PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

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Queensland Government

20 November 2020

Marisa Graetz,
Development Manager
Economic Development Queensland
Dept. of State Development, Manufacturing, Infrastructure and Planning
Level 14, 1 William Street, Brisbane QLD
By email: Marisa.Graetz@dsdmip.qld.gov.au

**RE: FAUNA FLORA MANAGEMENT PLAN FOR STAGE 3 OF CARSELDINE VILLAGE RENEWAL MASTERPLAN**

Dear Marisa,

# 1 Introduction

This letter has been prepared to summarise and accompany the Fauna Flora Management Plan (**FFMP**) prepared for Stage 3 of Carseldine Village. The Stage 3 FFMP is included as **Attachment 1.** As a result of Stage 3 works, impacts to habitat trees are proposed in accordance the approved Development Scheme. Subsequently, there is a requirement for the Stage 3 works to outline these impacts and identify how they will be managed in accordance with the Fitzgibbon Bushland Management Plan (**FBMP**). **Sheets 1** and **2** provide further detail into the context and background of this FFMP.

As part of the development application for Stage 3, EDQ are proposing the establishment of 53 terrace allotments, pedestrian linkage, access roads and footpaths, on-street parking and associated infrastructure such as sewer and stormwater.

# 2 Stage 3 Impact and Fauna Flora Management Plan

The attached FFMP has been prepared to govern the management of vegetation and fauna prior to, during and post construction works for Stage 3. **Table 1** below provides a summary of the impact to significant vegetation as a result of Stage 3 works and the required restoration works to compensate for the impacts.

**Table 1 - Summary of Stage 2 Impact**

| Significant Vegetation | Impact (hectares) | Required Rehabilitation Ratio | Required Rehabilitation (hectares) |
|---|---|---|---|
| Remnant RE 12.3.11 (Open Forest) | 0.0 | 2:1 | N/A |
| Remnant RE 12.3.7 (Open Forest) | 0.0 | 2:1 | N/A |
| Remnant RE 12.5.3 (Open Forest) | 0.0 | 2:1 | N/A |
| Non-Remnant Vegetation | 0.0 | 1:1 | N/A |
| Cabbage Tree Creek (including all plants, creek banks and bed) | 0.0 | 1:1 | N/A |
| Habitat Trees (>600mm DBH[1]) | 2 Trees | 3:1 | 6 nesting boxes |
| | | **Total Rehabilitation Required** | 6 nest boxes<br><br>**NOTE: the overarching ERP for the CUV considers the provision of these compensatory elements** |

## 2.1 Vegetation Management

**Sheets 4** & **5** of the Stage 3 FFMP outline the provisions for vegetation management throughout construction works, including protection measures to be installed in relation to retained vegetation (i.e. tree protection fencing), vegetation clearing methods, restrictions during construction phases (i.e. no access within Environmental or Tree Protection Zones) and responsibilities for the Project Manager.

[1] Diameter at Breast Height

## 2.2 Fauna Management

**Sheet 5** of the FFMP provides details for the management of fauna prior to and during vegetation clearing works. In particular, works are to be managed by a suitably licensed Fauna Spotter Catcher of which all clearing works will be conducted in accordance with their relevant Rehabilitation Permit and the FFMP (including all reporting requirements). Particular focus has been given to management of Significant Habitat Trees throughout the Stage, as these features have been identified to provide denning, roosting and nesting habitat for locally common fauna species including squirrel gliders. The FFMP provides clear requirements for fauna management activities to be carried out prior to and during clearing works each day, as well as recommended actions should injured animals be recovered during works and the establishment of post clearing monitoring requirements.

## 2.3 Ecological Restoration

EDQ proposed a 'whole of masterplan' approach to the rehabilitation works that are expected to be required over the life of the project (i.e. sufficient rehabilitation works to acquit all impacts to Significant Vegetation). This whole of masterplan rehabilitation approach is outlined and submitted as a separate document as part of the overall Stage 1 operational works package. Refer to the Carseldine Village Ecological Restoration Plan (**ERP**) that has been appended to this Stage 3 FFMP (**Attachment 2**). It is understood that the on-ground works for ecological restoration, as documented in the ERP will commencing imminently (November 2020).

The ERP was prepared to consider impacts already undertaken, impacts as a result of the current Stage 3 works and the extent of impact for the remaining stages (Stage 4-V) for the Carseldine Village Masterplan. An additional 10% of rehabilitation area was added to the total area of rehabilitation in good faith. It is intended that the ecological restoration works commence as part of the Stage 1 landscaping works and will be maintained and monitored for the required 2-year maintenance period. As such, the overall rehabilitation effort will likely reach completion before the delivery of the final stages of the Carseldine Village renewal.

The ERP specifies the relevant requirements for ecological restoration to be undertaken as a result of the impact to Significant Vegetation and to be commenced during and/ or after the construction works are completed. The Fitzgibbon Bushland Management Plan specifies that

a minimum 50 per cent of compensatory rehabilitation and restoration works must occur within non-remnant vegetation and the other 50 per cent in existing remnant vegetation.

Additionally, restoration works will be required to install several fauna habitat features including nest boxes, half of which are to be tailored to suit Squirrel Gliders as well as installation of glider poles at designated fauna crossing locations. The FBMP specifies that installation numbers are based on a minimum of 1 box per hectare cleared and 1 box per hollow removed.

In terms of bushland restoration, the ERP clearly outlines the requirements for works including the recommended planting species and appropriate densities based on pre-clear and current regional ecosystems, ongoing maintenance for planting areas and specifications for exotic plant removal and management for each of the Management Units as well as identified timeframes and success criteria for the completion of works. On-ground rehabilitation works will be undertaken by a suitably qualified, reputable bushland rehabilitation contractor to be commissioned and managed by EDQ.

# 3 Summary

The attached Stage 3 FFMP (**Attachment 1**) and Carseldine Village ERP (**Attachment 2**) have been prepared in accordance with the overarching FBMP, as a requirement for development occurring within the Fitzgibbon PDA and impacting Significant Vegetation. The Stage 3 FFMP is to be read in conjunction with all other operational works plans and all works are required to be conducted in accordance with the FFMP. All relevant construction workers will need to be inducted into the requirements of the FFMP before the commencement of their works. Contravention of the requirements outlined within the FFMP will need to be reported to the relevant Assessment Officer by the Project Manager, as well as the commencement and completion of each stage of works as necessary.

