28ºS ENVIRONMENTAL

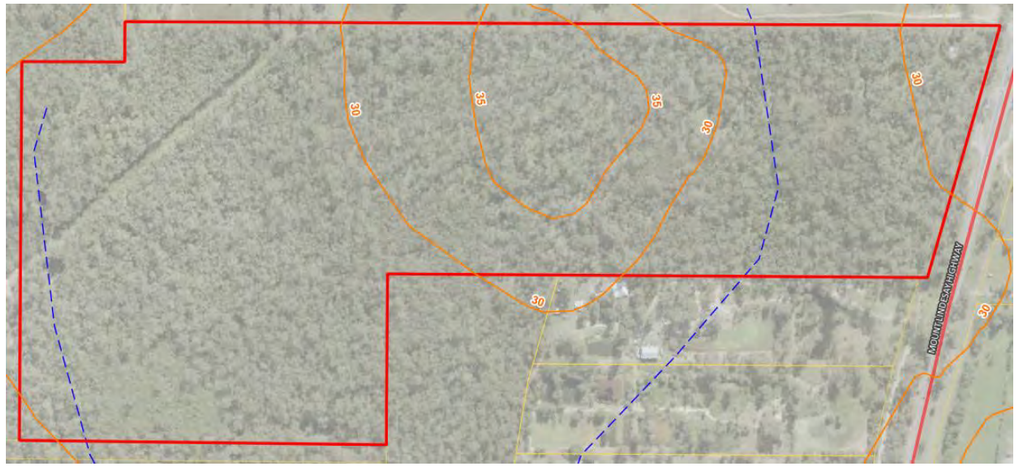
APPENDIX C.2

North Maclean Industrial Development – Operational Works Rehabilitation Management Plan

REHABILITATION MANAGEMENT PLAN

Introduction

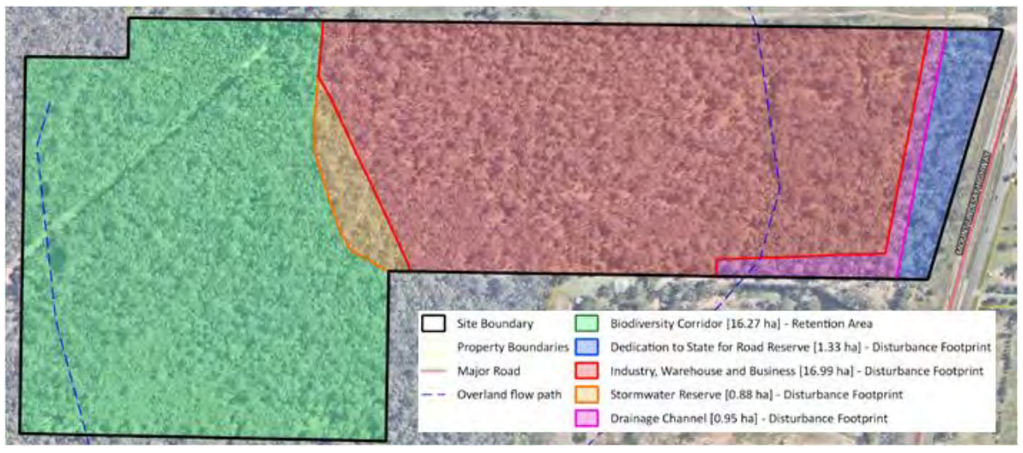
28 South Environmental Pty Ltd (**28 South**) has prepared this Conceptual Rehabilitation Management Plan (**RMP**) for the rehabilitation and restoration of the 16.27 ha Biodiversity Corridor/Environmental Protection Zone (**EPZ**) associated with the proposed Maclean Estates Residential Development over 4653 - 4691 Mount Lindsay Highway, North Maclean (**Lot 1** on **RP113251**) herein referred to as the Site (see **Inset 1**). The Site is situated in the Logan City Council (**LCC**) Local Government Area. The context of the Biodiversity Corridor in relation to other proposed project elements is shown as **Inset 2**.



Inset 1: Site Location

Declaration

This RMP has been prepared by an appropriately qualified and experienced environmental professional possessing tertiary qualifications in environmental science and ecology and demonstrated experience in preparing RMPs, auditing rehabilitation works and ecological reporting within the South East Queensland Bioregion.



Inset 2: Proposed development and project elements

Implementation, timing of work and ongoing management

The proposed action will result in the retention and enhancement of a 16.27 ha area of Regrowth and Remnant Regional Ecosystems by the proponent during the operational works component of the project. At plan sealing the area will be rezoned as Environmental Protection zone in accordance with the Greater Flagstone Priority Development Area, and the area dedicated to LCC for management as part of the LGA conservation estate in perpetuity.

Rehabilitation Area

The overarching Project is to cultivate a resilient, functioning Regional Ecosystem (**RE**) representative of the groundtruthed REs occurring on Site; **RE 12.3.5** *Eucalyptus tereticornis* (Queensland blue gum) +/- *Melaleuca quinquenervia* (Broad-leaved paperbark), *Lophostemon suaveolens* (Swamp box) (open forest on coastal alluvium), **RE 12.9 – 10.12** *Corymbia intermedia* (Pink bloodwood) +/- *Eucalyptus siderophloia* (Northern grey ironbark) , *Eucalyptus moluccana* (Grey gum) (woodland on sedimentary rocks), **RE 12.3.18** *Melaleuca irbyana* (Weeping paperbark) +/- *Eucalyptus moluccana*, *Eucalyptus tereticornis* (low forest on alluvial plains) within 20 years.

The EPZ contains a north – south-east tending overland flow path which drains into an unnamed tributary of Logan River. Historically the core of the EPZ has been preserved with parts of its extremities impacted by extensive clearing of native bushland occurring on the site for agriculture pursuits, mainly cropping with some minor grazing.

