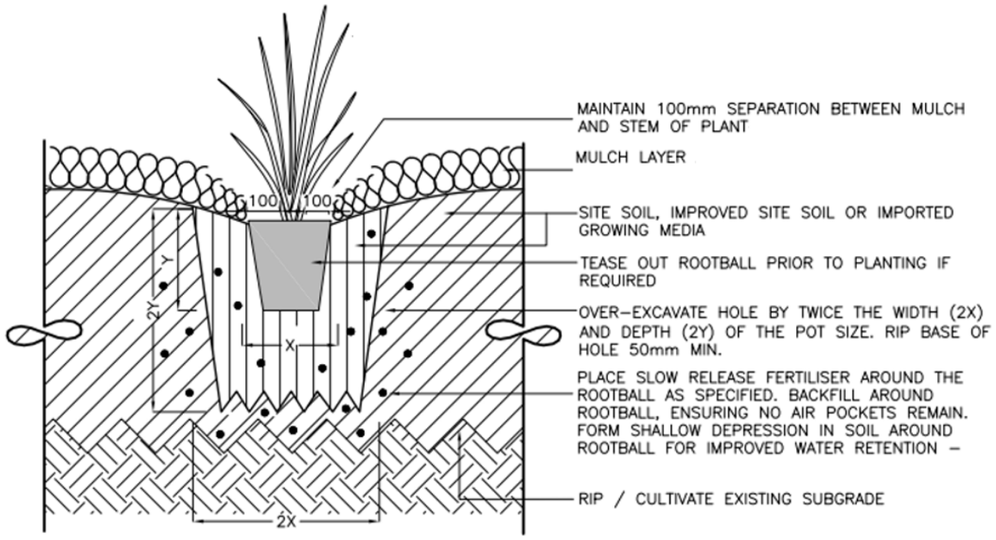


Figure 2 Typical Tubestock Planting Detail (Source: Brisbane City Council, 2014)

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REHABILITATION AREA MANAGEMENT

REHABILITATION AREA MONITORING

Routine monitoring must be conducted on a monthly basis for duration of the Establishment Period. After which time monitoring should occur quarterly during the Maintenance Period. These monitoring events must assess the Rehabilitation Areas for:

- Effectiveness of rehabilitation works;
- New and/or significant weed infestations;
- Poor health and/or mortality within reconstruction planting areas;
- Mulch depth and cover within reconstruction planting areas;
- Presence of rubbish and/or debris; and
- Disturbances or threatening processes that impact or may impact upon ecological values.

Where routine monitoring identifies management issues and/or non-compliances (e.g. significant weed infestation, rubbish, disturbances etc), reactive management must be undertaken as soon as possible to rectify the observed problem (e.g. newly planted trees that are observed to be dead, dying or structurally unsound, are to be replaced).

REHABILITATION AREA PERFORMANCE OUTCOMES

In order to ensure that the Rehabilitation Areas achieve rehabilitation objectives, maintenance activities must be assessed against a range of criteria in relation to performance outcomes. The set of criteria below represent the performance outcomes for the Rehabilitation Areas during the Establishment Period (duration of six [6] months) and Maintenance Period (duration of six [6] months).

ESTABLISHMENT PERIOD

Rehabilitation works will be maintained throughout the Establishment Period in all Rehabilitation Areas for a duration of six (6) months. The following criteria are to be achieved for rehabilitation within the Rehabilitation Areas:

- Signs of regenerating local native plant species throughout the Rehabilitation Areas.
- The Rehabilitation Areas has achieved a species diversity that is reflective of the target vegetation communities, with an overall average density of 1 native plant per square metre.
- 90% of declared and environmental weeds have been controlled.
- Any rubbish and debris has been removed from the Rehabilitation Areas.
- Where reconstruction and any supplementary planting has occurred:
  - All plantings will be properly established and sufficiently advanced to have attained a self-sustaining condition.
  - Establishment of vegetation to the extent that the vegetation will not perish without excess watering during drought periods.
  - Within mulched areas mulch depth must be a minimum of 100 mm.
  - 90% survival of planted specimens.
  - Planting has been maintained to ensure that plant stock exhibits good health and growth habit.
  - Planting has occurred to the extent that canopy growth reduces the need for excessive weed removal.

MAINTENANCE PERIOD

Rehabilitation works will be maintained throughout the Maintenance Period in all Rehabilitation Areas for a duration of six (6) months. The following criteria are to be achieved for rehabilitation works in the waterway corridor prior to Maintenance Period being accepted as complete:

- Signs of regenerating local native plant species in the Reconstruction Zone.
- Within mulched areas, mulch depth must be a minimum of 100 mm.
- 90% survival of plantings within reconstruction planting areas.
- Reconstruction and supplementary plantings have been maintained to ensure that plant stock exhibits good health and growth habit.
- 90% of environmental weeds have been controlled.

MAINTENANCE SCHEDULE

A maintenance schedule has been included in Table 3 below for the duration of Site Preparation, Initial Site Works, Establishment Period and Maintenance Period in the Rehabilitation Areas.

Table 3 Maintenance Schedule for Rehabilitation Areas

Management Stage	Management Action	Timing
Site Preparation	Ensure the Rehabilitation Areas are clearly delineated.	Prior to commencement of rehabilitation works
	Restoration contractor to establish photo-monitoring points and collect baseline photo-monitoring records in the Rehabilitation Areas.	
	Remove any rubbish and debris in the Rehabilitation Areas.	
Initial Site Works	Undertake primary weed control as specified in the Rehabilitation Management Plan.	At the commencement of rehabilitation works
	Undertake reconstruction planting in the Rehabilitation Areas as specified in this RMP.	After primary weed control
Establishment Period (duration of six [6] months)	Watering while tubestock plantings are establishing, depending on suite of species planted, proximity to waterway channel, weather conditions and time of year when revegetation works commenced.	Every day for week 1, twice per week for weeks 2-6 and weekly for weeks 6-12 (as required).
	Undertake routine weed control within the Rehabilitation Areas.	Monthly
	Undertake routine monitoring and management within the Rehabilitation Areas, if required: • Reinstate topsoil and mulch depths. • Application of fertiliser to tubestock only. • Replacement of ties and stakes. • Replace dead or dying tubestock. • Remove rubbish and debris.	Monthly
	Undertake routine photo-monitoring within the Rehabilitation Areas.	Quarterly
Maintenance Period (duration of six [6] months)	Undertake supplementary tubestock planting in Rehabilitation Areas as per Establishment Period.	Quarterly (if required)
	Undertake routine weed control within the Rehabilitation Areas.	Quarterly
	Undertake routine monitoring and management within the Rehabilitation Areas, if required: • Reinstate topsoil and mulch depths. • Application of fertiliser to tubestock only. • Replacement of ties and stakes. • Replace dead or dying tubestock. • Remove rubbish and debris.	Quarterly
	Undertake routine photo-monitoring within the Rehabilitation Areas.	Bi-annually
After Maintenance Period has concluded	Undertake routine weed control within the Rehabilitation Areas.	Annually
	Undertake routine monitoring and management within the Rehabilitation Areas.	
	Undertake routine photo-monitoring within the Rehabilitation Areas.	

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