Kind regards,

Rebecca Freese
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0414 124 665

# Attachment 1 – Stage 3 Fauna Flora Management Plan

## 1.0 BACKGROUND

Economic Development Queensland (**EDQ**) has been facilitating ongoing development and renewal projects within the Fitzgibbon Priority Development Area (**Fitzgibbon PDA**) since 2008 and is in the north of the Brisbane City Council (**BCC**) Local Government Area (**LGA**) as shown in **Image 1**. The Carseldine Village forms the southern-most extent of precinct 1 within the Fitzgibbon PDA and is wholly comprised of one property; described as 532 Beams Road, Carseldine (Lot 322 on SP172124). The Carseldine Village is bound: to the north by Beams Road; to the east by the North Coast Train Line; to the south by Cabbage Tree Creek and Aspley State High School (SHS); and to the west by Dorville Road. The location of the Carseldine Village is further shown in **Image 2**.

As a part of ongoing development and renewal within the Fitzgibbon PDA, EDQ are proposing to commence the renewal of the Carseldine Village. The purpose of the renewal of the Carseldine Village is to promote the development of future transport orientated development in proximity to Carseldine Station and potential future busways; while also stimulating economic growth through commercial, retail, special purpose learning and research areas, enhanced employment opportunities and outdoor recreational and open space areas. As a part of the Carseldine Village, large components of key bushland areas will be retained and enhanced through the delivery of the Fitzgibbon Bushland Management Plan (**FBMP**). The FBMP is referenced by the Fitzgibbon PDA Development Scheme (**FDS**) as a relevant consideration in development assessment within the Carseldine Village.

The FBMP contributes to the FDS by identifying environmental values within the Carseldine Village and direction on how rehabilitation opportunities should be pursued as a result of impacts to values through compliant development applications. Section 3.11 of the FDS outlines that any impacts to 'significant vegetation' must provide rehabilitation of land within the Bushland and open space zone in accordance with the FBMP.

### 1.1 Stage 3 Works

The Carseldine Village Masterplan will be delivered by virtue of a number of stages, with Stage S having already been constructed and works for a pedestrian bridge and key pedestrian trails in the Bushland and Open Space precinct currently under construction, and Stage 1 and 2 are currently under construction. As such, the development application for Stage 3 has been submitted and is expected to receive a conditional approval imminently. Stage 3 will be comprised 53 terrace allotments, pedestrian linkage, access roads and footpaths, on-street parking and associated infrastructure such as sewer and stormwater. The establishment of Stage 3 will result in minor impacts to vegetation (i.e. loss of 2 habitat trees) within the Carseldine Village as defined by the FBMP.

**Image 1- Fitzgibbon PDA**

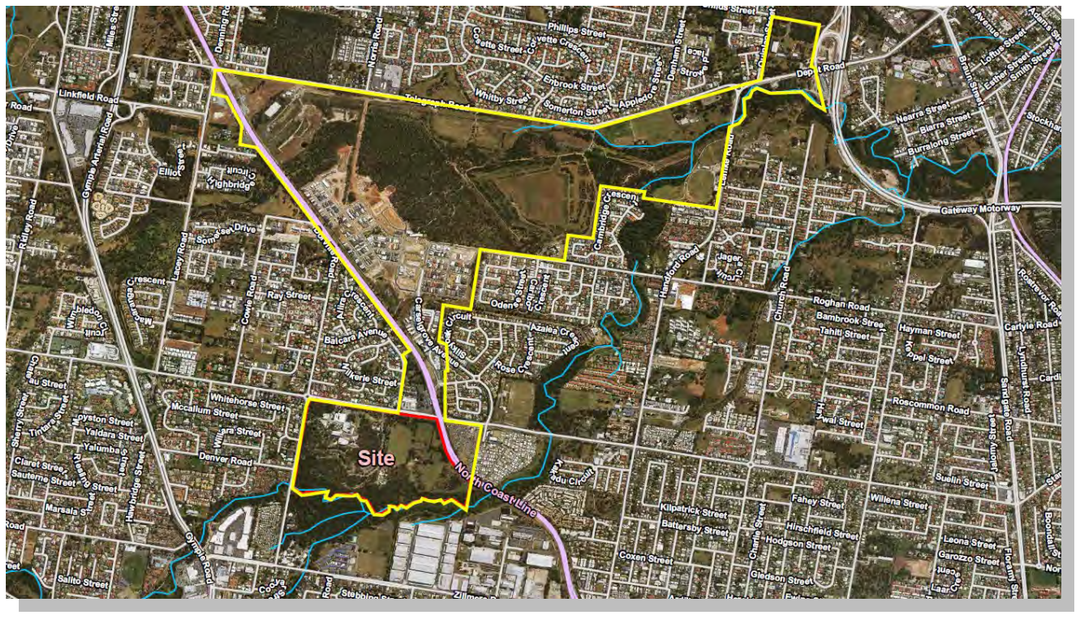



**Image 2- Carseldine Village**


### 1.2 Purpose of this Fauna Flora Management Plan

The preparation of a Fauna Flora Management Plan (**FFMP**) for each development stage of the Carseldine Village is a standard conditional requirement and will be subject to compliance assessment. The FFMP is to be prepared in accordance with the environmental provisions of the Fitzgibbon PDA development scheme and the Fitzgibbon Bushland Management Plan and should include the following details:

i. The location, type and area of Significant Vegetation to be impacted by the development;

ii. The location of habitat trees to be impacted by the development

iii. The location of the proposed rehabilitation areas to be utilised to provide necessary offset obligations as defined by the FBMP;

iv. The species to be planted for the rehabilitation works, including species, size and location generally in accordance with the relevant Regional Ecosystems;

v. The timing for undertaking the rehabilitation works; and

vi. A maintenance period for the rehabilitation works.

The construction and development works associated with Stage 3 are required to by undertaken in accordance with the specifications of this FFMP.

## 2.0 IMPACT PLAN

The Stage 3 development will result in the removal of 2 habitat trees. This is illustrated on **Sheet 3** and discussed in **Section 2.1** below.