More recently, cessation of these agricultural practices has enabled some natural regeneration of these areas with the establishment of regrowth vegetation and exotic weeds.

Management Units

Three management units occur within the Biodiversity Corridor. Their spatial extents are illustrated in **RMP001**.

North Maclean No. 2

RMP001

28 South Project Ref: 2023-033

Source: D:\Dropbox\(d) Projects\2022\2022-033 (North Macelan No. 2)\(d) Data\(d) GIS

Data Sources: Aerial Imagery (Nearmap/Qld Globe); Digital Cadastre Database (DNRME, 2021); Roads (DNRME, 2020); Watercourse (DNRME, 2020); Contours (DNRME 2016).

Legend

- Site Boundary
- Overland Flow Path
- Drainage Channel
- Impact Area
- Impact Area Stormwater Reserve
- Road Reserve
- Environmental Protection Zone
- Temporary Construction Fencing
- Location of Temporary Construction Fencing and Koala Exclusion Fencing
- Management Unit 1 [RE 12.3.5]
- Management Unit 2 [RE 12.3.18]
- Management Unit 3 [RE 12.9-10.12]

Issue Date	Dwg No.	Author
2023-03-06	2023-033-RMP001	JD
Approved	**Revision Note**	
AD		

GDA2020 MGA 56

1:3,000

0 75 150 225 300 m

Management Unit 1

Management Unit 1 (**MU1**) comprises 11.12 ha of Eucalyptus tereticornis and Melaleuca quinquenervia dominated remnant forest (refer **Plate 1** and **Plate 2**) with a subcanopy dominated by endemic species and a mixed weedy understorey. The regrowth vegetation is analogous with pre-clear **RE 12.3.5**. There are a large number of mature *Eucalyptus tereticornis* (Queensland blue gum) in the 700-1200 mm DBH and these trees afford significant foraging opportunities for koala and grey headed flying fox. A subcanopy of *Melaleuca linariifolia* (snow-in-summer) and or *Lophostemon suaveolens*, and semi-mature canopy species is present; these afford supplementary shelter and forage habitat.

The shrub layer is generally sparse although there are areas of *Corymbia torelliana** (Cadaghi) and *Cyperus sbsp**. Native shrubs / small trees include *Machaerina articulata* (Jointed rush), *Philydrum lanuginosum* (Frogsmouth), *Ludwigia octovalvis* (Willow primrose). Groundcover is largely native through dominating *Lachnagrostis filiformis* (Common blown grass) and *Leersia hexandra* (Swamp rice grass) with occurrences of *Imperata cylindrica** (Cogon grass), *Lachnagrostis filiformis* (Pacific bent grass) and *Paspalum sp.* (Crowngrass). The exotic *Limnobium laevigatum** (Frogbit) was found on Site. There are moderate levels of groundcover, fallen woody debris and dense leaf litter.

Plate 1: Representative habitat condition of Management Unit 1 (Left: North, Right: South)

Plate 2: Representative habitat condition of Management Unit 1 (Left: North, Right: South)

Management Unit 2

Management Unit 2 (**MU2**) comprises 3.32 ha and occupies much of the southern boundary of the EPZ and a small collection near the centre western boundary, groundtruthed as **RE 12.3.18** (refer **Plate 3** and **Plate 4**). It is described as *Melaleuca irbyana* open to closed forest to 15m. The centre (and majority) of the MU is remnant vegetation with the eastern corner representing mature regrowth. The canopy is dominated by *Melaleuca irbyana* with some emergent occurrences of *Eucalyptus moluccana* and Eucalyptus *siderophloia* to 30m. *Alphitonia excelsa* (Red ash), *Streblus brunonianus* (Whalebone tree) and *Eucalyptus crebra* comprise the subcanopy.

The groundcover is dominated by the exotic *Callisia repens** (Pink lady) which has been able to outcompete other species in the shady conditions which are moist but not submerged. This has rendered the shrub layer as non-existent. Other groundcover species are scarce and include *Eleocharis philippinensis*, *Alternanthera denticulata* (Lesser joyweed), *Cyperus sbsp.* and *Ageratum houstonianum** (Blue billygoat weed). There are moderately low levels of groundcover, fallen woody debris and dense leaf litter.

Plate 3: Representative habitat condition of Management Unit 2 (Left: North, Right: South)

Plate 4: Representative habitat condition of Management Unit 2 (Left: North, Right: South)

Management Unit 3

Management Unit 3 (**MU3**) comprises 23.96 ha of *Eucalyptus tereticornis, Eucalyptus seeana* (Narrow-leaved red gum), *Lophostemon suaveolens* open forest to 28m. This MU is analogous with pre-clear **RE 12.9 – 10.12** and exhibits sandy soils with Eucalyptus *siderophloia*, *Angophora leiocarpa (*rusty gum*), Corymbia intermedia* rounding out the comprising species within the endemic canopy of the remnant and mature regrowth vegetation (refer **Plate 5** and **Plate 6**). *Lophostemon suaveolens* dominates the subcanopy which forms dense strands and most individuals register DBHs in the range of 400-600 mm. These trees afford significant foraging opportunities for greater glider and grey headed flying fox. The subcanopy is further comprised of *Melaleuca quinquenervia*, *Acacia disparrima* (Southern salwood) and *Alphitonia excelsa* (*Red ash*) to 12m which provide supplementary shelter and forage habitat.

The shrub layer is moderately sparse although there are areas of *Gomphocarpus physocarpus** (Hairy balls) and dominance of *Lantana Camara** (Common lantana) reaching 2m in open areas. In addition to upper strata regrowth, native shrubs / small trees include *Glochidion ferdinandi* (Cheese tree), *Acacia leiocalyx* (Black wattle), *Acacia concurrens* (Coastal wattle), *Leptospermum polygalifolium* (Wild may). Groundcover is largely native and various through established *Dianella brevipedunculata* (Blue fax lily), *Hypoxis hygrometrica var. villosisepala*, *Lobelia purpurascens* (White root), *Ottochloa gracillima* (Graceful grass), *Scleria rugosa* (Sedge), *Oplismenus aemulus*, *Microlaena stipoides* (Weeping grass), *Entolasia stricta* (Wiry panic), *Cymbopogon refractus* (Barbed wire grass), *Aristida sp.*, *Paspalidium sp.*. Weeds are scarce but include *Imperata cylindrica**, *Lantana montevidensis** (Trailing lantana), *Ageratum houstonianum** (Bluemilk) and *Leptochloa decipiens**. There are moderately high levels of groundcover, fallen woody debris and dense leaf litter.

Plate 5: Representative habitat condition of Management Unit 3 (Left: North, Right: South)

Plate 6: Representative habitat condition of Management Unit 3 (Left: North, Right: South)

Ecological Restoration and Reconstruction Goals

The primary purpose of this Rehabilitation Management Plan is to:

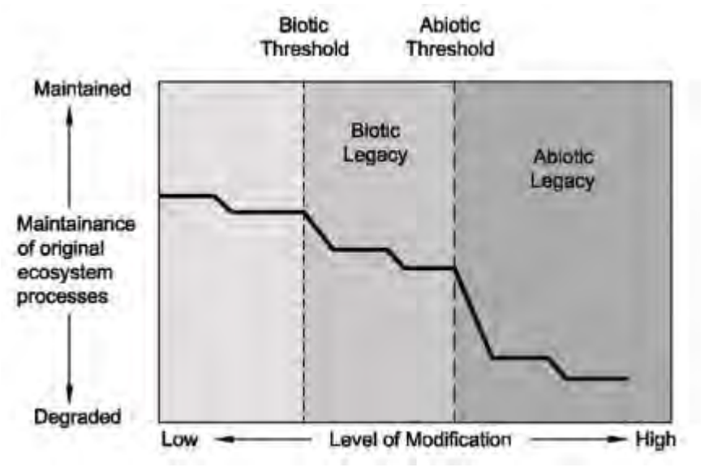
- Establish 16.27 ha of ecologically functioning, resilient open forest representative of remnant **RE 12.3.5**, **RE 12.9 – 10.12** and **RE 12.3.18** with low levels of weeds and diverse habitats, within 20 years of works occurring.
- Establish and maintain high quality open forest habitat affording ecological functionality affording uninterrupted habitat and movement opportunities for koala.
- Establish and maintain high quality grey-headed flying-fox foraging habitat with a high degree of winter-flowering species.
- Establish and maintain high quality greater glider foraging habitat affording uninterrupted habitat and movement opportunities.

The primary goals and performance criteria are:

- Retain and protect all native trees
- Retain and enhance all existing native fauna habitat
- Remove extensive weed infestations and review regenerating species with a view to promoting native regeneration and removal of exotic regrowth
- Plant-out areas which do not support native regeneration with native endemic tube stock to increase the extent of native vegetation cover both initially and over time
- Expand on the existing mature habitat and remnant vegetation to increase density within the EPZ
- Improve ecological connectivity within the site and the greater North Maclean corridor
- Ensure WoNS and weed species listed under the *Biodiversity Act 2014* are not present within the Environmental Protection Zone
- Observe evidence of significant reductions in the presence of other exotic species
- Perform all weed treatment in a manner that does not promote erosion
- Routinely monitor Management Units to identify and rectify the following impacts:
    - Litter and/or rubbish dumping
    - Plant theft
    - Fauna impacts
    - Soil compaction
    - Erosion.
    - Overgrowth.

Restoration Actions

The spatial extents that all three Management Units (**MUs**) are based exhibit a level of maintenance of original ecosystem processes and a low level of modification as per **Inset 3** that infer assisted natural regeneration will facilitate a complete restoration for all MUs. The near ubiquitous presence of weedy understoreys impede a natural regeneration approach from being successful. In the instance that this approach isn't as influential in restoration as desired, planting palettes have been included within this RMP to advise in-fill planting where necessary.



Inset 3: Graphical representation of ecosystem transitional states (from *SEQ Ecological Restoration Framework Guideline, 2012*)

Management measures for each MU have been derived from in-field detailed inspection and prepared in line with the SMART principals (Specific, Measurable, Achievable, Realistic & Timed) and are informed by the *South East Queensland Restoration Framework* (https://hlw.org.au/resources/seqecologicalrestorationframework/).

Management measures have also been prepared to ensure that temporal conditions can be reacted to and place greater accountability on the engaged contractor to utilise the most appropriate measures based on the proposed goals and on-ground temporal conditions (i.e. if good native recruitment is occurring at the time of works, tube stock plantings may not be required or can be significantly reduced. Conversely, increasing weed incursion during works may require further weeding and increased tube stock plantings). Specifications encourage the active natural regeneration from the seed bank where possible as this is the best means of establishing a robust and resilient native ecosystem that is genetically suited to its endemic conditions. Key actions for each MU are outlined in **Table 1**.