## 2.1 STAGE 3 SIGNIFICANT VEGETATION IMPACTS

Significant Vegetation is defined under the FDS as vegetation whether living or dead, including their root zone as[1]:

- *all plants within the bed and banks of Cabbage Tree Creek*
- *vegetation included in regional ecosystem 12.5.2 remnant and non-remnant*
- *vegetation included in regional ecosystem 12.5.3 remnant and non-remnant*
- *vegetation included in regional ecosystem 12.3.11 remnant and non-remnant*
- *vegetation included in regional ecosystem 12.3.6 remnant and non-remnant*
- *vegetation included in regional ecosystem 12.3.7 remnant and non-remnant*
- *all other trees with a diameter of equal to or greater than 60cm measured at 1 metre above the ground level ('habitat trees').*

To ensure the impacts as a result of Stage 3 works have considered the above criterion, a detailed survey of all trees >600mm Diameter at Breast Height (DBH) within and immediately adjoining the development footprint and construction workspaces has been undertaken. Further, any trees which were identified as supporting hollow bearing limbs or trunks, or those suspected of supporting such features were also subject to detailed survey. All trees have relevant arboricultural data collected including each trees DBH and included in a Tree Schedule at the end of this FFMP. All trees have assigned a Tree Protection Zone (**TPZ**) commensurate with the Australian Standard AS4970-2009 (12 times the DBH as a radius from the trunk).

The clearing for civil works associated with Stage 3 will result the removal of 2 habitat trees. This impact considers not only the proposed buildings and built form, but also the full extent of the infrastructure and all additional works space areas. The FBMP identifies that impacts to Significant Vegetation are to be compensated for at specific ratios which have been outlined below in **Table 1**.

**Table 1: Rehabilitation Ratios for Stage 3 Proposed Works**

| Significant Vegetation | Ratio of Area to be Rehabilitated to that Lost to Development | Impact to Significant Vegetation (hectares) | Rehabilitation Area Required (hectares) |
|---|---|---|---|
| All Trees with a DBH equal to or greater than 600mm | 3:1 | 2 Habitat Trees | 6 Nesting Boxes |
| | | **Total Rehabilitation** | **6 Nest Boxes** |

## 2.2 Rehabilitation Requirements

The FBMP has specific rehabilitation requirements for the Fitzgibbon PDA and further requirements for rehabilitation within the Carseldine Village precinct. However, instead of undertaking rehabilitation specific to the Stage 3 works and impacts, EDQ have proposed to undertaken a 'whole of Site' approach to the rehabilitation works as part of the delivery and construction of Stage 1 for the Carseldine Village Masterplan. The 'whole of site' rehabilitation works will commence in concert with the landscaping works for Stage 1. This is outlined in further detail under separate cover (refer: Ecological Restoration Plan (**ERP**)). The ERP has clearly delineated the impacts resulting from all stages of the Carseldine Village. Rehabilitation works have then been proposed and identified as a result of this total impact, plus an additional 10% in good faith. The 'whole of site' ERP and the ecological restoration works will continue to be maintained, at a minimum, for the required 2-year maintenance period. As such, the overall rehabilitation effort will likely reach completion before the deliver of the final stages. Refer to the ERP for further details on the rehabilitation works.

It is confirmed that the impact to Significant Vegetation (being 2 Habitat Trees) as part of the FFMP for Stage 3 development works was appropriately reflected and compensated for as part of the ERP (separate cover).

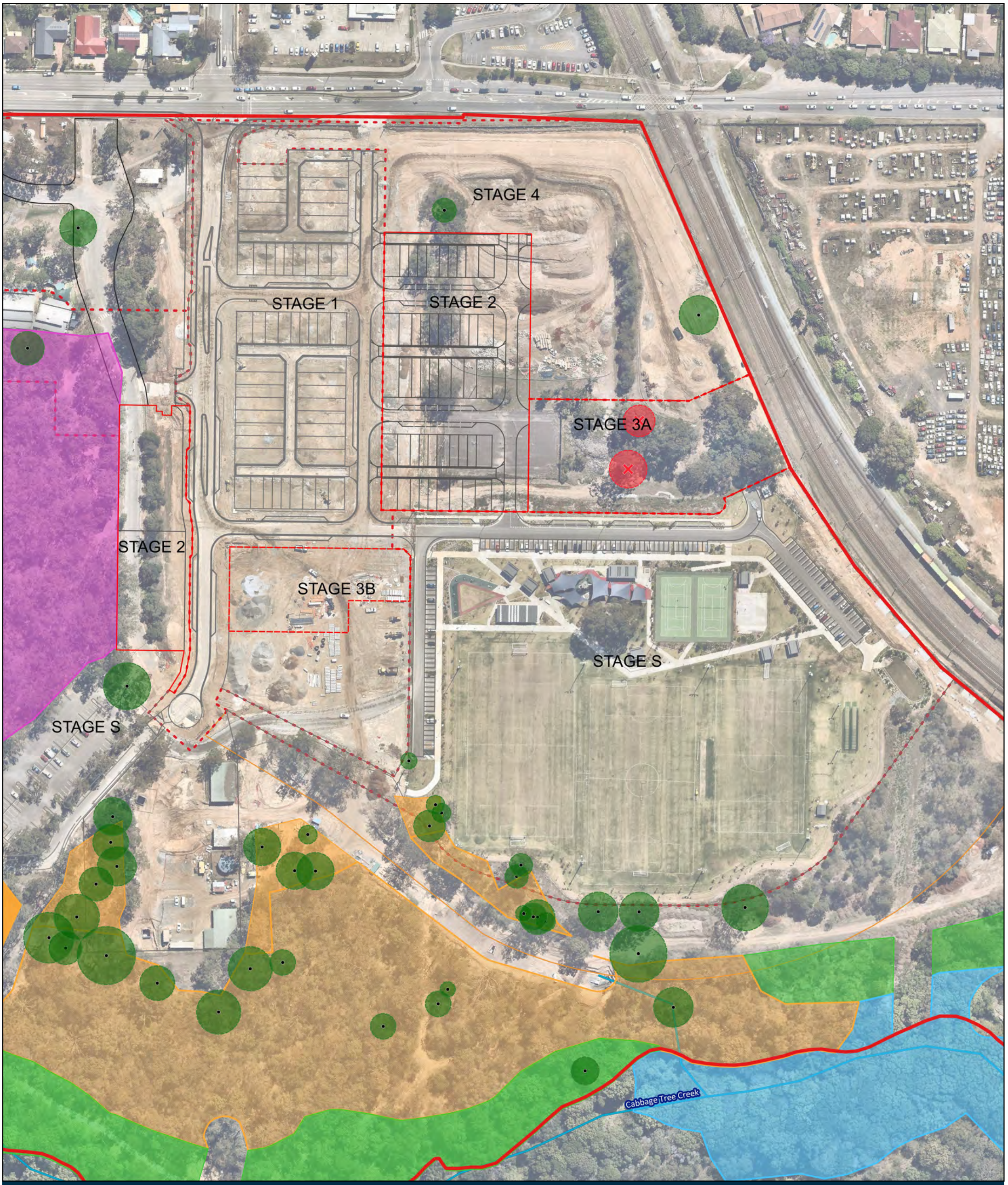
## 2.3 Arboricultural Management Measures