Table 1: Management Unit actions

Management Unit 1	Management Unit 2	Management Unit 3
• Remove waste and detritus from EPZ • Install temporary exclusion fencing as per detail in "**Temporary construction fencing**"		
1. The ecological restoration approach of assisted natural regeneration will be employed for this MU to enhance its existing ecological values. 2. Disturbed infested sections will be cleared of weeds to facilitate the surrounding vegetation's restoration. 3. In-fill planting will take place in weed cleared areas to increase the RE's density according to the **RE 12.3.5** planting palette below. 4. Where available, canopy planting will be undertaken to increase the MUs canopy cover. 5. Install fauna friendly fencing (koala exclusion fencing) in line with landscape plans. 6. Ongoing maintenance of planted vegetation and declared weeds will be necessary as per Monitoring, Maintenance and Weeding and Management Specifications below. 7. Replacement planting in each (separate) structural layer (i.e. sub-canopy, shrub, groundcover) with species relevant to floristic species and densities shall be undertaken when any random sampling, observation or monitoring event identifies mortality of greater than 5% in any given strata.	1. The ecological restoration approach of assisted natural regeneration will be employed for this MU to address its significant weed infestation and enhance its existing natural values. **2.** Disturbed infested sections will be cleared of weeds to facilitate the surrounding vegetation's restoration. Key consideration will be the use of fire per fire management prescriptions within REDD Ecological Burn Prescriptions in consultation with traditional owners (ie. Cultural burn). 3. In-fill planting will take place in weed cleared areas to increase the RE's density according to the **RE 12.3.18** planting palette below. 4. Where available, canopy planting will be undertaken to increase the MUs canopy cover. 5. Install fauna friendly fencing (koala exclusion fencing) in line with landscape plans. 6. Ongoing maintenance of planted vegetation and declared weeds will be necessary as per Monitoring, Maintenance and Weeding and Management Specifications below. 7. Replacement planting in each (separate) structural layer (i.e. canopy, sub-canopy, shrub, groundcover) with species relevant to floristic species and densities shall be undertaken when any random sampling, observation or monitoring event identifies mortality of greater than 5% in any given strata.	1. The ecological restoration approach of assisted natural regeneration will be employed for this MU to enhance its existing ecological values. 2. Disturbed infested sections will be cleared of weeds to facilitate the surrounding vegetation's restoration. 3. In-fill planting will take place in weed cleared areas to increase the RE's density according to the **RE 12.9 – 10.12** planting palette below. 4. Where available, canopy planting will be undertaken to increase the MUs canopy cover. 5. Install fauna friendly fencing (koala exclusion fencing) in line with landscape plans. 6. Ongoing maintenance of planted vegetation and declared weeds will be necessary as per Monitoring, Maintenance and Weeding and Management Specifications below. 7. Replacement planting in each (separate) structural layer (i.e. sub-canopy, shrub, groundcover) with species relevant to floristic species and densities shall be undertaken when any random sampling, observation or monitoring event identifies mortality of greater than 5% in any given strata.

Planting Palette

The species list and target density for planting in **Tables 3, 4 & 5** have been derived from Regional Ecosystem Technical Descriptions (https://www.publications.qld.gov.au/dataset/re-technical-descriptions) and the groundtruthed bio-condition and field surveys of the Site. Canopy and subcanopy planting is to achieve a target density range of 1,600-2,000 stems per hectare.

Table 3: Planting palette **RE 12.3.5**

Botanical Name	Common Name	Dominance (%)	Density*
Canopy			
Eucalyptus tereticornis	Queensland blue gum	40%	Canopy plantings should be established at 1/40m² (~6.3m spacing)
Melaleuca quinquenervia	Broad-leaved paperbark	30%	
Lophostemon suaveolens	Swamp box	20%	
Casuarina glauca	Swamp oak	10%	
Sub canopy			
Glochidion sumatranum	Umbrella cheese tree	10%	Sub-canopy plantings should be established at 1/20m² (~13m spacing)
Melaleuca linariifolia	Narrow-leaved paperbark	10%	
Elaeocarpus obovatus	Hard quandong	10%	
Meliocope elleryana	Pink doughwood	10%	
Gahnia seiberiana		10%	
Banksia robur	Swmap banksia	10%	
Acaia leiocalyx	Black wattle	5%	
Glochidion ferinandi	Cheese tree	5%	
Alphitonia excelsa	Red ash	5%	
Shrub			
Hibiscus diversifolius		5%	Shrub plantings should be

Botanical Name	Common Name	Dominance (%)	Density*
Jagera pseudorhus	Foambark	5%	established at 1/16m² (~4 m spacing)
Leptospermum polygalifolium	Wild may	5%	
Trema tomentosa	Poison peach	5%	
Breynia oblongifolia	Coffee bush	5%	
Groundcover			
Blechnum indicum	Swamp water fern	15%	Groundcover plantings established at 1/1m² (~1 m spacing)
Leersia hexandra	Swamp rice grass	15%	
Persicaria strigosa	Prickly persicaria	10%	
Phragmites australe	Phragmites	10%	
Lepidosperma laterale	Variable sword sedge	5%	
Imperata cylindrica	Blady grass	5%	
Gahnia aspera	Rough saw sedge	5%	
Juncus usitatus	A rush	15%	
Lomandra longifolia	Mat rush	10%	
Hardenbergia violacea	False sarsaparilla	5%	
Dianella caerulea	Blue flax-lilly	5%	
Dianella brevipedunculata	Flax-lilly	5%	
Eustrephus latoifolius	Wombat berry	5%	
Stephania japonica	Snake vine	5%	

Table 4: Planting palette **RE 12.3.18**

Botanical Name	Common Name	Dominance (%)	Density*
Canopy			
Melaleuca irbyana	Weeping paperbark	70%	Canopy plantings should be established at 1/24m² (~10m spacing)
Eucalyptus moluccana	Grey-gum	10%	
Eucalyptus tereticornis	Queensland blue gum	10%	
Eucalyptus siderophloia	Northern grey ironbark	10%	
Sub canopy			
Streblus brunonianus	Whalebone tree	10%	Sub-canopy plantings should be established at 1/20m² (~13m spacing)
Eucalyptus crebra	Narrow-leaved ironbark	40%	
Allocasuarina luehmannii	Ironwood tree	10%	
Acacia leiocalyx	Black wattle	30%	
Alphitonia excelsa	Red ash	10%	
Shrub			
Acacia concurrens	Coastal wattle	25%	
Corymbia tessellaris	Moreton Bay ash	25%	Shrub plantings should be established at 1/16m² (~4 m spacing)
Alstonia constricta	Bitterbark	40%	
Dockrillia linguiformis	Thumbnail orchid	10%	
Groundcover			
Paspalidium distans		15%	Groundcover plantings established at 1/1m² (~1 m spacing)
Eleocharis philippinensis		15%	
Alternanthera denticulata	Lesser joyweed	10%	
Cyperus gracilis	Slender flat-sedge	10%	
Themeda triandra	Kangaroo grass	5%	
Enteropogon unispiceus		5%	
Digitaria breviglumis		5%	
Achyranthes aspera	Devil's hornwhip	15%	
Alternanthera nana	Hairy joyweed	5%	
Cheilanthes sieberi		5%	
Aristida queenslandica		10%	

Table 5: Planting palette **RE 12.9 – 10.12**

Botanical Name	Common Name	Dominance (%)	Density*
Canopy			
Eucalyptus tereticornis	Queensland blue gum	40%	Canopy plantings should be established at 1/24m² (~10m spacing)
Eucalyptus seeana	Narrow-leaved red gum	30%	
Angophora leiocarpa	Rusty gum	20%	
Eucalyptus siderophloia	Northern grey ironbark	10%	
Sub canopy			
Lophostemon suaveolens	Swamp box	10%	Sub-canopy plantings should be established at 1/20m² (~13m spacing)
Corymbia intermedia	Pink bloodwood	10%	
Melaleuca quinquenervia	Broad-leaved paperbark	10%	
Acacia disparrima	Southern salwood	10%	
Alphitonia excelsa	Red ash	10%	
Shrub			
Glochidion ferinandi	Cheese tree	5%	Shrub plantings should be established at 1/16m² (~4 m spacing)
Acaia leiocalyx	Black wattle	5%	
Acacia concurrens	Coastal wattle	5%	
Leptospermum polygalifolium	Wild may	5%	
Alstonia constricta	Bitterbark	5%	

Botanical Name	Common Name	Dominance (%)	Density*
Groundcover			
Dianella brevipedunculata	Flax-lilly	15%	Groundcover plantings established at 1/1m^2 (~1 m spacing)
Hypoxis hygrometrica var. villosisepala		15%	
Lobelia purpurascens	White root	10%	
Ottochloa gracillima	Graceful grass	10%	
Scleria rugosa	Sedge	5%	
Oplismenus aemulus		5%	
Aristida queenslandica		5%	
Paspalidium distans	Shotgrass	15%	
Microlaena stipoides	Weeping grass	5%	
Entolasia stricta	Wiry panic	5%	
Cymbopogon refractus	Barbed wire grass	10%	

Temporary construction fencing

Temporary construction fencing is to be installed on Site before construction begins to facilitate faunal movement (see **Inset 3**). It will encompass the entire Site baring the extents of the EPZ open to the landscape to not impede fauna movement. It is also to be installed along the EPZ's and Stormwater Easement's boundary from the Industry, Warehouse and Business precincts (see **RMP001**) with every fifth panel left vacant to allow vacating fauna to egress into the riparian corridor without impediment.

Inset 3: Indicative temporary fauna exclusion fencing aligning a construction site

Koala exclusion fencing

Koala exclusion fencing is to be installed along the EPZ's and Stormwater Easement's boundary from the Industry, Warehouse and Business precincts to support safe dispersal of native fauna along the ecological corridor within the EPZ (see **RMP001**). 1.8 metre (**m**) aluminium pool fencing (**Inset 3)** presents a cost effective and suitable fencing material to exclude domestic and wild dogs from the Riparian Reserve. Climbing posts will be installed to allow scansorial fauna to climb over the posts to escape from residential / Local Park area. Self-closing pool gate can be used as pedestrian gates.

Inset 4: Indicative koala friendly fencing aligning an esplanade road

Contractor qualifications

The contractor must be suitably qualified in bushland rehabilitation and be able to demonstrate bushland regeneration experience in riparian zones. All rehabilitation personnel must hold a minimum Certification III in Conservation Land Management, Certificate III in Horticulture, Certificate III in Rehabilitation Construction or equivalent experience in bush regeneration and rehabilitation.

Further, the supervising officer for the engaged rehabilitation contracting team must hold a minimum Bachelor's Degree in Environmental Science or similar. Further, all chemical weed treatment works must be undertaken under a current Ground Distribution Contractors Licence and Agricultural Chemical Distribution Certificate (ACDC). This WMSP has been based on best practices from the SEQ Ecological Restoration Framework and significant practical experience in restoration implementation projects.

Management Unit Additional Notes

Best practice erosion and sediment controls

In preparing and maintaining the site, the rehabilitation contractor responsible for the installation and maintenance of all appropriate erosion and sediment controls in accordance with Best Practice Erosion and Sediment Controls (International Erosion Control Association, 2008) to manage flows into and from the Rehabilitation Zone, and installation of any temporary erosion control measures, including jute mesh / jute mat and sediment / flow controls including coir logs identified within the Management Units as specified by this plan. Indicative sediment controls are

shown (source: Book 6 – Standard drawings https://www.austieca.com.au/publications/sediment-control)Soil Stockpiling and Handling).