As part of the ongoing consultation and design process for Carseldine Village and the future development stages, the Project Arborist (current appointed Level 5 arborist- *Independent Arboricultural Services*)[2] has been involved to advise on design, construction process and mitigation measures. This FFMP provides additional detail on the protection of vegetation and the following measures will be implemented throughout the construction phase of the development:

- establishment of tree protection fencing with signage in accordance with AS4970-2009;
- tunnel boring and exploratory excavations works to be supervised by the Project Arborist or suitably qualified Level 5 Arborist (as necessary);
- ongoing review to be undertaken by the Project Arborist assess risk to trees surrounding the proposed construction works space and access areas.

[1] This does not include pest vegetation.

[2] All references to "Project Arborist" refer to Independent Arboricultural Services.




## Carseldine Village - Ecological Restoration

## Stage 3 Impact Plan

28 South Project Ref: 2017-057

Data Sources: Nearmap Aerial Imagery (Nearmap March 2020); Digital Cadastre Database (Dept. Natural Resources and Mines, 2020); Baseline Roads (DNRME 2020); Waterways (DNRME 2019).

28ºS ENVIRONMENTAL

**Legend**

- Carseldine Village Site Boundary
- Stage 3 Boundary
- Stage Boundaries
- Watercourse
- Tree to be removed (2)
- Tree to be retained

**Significant Vegetation**

- 1 Open Forest (RE 12.5.2)
- 2 Open Forest (RE 12.5.3)
- 3 Open Forest - Modified Understory (RE 12.5.3)
- 4 Open Forest (RE 12.3.11)
- 5 Open Forest - Modified Understory (RE 12.3.11)
- 6 Open Forest (Non-remnant)
- 7 Open Forest - Modified Understory (RE 12.3.11)
- 8 Riverine Open Forest (RE 12.3.7)
- 9 Open Woodland (non-remnant)
- 10 Closed Forest (Non-remnant)

| Issue Date | Dwg No. | Author |
|---|---|---|
| 19 November 2020 | 2017-057-3FFMP-00 | RF |
| **Approved** | **Revision Note** | |
| MT | | |

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## 3.0 VEGETATION MANAGEMENT AND MITIGATION MEASURES

**Project Management**

For the duration of operational works, the Project Manager will be ultimately responsible for the implementation and compliance with this FFMP and all subsequent requirements identified herein. Should for any reason, the Project Manager change (e.g. construction company changes for different sections of work), it is the responsibility of the current Project Manager to notify the Assessment Manager.

The Project Manager is responsible for the ongoing compliance with the requirements specified in this FFMP through the entirety of construction works for Stage 3. The Project Manager must alert the Assessment Manager of any breaches by contractors as well as inform upon commencement and completion of each stage or hold point of development phases.

### 3.1 VEGETATION MANAGEMENT

**Significant Vegetation and Habitat Tree Retention Plan**

The construction and establishment of the Stage 3 of the Carseldine Village results in the to 2 habitat trees. The project arborist is to provide on-going construction advice and supervision to ensure the construction works are completed in a way that will avoid secondary impacts to habitat trees, particularly to the north, despite the expected removal of these trees as part of future development stages. The extent of works with relation to Significant Vegetation and Habitat Trees is illustrated within **Sheet 3**.

The following data has been collected for each surveyed tree over 600mm DBH or habitat tree: Species, DBH, Height, Canopy Spread, Health, Form Vigour, Structure and Habitat Features. Each tree has been spatially located over the approved Carseldine Village Development Plan and associated civil works drawings. Each tree has been assigned to all trees in accordance with the AS4970-2009. A TPZ is represented by a buffer of 12 times the DBH. All TPZs shown for each tree within **Sheet 3** are denoted by the outer circle surrounding the tree survey point.

**Construction Zone Fencing**

The Project Manager will be ultimately responsible to the establishment of or engage a contractor to establish the necessary Tree Protection Fencing in accordance with the recommendations by Project Arborist. Tree Protection Fencing must be erected under the direction of the Project Arborist and remain erected prior to and during all phases of the clearing and construction. Fencing may only be removed once construction works have been fully completed. Tree Protection Fencing requirements are outlined below:

The establishment of construction zones and the erection of fencing around the identified civil works and vegetation retention interface must occur prior to the commencement of works. This is to be inspected and approved by the project arborist and ecologist and the assessment manager prior to any clearing or civil works commencing. Tree Protection Fencing should be established by utilising temporary metal panel fencing or orange barrier fencing with star pickets and a top and bottom tension wire is required as a minimum. A Gap between the ground level and bottom of this fencing should be a minimum of 200mm to allow any fauna vacating clearing areas access underneath this fencing.

Construction exclusion signs should be attached to this tree protection fencing to highlight that no access beyond is permitted unless otherwise authorised. These signs should say as a minimum Tree Protection Zone – No Construction Access Permitted. An example of this signage is provided in **Image 3**. The fencing must be directed by the Project Arborist.