Monitoring Program

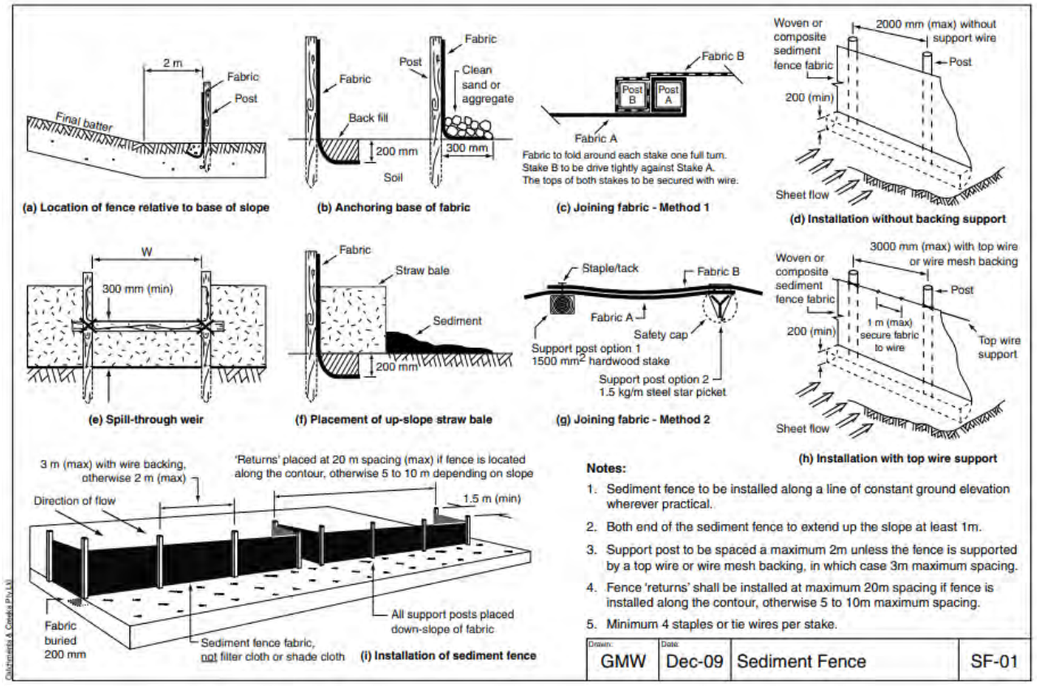
Each MU will require a minimum of 3 monitoring point to be established as part of this RMP. It is important to monitor the restoration progress through collecting a range of data to illustrate the achievement of the success criteria identified in **Table 2**. Monitoring should be undertaken at 6, 12, 18 and 24 month intervals and be documented. Upon the completion of the works program (2 years), the monitoring efforts are to be compiled and submitted to MBRC. It is the responsibility of the rehabilitation contractor to actively undertake monitoring and achieve the monthly records. Data that should be collected includes:

- Average height of RMP planted plants within Management Units (height in meters for tree, shrub and groundcover species)
- Dominant species (qualitative description of the dominant species in each strata)
- Assessment of the health of vegetation within the restoration area
- Percentage weed cover within the restoration area
- Survival percentage of planted specimens
- Notation of natural death or illegal removal of any native plants
- Abundance of natural recruitment including native and exotic species.

Photographs shall be taken in cardinal directions at each monitoring site which is to consist of a 10 m x 10 m plot. The plot should be marked with star pickets or flagging tape to allow for ease of identification in the field. All works and chemicals used should be logged and documented as part of the Monitoring Program.

The restoration contractor should develop pro-forma for the collection of relevant monitoring information during all events to ensure consistency and comparability between surveys.

Where actions are required to address instances of non-compliance or plant failure, corrective actions are to be implemented by the rehabilitation contractor. Refer to Corrective Actions detailed below.



Redundant structures, farm dams and rubbish

The rehabilitation contractor shall be responsible for the removal of all redundant structures, rubbish, abandoned equipment, machinery, domestic fittings etc.

Final Planting Approach

While the above provides the general reconstruction and planting strategy for the Management Units, it is acknowledged that the final approach will depend on the on-ground conditions following weed removal and will require adaptive management as the rehabilitation works progress.

Maintenance

In addition to those detailed in **Table 6**, the minimum following maintenance measures are required to be undertaken by the engaged restoration contractor:

- Planting areas are to be regularly watered for a period of 12 weeks or as deemed necessary by the contractor to ensure establishment is successful or until sufficient rainfall is received or plants have established sufficiently.
- Recurrent listed WoNS or Biosecurity Act weeds within regeneration areas are to be removed (weed management measures are outlined within **Table 7**).
- All fallen debris and hollow logs are to be retained in situ to retain terrestrial microhabitats.
- Hollow-bearing limbs and suitable hollow logs removed during operational works should be salvaged and relocated into the MU to enhance the microhabitats available within the Site.

Establishment, Maintenance and Success Criteria

Success criteria are outlined as **Table 6**.