**Construction Zone Fencing are to employ the following restrictions during construction phases**

- No access or activities are to be carried out within the fenced construction zone fencing unless otherwise approved by the project arborist, EDQ or for rehabilitation purposes (e.g. weed removal and revegetation).
- All tree protection measures are to be monitored and recorded monthly to ensure tree protection is being maintained. This is to be summarised in a Completion Report certifying that the tree protection was maintained for the duration of the project.
- No parking or movement of construction machinery and vehicles are permitted within the construction zone fenced areas. Parking is to be limited to approved development areas.
- No vehicle access is permitted beyond the construction zone fencing. Vehicle and pedestrian access are to be restricted to areas of existing compaction or earthworks or existing bushland trails. Exhausts of vehicles or plant that are left running such as cranes, trucks and generators are not to point into the canopy of any trees proposed for retention.
- Placement of site offices, storage sheds, portaloos, and other permanent or temporary structures are to be located within the construction zone only.
- Storage of topsoil, stockpiles, building materials, fuels and other chemicals is to occur within the construction zone.
- Dumping of excess materials and / or wastes is to occur within the construction zone.
- No washing off vehicles and construction machinery, rinsing out fuel containers, and disposal of cleaning products is to occur the construction zone proximate to Cabbage Tree Creek – this should be completed once out of the construction zone.
- No pruning works of vegetation situated within the construction fence areas can be undertaken, any overhanging limbs must be assessed the project arborist and pruned in accordance with the Australian Standard (AS4373/96).
- No general foot access of construction staff to unless specifically related to the requirements of the Rehabilitation, Landscape or Stormwater Management Plans or as advised by the project arborist.

**Pre-start Meeting**

Once the Assessment Manager, Project Manager, Arborist & Ecologist have inspected and approved the Construction Zone Fencing, a pre-start meeting is to be held which includes the engaged Fauna Spotter Catcher and clearing contractors. Once the pre-start meeting has been completed: the fencing approved; and the final pre-clearing report prepared by the engaged Fauna Spotter Catchers, clearing and civil works may commence under the supervision of the Project Arborist/Ecologist and Fauna Spotter Catcher.

The timing of this meeting will be governed by the Project Manager and EDQ once construction fencing has been erected to the satisfaction of the Project Arborist/Ecologist.

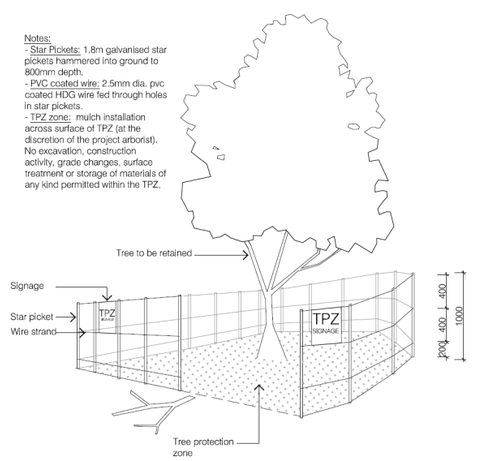
**Vegetation Clearing Methods and Re-use**

At this stage of the development clearing methods are not known and clearing may not occur immediately. Damage to vegetation is however, likely to be undertaken through the use of excavators or other large plant. Methods for removal should be set out within the engaged contractors CEMP including any methods which require ticketed permit holders to operate machinery or undertake any works such as but not limited to:

- Specific Plant Operators Ticket;
- Fauna Spotter Catcher Permit;
- Chainsaw and Arborist Diploma;
- Elevated Work Platform; Tree Climbers;
- Crane Removal; Wood chipping;
- Log Removal;
- Stump Grinding; and
- Physical Excavation of Stumps.

All native trees felled on Site are to either be stored and retained for use as habitat within the rehabilitation areas or subject to mulching and the mulch piled (no more than 2m in height), stored and aged on the Site until dry. Mulch is to be used in landscaping and rehabilitation areas. Any hollow-bearing limbs located during surveys are to be lopped in accordance with the specifications below (**Fauna Management Recommendations**) and located in the Tree Protection Areas.

**Image 3 – Temporary Metal Exclusions Fencing and Exclusion Zone Signage (Source Arbor Australis)**

## 4.0 FAUNA MANAGEMENT

During vegetation clearing works of Stage 3, licensed Fauna Spotter Catchers must be engaged to manage the protection and relocation of any fauna prior to and during vegetation/ecological feature clearing. The below outlines the procedures for dealing with fauna observed immediately prior to and during vegetation clearing as well as treatment of fauna from the Site.

Habitat assessments have identified the impact areas contain low to moderate ecological values. The area provides foraging and refuge for common fauna species. As such, clearing should consider the presence of a wide array of fauna species. A pre-clear inspection is to be undertaken prior to clearing works with a certification report prepared and submitted to the Assessment Manager prior to the required pre-start meeting.

**Fauna Management Specifications**

The following specifications have been made as a recommendations for fauna management throughout the vegetation clearing works associated with Stage 3 of the Carseldine Village. An appropriately qualified fauna manager/ spotter-catcher(s) must be commissioned and will be present during the clearing of all trees which are not being retained.

All clearing and earth-moving 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.

*Pre-clearing*

1. Fauna pre-clearance surveys must be undertaken in the days prior to clearing to flag all noted habitat features and microhabitats within the proposed clearing areas. All habitat features and microhabitats must be monitored for use during pre-clear inspections;
2. At a minimum, trees must be inspected by the qualified fauna spotter catcher at the beginning of each clearing day prior to works commencing;
3. The engaged Fauna Spotter Catchers are to hold a pre-work toolbox with the relevant contractors to identify where microhabitats have been identified and discuss how these will be approached. Toolboxes should highlight the requirements of this FFMP and the FBMP; and
4. A range of spare nest boxes may be kept on Site to account for any hollows not identified in initial surveys. Alternatively, additional boxes can be ordered as required.

*Clearing - General*

1. Each day of clearing work must be undertaken as a two-step process whereby non-habitat trees are removed first and habitat trees felled as close to sunset as practical to afford predominantly nocturnal fauna a minimal period of daylight hours spent out of shelter. Habitat trees must be allowed to rest until the following morning and reinspected. This will afford any undetected fauna to potential move of their own volition;
2. Owing to the potential presence of stick nests or dreys between initial surveys and clearing, reinspection by the fauna spotter catcher prior to clearing is required.
3. Where limited habitat or resources remain on Site (and adjacent) or if safe escape corridors cannot be maintained, animals vacating felled trees should be hand captured (if possible) for relocation. Where suitable escape corridors or contiguous offsite habitat is present, animals should be monitored as they disperse of their own volition to ensure adequate temporary refuge is found. All fauna detected during works must be recorded and nest boxes appropriate to the species installed;
4. Trees are to be felled in such a way as to avoid falling into and damaging adjacent vegetation; and
5. Felled vegetation must be inspected each morning prior to works commencing to detect any fauna which may have sought refuge overnight.

*Clearing Koala*

1. The Site is not located within a Koala Priority Area; however, does contain mapped Koala Habitat Areas. As such all clearing works must be undertaken in accordance with **Section 11 of the *Nature Conservation (Koala) Conservation Plan* 2017** and general best practice for clearing. Fauna pre-clearance surveys must be undertaken in the days prior to clearing, to flag all noted habitat features within the proposed clearing areas as well as undertake koala presence surveys. Should, in the unlikely event, koalas be present within clearing areas prior to or at the time of clearing, the tree in which the identified koala is residing must be flagged and retained. Further, all trees within an interlocking canopy must also be retained as well as a vegetated escape route to assist in guiding the koala offsite of its own volition. Koalas may not be interfered with by any means unless the koala is at risk of injury or death. Only once koalas have vacated a tree and vicinity can clearing operations including the host tree and surrounding vegetation commence.
2. As a minimum, clearing must be conducted in a slow sequential manner. Clearing should be commenced in a north to south direction. Directional clearing will allow any fauna vacating the Site of their own volition the opportunity to move to vegetated areas remaining on Site and in the adjoining properties.

*Clearing – Grey-headed Flying Fox*

It is likely that the grey-headed flying-fox would forage over the Carseldine Village, particularly during periods where foraging resources are abundant (e.g. winter). A flying fox camp is noted to have historically occurred in the southern extremes of the Carseldine Village, well removed from the works associated with Stage 3. It is likely that the camp is seasonal and that the grey-headed flying-fox is likely to use the camp periodically.

1. A survey must be undertaken immediately prior to vegetation clearing in Stage 3 to determine whether a flying fox camp has re-established;
2. Should an active roost be identified in proximity to the Stage 3 works, a specific flying-fox management plan must be developed to govern works specific to the present roost; as well the consideration of referral of the proposed actions to the Commonwealth Government under the *Environment Protection and Biodiversity Conservation Act 1999*.
3. Overall, impacts to roosts can be avoided by virtue of the works occurring during daylight hours and through staging of works outside of active roost periods.

*Clearing – habitat trees*

All habitat trees must be dealt with as advised by the Fauna Manager/ Spotter Catcher. The following specifications are recommended:

1. For hollow bearing trees, elevated work platforms or a climbing arborist should be utilised where possible. Each hollow-bearing limb should be inspected immediately prior to clearing;
2. If practical and safe, hollow features should be cut off the tree prior to felling and relocated into bushland areas;
3. At a minimum, trees should be 'tapped' by the excavator (or other machinery used for clearing) to allow animals time to escape;
4. Where practicable, hollow bearing limbs should be plugged, removed from the tree and relocated to an appropriate location within the retained Cabbage Tree Creek corridor. Limbs should be unplugged as close to sunset as practical to afford predominantly nocturnal fauna a minimal period of daylight hours spent out of shelter;
5. All small (non-macropod) fauna which has to be relocated during this period will be taken (if healthy) to the adjoining vegetated corridor of Cabbage Tree Creek with relevance to the species home range and habitat requirements. All hollow dependant fauna should be re-located with species specific denning boxes where practical;
6. Reporting requirements for sick, injured or orphaned protected animals (not including marine mammal or marine turtles) under the *Nature Conservation (Wildlife Management) Regulation 2006* include:
    a. A person (who has no authorisation or wildlife permit) must, within 72 hours after the person takes possession of an animal, either—
        i. give the animal to the holder of a rehabilitation permit for the animal, or a relevant person for the holder; or
        ii. notify a conservation officer that the person has taken possession of the animal.
    b. If the person notifies a conservation officer and the officer directs the person to deal with the animal in a particular manner, the person must follow the directions given
    c. For reporting injured, sick or orphaned wildlife (other than crocodiles and cassowaries) call RSPCA Qld – 1300 264 625
7. Injured animals recovered from the Site should be released into a suitably qualified carer or veterinarian (unless another suitably qualified veterinarian or carer can be found in a more proximate location:
    a. Aspley Veterinary Practice, 758 Zillmere Road, Aspley – (07)3263 3166; or
    b. Zillmere Veterinary Surgery, 422 Zillmere Road, Zillmere – (07) 3865 2020.
8. Records of all relocated and/or injured fauna will be kept by the Fauna Manager to advise the Assessment Manager.

*Post-clearing*

1. Monitoring of the nest boxes installed in the adjoining bushland must occur as part of the ERP (separate cover), with inspections occurring at 6 months, 1 year and 2 years.
2. It is the responsibility of the Project Manager to engage a suitably qualified contractor to monitor and report on the usage and condition of each box.
3. Replacement of defective boxes or boxes inhabited by exotic species such as European bee or exotic birds must occur upon observation.

# Attachment 2 – Ecological Restoration Plan (Overall Masterplan)

## 1.0 BACKGROUND

Economic Development Queensland (**EDQ**) has been facilitating ongoing development and renewal projects within the Fitzgibbon Priority Development Area (**Fitzgibbon PDA**) since 2008 and is in the north of the Brisbane City Council (**BCC**) Local Government Area (**LGA**) as shown in **Image 1**. The Carseldine Village (**CV**) forms the southern-most precinct 1 of the Fitzgibbon PDA and is wholly comprised of one property; described as 532 Beams Road, Carseldine (Lot 322 on SP172124). The CV is bound: to the north by Beams Road; to the east by the North Coast Train Line; to the south by Cabbage Tree Creek and Aspley State High School (**SHS**); and to the west by Dorville Road. The location of the CV is further shown in **Image 2**.