Table 6: Rehabilitation timeframes and success criteria

Phase	Action	Timeframe	Applicable MU
ESTABLISHMENT			
1	Initial inspection of the Rehabilitation Area by the rehabilitation contractor (pre-start). Detail the extent of weeding works required, areas requiring planting and areas supporting existing native vegetation. This is to be reflected in the costing and planting levels based on the temporal period of survey.	Prior or during OPW.	All MUs
2	MU area pegging established around the perimeter to flag the extent of works.	Prior or during OPW.	
3	Initial Weed Treatment per **Table 7** as appropriate for the identified management units. Active weed management following plant establishment and encouragement of native regeneration (preferably over growing seasons being spring, summer and autumn). Weed densities are not to exceed 25% coverage at the time of on-maintenance inspection unless agreed to in writing by the Assessment Manager.	On-maintenance inspection with Ecologist and Assessment Manager is to occur 3 months after primary weed control works and any necessary planting is completed. 3 months.	All MUs
ON-MAINTENANCE			
	Assessments to be undertaken in line with success criteria for the abundance of weeds, and regeneration review of all rehabilitation weeding.	Every 3 months after on-maintenance is	All MUs
	All plantings that don't strike, are killed or damaged must be replaced during this period.	achieved to 24 months (2 years) from planting, an inspection with the Assessment Manager is to occur.	
	Replacement planting in each (separate) structural layer (i.e. canopy, sub-canopy, shrub, groundcover) with species relevant to floristic species and densities shall be undertaken when any random sampling, observation or monitoring event identifies mortality of greater than 5% of planted stock in any given strata.		
OFF-MAINTENANCE			
4	The following success criteria must be met to achieve off-maintenance: o WoNS, weed species listed under the *Biosecurity Act 2014* are not to be present in MUs. o Evidence of significant reductions in the presence of other exotic species. It is noted that the removal of all individual exotic species is likely to be unachievable and not practical. Further, the timing of this RMP may not reflect the abundance or density of weed species at the commencement of works. The engaged contractor must establish a starting density and abundance of weeds at the time of initial inspection and no more than 10% coverage is required by time of off-maintenance inspection. o MUs planted out according to species and densities specified in **Table 3, 4 & 5** as appropriate for the identified management units. o Should pest plants establish after 12 months from the commencement of this RMP, the understory planting density should be increased. o All plantings must have been established and likely to persist without assistance going forward.	2 years.	All MUs

Corrective Actions

The following corrective actions are to be implemented in instances of non-compliance with the Goals and Success Criteria:

- If retained trees show signs of ill health (i.e. dead or poor health), an arborist is to be engaged to identify the likely causes and to recommend mitigation measures to improve regeneration conditions.
- Where weed re-establishment occurs, additional treatment and removal works are to be instigated; if evidence of excessive spraying exists or if off-target damage is evident, further restoration will be required to the satisfaction of the assessment manager.
- Where planted specimens within the establishment and monitoring period fail to strike, supplementary planting is to be undertaken.

Contractor Requirements

The contractor must be suitably qualified in bushland rehabilitation and be able to demonstrate bushland regeneration experience. All rehabilitation personnel must hold a minimum Certification III in Conservation Land Management, Certificate III in Horticulture, Certificate III in Rehabilitation Construction or equivalent experience in bush regeneration and rehabilitation. Further, the supervising officer for the engaged rehabilitation contracting team must hold a minimum Bachelor's Degree in Environmental Science or similar. Further, all chemical weed treatment works must be undertaken under a current Ground Distribution Contractors Licence and Agricultural Chemical Distribution Certificate (ACDC). This RMP has been based on best practices from the SEQ Ecological Restoration Framework and significant practical experience in restoration implementation projects.

Site Clean-up & Waste Management

Hazards and wastes are removed from the development site; this includes:

- Any wastes as defined in the Environmental Protection Act 1994.
- Machinery, fencing or equipment left over from past uses and practices.
- Items of rubbish and litter.

Fire Ant Movement Controls

The Site is located within a Fire Ant Biosecurity 2 Zone. To prevent the spread of fire ants, the Queensland Government has implemented controls that apply to individuals and commercial operators, to restrict the movement of materials that could carry fire ants including soil, turf, potted plants, mulch, baled hay or straw, animal manures mining or quarry products.

All rehabilitation contractors engaged to work on this project must have a relevant Approved Risk Management Plan (**ARMP**). **Note:** all vegetation or soil moved off site must be conducted under an ARMP. It is the contractor's responsibility to conduct all activities in accord with their ARMP as penalties apply for non-compliance with the movement controls. The engaged contractors are unsure of their obligations they should contact Biosecurity Queensland.

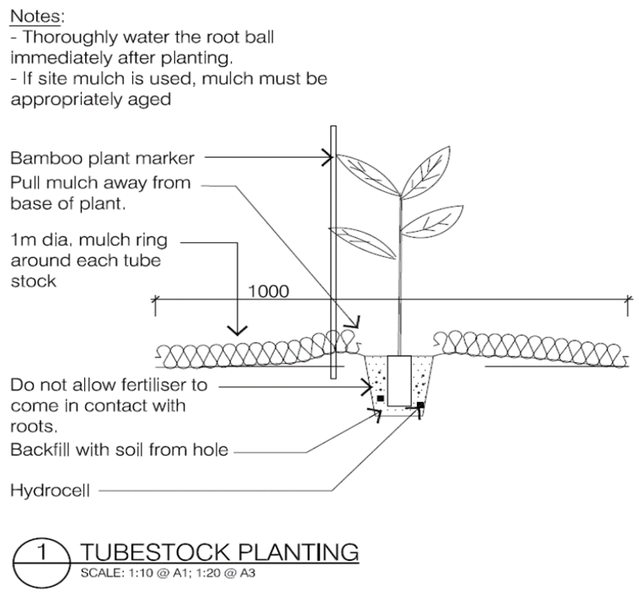
Environmental Management and Conservation Precinct Restrictions

The following Environmental Protection Zone restrictions shall be implemented:

- No parking or movement of construction machinery and vehicles.
- No placement of site offices, storage sheds, portaloos, and other permanent or temporary structures.
- No storage of topsoil, building materials, fuels and other chemicals.
- No dumping of excess materials and / or wastes.
- No washing off vehicles and construction machinery, rinsing out fuel containers, and disposal of cleaning products.
- No general foot access of construction staff unless specifically related to restoration/rehabilitation of MUs.