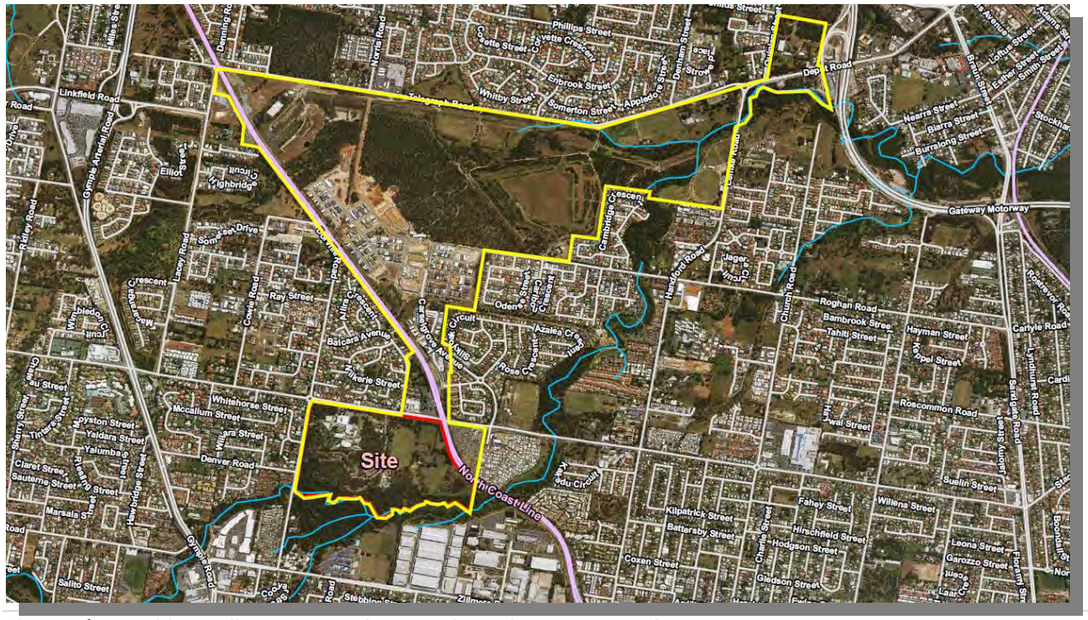
As a part of ongoing development and renewal within the Fitzgibbon PDA, EDQ have commenced the renewal of the CV. The purpose of the renewal of the CV is to promote the development of future transport orientated development in proximity to Carseldine Station and potential future busways; while also stimulating economic growth through commercial, retail, special purpose learning and research areas, enhanced employment opportunities and outdoor recreational and open space areas. As a part of the CV, large components of key bushland areas will be retained and enhanced through the delivery of the Fitzgibbon Bushland Management Plan (**FBMP**). The FBMP is referenced by the Fitzgibbon Development Scheme (**FDS**) as a relevant consideration in development assessment within the CV.

The FBMP contributes to the FDS by identifying environmental values within the CV and direction on how rehabilitation opportunities should be pursued as a result of impacts to values through compliant development applications. Section 3.11 of the FDS outlines that any impacts to 'significant vegetation' must provide rehabilitation of land within the Bushland and open space zone in accordance with the FBMP.

### 1.1 Purpose of this Ecological Restoration Plan

Compliance with the FDS and the FBMP requires the rehabilitation of land within the Bushland and Open Space Zone where Significant Vegetation is cleared as a result of development within the Fitzgibbon PDA. EDQ are proposing the consideration of a 'whole-of-masterplan' approach to the ecological restoration works that are expected to be required for the life of the CV project. This Ecological Restoration Plan (**ERP**) retrospectively summarises the impacts that have: i) already occurred as part of the approved and constructed Stage S and the Pedestrian Bridge; ii) those impacts approved for Stage 1; and iii) the remaining future impacts expected to occur for Stages 2, 3, 4 and V. This will guide the extent of ecological restoration proposed as part of this 'whole-of-masterplan' ERP. It is intended that the ecological restoration works commence as part of the Stage 1 construction and landscape works and will be maintained and monitored, at a minimum, for the required 2-year maintenance period. As such, the entirety of the ecological restoration effort will likely reach completion before the delivery of the final stages of the CV Masterplan.

**Image 1- Fitzgibbon Priority Development Area**




### 1.2 Compliance Requirements

This ERP has been prepared as part of the overall operational works stage package associated with the Stage 1 development works of the CV Masterplan. Specifically, this ERP has been prepared to satisfy the ecological restoration components of Condition 32 (Fauna Flora Management Plan – *Compliance Assessment*) for the Stage 1 Development Approval (DEV2019/1074). Notwithstanding the specificity for Stage 1, this ERP also intends to guide the ecological restoration activities for all future Stages (2-V) that are to be delivered for the overall CV Masterplan (DEV2018/932). As such, care has been taken in the preparation of this ERP document to ensure that the rehabilitation requirements outlined are comprehensive to ensure a positive ecological outcome is achieved for the whole of the CV Masterplan. To ensure that ecological restoration works adequately address impacts of the approved development areas, a 10% contingency has been added to the total area of ecological restoration works.

***Condition 32*** *– Fauna Flora Management Plan – Compliance Assessment*

*(a) Submit to EDQ Development Assessment, DSDMIP for compliance assessment a Fauna Flora Management Plan (FFMP) prepared by a suitably qualified ecologist, generally in accordance with the requirements set out in the approved Ecological and Bushfire Technical Note, prepared by 28 South Environmental, dated 02/08/2019; the environmental provisions of the Fitzgibbon PDA development scheme and the Fitzgibbon Bushland Management Plan.*
*The FFMP is to set out:*
- *i. The location, type and area of Significant Vegetation to be impacted by the development;*
- *ii. The location of habitat trees to be impacted by the development*
- *iii. The location of the proposed rehabilitation areas to be utilised to provide necessary offset obligations as defined by the FBMP;*
- *iv. The species to be planted for the rehabilitation works, including species, size and location generally in accordance with the relevant Regional Ecosystems;*
- *v. The timing for undertaking the rehabilitation works; and*
- *vi. A maintenance period for the rehabilitation works.*

*(b) Carry out the vegetation clearing and rehabilitation works specified in the FFMP endorsed under part a) of this condition.*
*(c) Submit to EDQ Development Assessment, DSDMIP, written evidence prepared be a suitably qualified person, stating that the rehabilitation works have been carried out generally in accordance with the FFMP approved under part a) of this condition.*

This ERP is to be read in conjunction with the Stage 1 FFMP (28 South Environment, 28 May 2020) document which satisfies Condition 32 (a) i – ii above.