Specification Notes for Rehabilitation Planting

1. Ensure all water crystals are thoroughly wetted before application and fertiliser is applied at the nominated rate.
2. Compensatory Planting Treatments: remove all weeds and install planting as noted. Provide a bamboo marker at each tube stock location that extends 300mm above the ground and has the top 100mm painted white or pink – Per Tubestock Planting 1.
3. It is the responsibility of the engaged contractor to determine the final location of each planting. This location should take into account the position of any existing vegetation retained within the Site and the necessary maintenance of the MU.
4. Ensure all water crystals are thoroughly wetted before application and fertiliser is applied at the nominated rate.
5. Install aged forest mulch to a depth of 100 mm across the entire RMU in accordance with the Detail 1.
6. Install tree guards (bags or coreflute) on all planted trees



Weeds and herbicide use

Within each of the RMUs, weed of concern; declared weeds and weeds of concern within Gold Coast Biosecurity Management Plan 2019–2024, and other environmental weeds must be treated in accordance with the control methods provided in: "South East Queensland Restoration Framework (2012) – Manual – Appendix C" unless it can be demonstrated that there is an overriding need to utilise another method which deviates from the below methods (e.g. if a woody weed is specifically left in-situ but killed and planted into with native figs for soil retention and visual amenity). It is noted that not all weeds are or will be present during works; however, may occur over time. The engaged restoration contractor must undertake detailed site inspections prior to works commencing to identify target weed species, their location and extent for treatment. Target weeds identified on-site and their control method are outlined in **Table 7**.

Herbicides must be applied by appropriately qualified/supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance.

Table 7: Control techniques and herbicide application rates

Common Name	Scientific Name	Application Method	Chemical	Application Rate
Trees				
Camphor laurel	*Cinnamomum camphora*	Stem inject	Glyphosate	
		Cut, scrape and paint	Glyphosate	
		Basal bark (saplings)	Fluroxypyr	
		Spot spray	Glyphosate, Glyphosate + Metsulfron methyl	
Chinese celtis	*Celtis sinensis*	Cut stump and paint, stem injection	Triclopyr 200g /L plus picloram 100 g/L	
		Stem injection, cut stump and paint	Glyphosate 360 g/L	
		Spot spray	Fluroxypyr 200 g/L	
Cadaghi	*Corymbia torelliana*	Spot Spray	Glyphosate	
		Cut, scrape and paint	Glyphosate	
		Stem inject	Glyphosate	
		Basal bark (saplings)	Fluroxypyr	
Umbrella tree	*Schefflera actinophylla*	Spot Spray	Glyphosate + Metsulfron methyl	
		Cut, scrape and paint	Glyphosate	
		Stem inject	Glyphosate	
Giant devils fig and wild tobacco	*Solanum chrysotrichum* and *S. mauritianum*	Spot spray	Glyphosate, Fluroxypyr	
		Cut, scrape and paint	Glyphosate	
		Basal bark (juvenile / mature)	Fluroxypyr	
		Stem inject	Glyphosate	
African tulip tree	*Spathodea campanulata*	Spot spray	Glyphosate	
		Cut, scrape and paint	Glyphosate	
		Stem inject	Glyphosate	
Cocos palm	*Syagrus romanzofffiana*	Stem inject	Glyphosate + Metsulfron methyl	
		Spot spray	Glyphosate + Metsulfron methyl	
Shrubs				
Easter Cassia	*Senna pendula var. glabrata*	Spot Spray	Glyphosate	
		Cut Scrape Paint	Glyphosate	
		Stem Inject	Glyphosate	
Lantana	*Lantana camara*	Cut, Scrape and Paint	Glyphosate	
		Spot-spray	Fluroxypyr	
		Spray (spot spray and	Glyphosate	
Brazilian peppertree	*Schinus terebinthifolius*	Spot spray	Glyphosate	
		Cut scrape paint	Glyphosate + Metsulfuron Methyl	
		Basal barking	Fluroxypyr	
Groundsel	*Baccharis halimifolia*	Spot Spray, Stem Inject, Cut Scrape Paint	Glyphosate	
		Spot Spray	2,4-D	
Yellow bells	*Tecoma stans*	Cut stump method	Triclopyr 200g /L plus picloram 100 g/L	
		Spot spray	Glyphosate	
		Basal barking	Fluroxypyr	
		Stem injection	Glyphosate	
Groundcovers and grasses				
Singapore Daisy	*Sphagneticola trilobata*	Spot-spray	Glyphosate + Metsulfuron Methyl	
			Metsulfuron Methyl	
Pink Lady	*Callisia repens*	Culture burn	Glyphosate	

Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates as identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued permit where applicable. Refer to the South East Queensland Ecological Restoration Framework for addition guidance.

Common Name	Scientific Name	Application Method	Chemical	Application Rate
		Spot Spray		
Blue billy goats weed	*Ageratum houstonianum*	Spot Spray	Glyphosate	
			Metsulfuron Methyl	
Singapore Daisy	*Sphagneticola trilobata*	Spot-spray	Glyphosate + Metsulfuron Methyl	
			Metsulfuron Methyl	
Basket asparagus	*Asparagus aethiopicus*	Spot Spray	Glyphosate + Metsulfuron Methyl	
			Metsulfuron Methyl	
Red Natal, South African Pigeon Grass, Molasses Grass, Para Grass, Rhodes Grass, Guinea Grass, Elephant Grass, Signal Grass	*Melinis repens, Setaria sphacelata, Melinis multiflora, Urochloa mutica, Chloris gayana, Megathyrsus maximus*, *Pennisetum purpureum, Urochloa decumbens*	Spot Spray	Glyphosate	