**Image 2- Carseldine Village**

## 2.0 SUMMARY OF IMPACTS

The following section precedes the ecological restoration components of this ERP to provide background and justification for the proposed extent of restoration works. The FDS and FBMP have specific rehabilitation requirements for the Fitzgibbon PDA. Significant Vegetation is defined under the FDS as vegetation whether living or dead, including their root zone as[1]:

- *all plants within the bed and banks of Cabbage Tree Creek*
- *vegetation included in regional ecosystem 12.5.2 remnant and non-remnant*
- *vegetation included in regional ecosystem 12.5.3 remnant and non-remnant*
- *vegetation included in regional ecosystem 12.3.11 remnant and non-remnant*
- *vegetation included in regional ecosystem 12.3.6 remnant and non-remnant*
- *vegetation included in regional ecosystem 12.3.7 remnant and non-remnant*
- *all other trees with a diameter of equal to or greater than 60cm measured at 1 metre above the ground level.*

An analysis of each stage of the Carseldine Village Masterplan has been undertaken and illustrated in the **Sheets 3-6.** Each Stage includes a summary table of the impacts and the corresponding rehabilitation requirements based on compensation ratios. **Table 1** below summarises the impacts to the Significant Vegetation as a result of the Masterplan as a whole.

**Table 1: Rehabilitation Ratios for Carseldine Village Masterplan**

| Significant Vegetation | Ratio of Area to be Rehabilitated to that Lost to Development | Impact to Significant Vegetation (hectares) | Rehabilitation Area Required (hectares) |
|---|---|---|---|
| **Stage S – Sheet 3** | | | |
| Remnant RE 12.3.11 (Open Forest) | 2:1 | 0.2679 | 0.5358 |
| Non-remnant RE12.3.7 and 12.3.11 | 1:1 | 0.3873 | 0.3873 |
| All Plants within the bed and banks of Cabbage Tree Creek | 1:1 | 0.0044 | 0.0044 |
| All Trees with a DBH equal to or greater than 600mm | 3:1 | 20 | 60 nest boxes |
| **Pedestrian Bridge – Sheet 4** | | | |
| Remnant RE 12.3.7 (Open Forest) | 2:1 | 0.0705 | 0.1410 |
| All Trees with a DBH equal to or greater than 600mm | 3:1 | 3 | 9 nest boxes |
| **Stage 1 – Sheet 5** | | | |
| Remnant RE 12.3.11 (Open Forest) | 2:1 | 0.7126 | 1.4252 |
| Remnant RE 12.3.7 (Open Forest) | 2:1 | 0.0469 | 0.0938 |
| Remnant RE 12.5.3 (Open Forest) | 2:1 | 0.0369 | 0.0738 |
| All Trees with a DBH equal to or greater than 600mm | 3:1 | 36 | 108 nest boxes |
| **Stages 2, 3, 4 & V – Sheet 6, 7 & 8** | | | |
| Remnant RE 12.5.3 (Open Forest) | 2:1 | 0.8698 | 1.7396 |
| All Trees with a DBH equal to or greater than 600mm | 3:1 | 17 | 51 nest boxes |
| | **Total** | **2.3963 hectares** | **4.4 hectares and 228 nest boxes** |

In summary, a total of 2.3963 hectares of Significant Vegetation will be impacted, and a total of 4.4 hectares of rehabilitation is to be undertaken to compensate for the overall impact. To ensure the ecological restoration works are comprehensive and inclusive all current and future impacts, an additional 10% contingency has been allowed for in the total area for restoration to ensure any unexpected changes as a result of detailed design can be readily accounted for. ***As such there is a requirement to restore a total of 4.5 hectares***. Further, the FBMP notes that *within Precinct 1 a minimum of 50 per cent of the offset area is to include revegetation and rehabilitation of non-remnant vegetation*. As such, there is a requirement for **2.25 hectares** of restoration works within non-remnant areas and **2.25 hectares** of restoration works within remnant areas.

## 3.0 ECOLOGICAL RESTORATION STRATEGIES

**Sheet 9** illustrates the areas of the Bushland Open Space Precinct that are proposed for restoration under this ERP with 50% of the area encompassing remnant vegetation, and 50% of the area encompassing non-remnant vegetation. In order to appropriately inform the preparation of this ERP, 28 South Environmental have undertaken detailed in-field Site inspections to:

- Review the entire area identified for restoration on **Sheet 9**;
- Identify management areas to be subject to specific ecological restoration/ rehabilitation strategies. Management Units are based on their required treatments going forward and their existing ecological resilience;
- Identify the location of management units based on the extent and location of native remnant and non-remnant communities. A focus must aim to increase the area of native remnant communities. This will not only enhance and consolidate higher ecological and habitat values within the Bushland and Open Space Precinct, but also assist in normalising edges (reducing edge-area ratio) and sealing edges from weeds and other impacts; and
- Identify the most appropriate mix of flora species to utilise for each MU.

Management measures and strategies to be employed as part of the ecological restoration works must occur as specified by the Management Units (**MU**) illustrated on **Sheet 10.** 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). 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 proposed goals and on-ground temporal conditions. Specifications encourage the active natural regeneration from the seed bank where possible as this is the best means of establishing native ecosystems that are genetically suited to endemic conditions.

**Overall Objectives**

Works should aim at encouraging natural regeneration of native flora species from the seed bank if possible. Weed removal and management will give any native seed opportunity to regenerate. Where weed removal results in bare ground or open areas with limited native vegetation; ecological restoration works should commence through mulching and planting of native endemic species derived from the pre-clearing Regional Ecosystem. Each MU's planting palette reflects the appropriate species mix and density from the corresponding pre-clear regional ecosystem landscape.

[1] This does not include pest vegetation.

| Significant Vegetation | Ratio of Area to be Rehabilitated to that Lost to Development | Impact to Significant Vegetation (hectares) | Rehabilitation Area Required (hectares) |
|---|---|---|---|
| | **Stage S** | | |
| Remnant RE 12.3.11 (Open Forest) | 2:1 | 0.2679 | 0.5358 |
| Non-remnant RE12.3.7 and 12.3.11 | 1:1 | 0.3873 | 0.3873 |
| All Plants within the bed and banks of Cabbage Tree Creek | 1:1 | 0.0044 | 0.0044 |
| All Trees with a DBH equal to or greater than 600mm | 3:1 | 20 | 60 |

**Carseldine Village - Ecological Restoration**

## Sheet 3 - Stage S Impact Plan

28 South Project Ref: 2017-057

Data Sources: Nearmap Aerial Imagery (Nearmap July 2019); Digital Cadastre Database (Dept. Natural Resources and Mines, 2019); Roads (DNRME, 2018).

28ºS ENVIRONMENTAL

**Legend**

- Carseldine Village Site Boundary
- Stage S Boundary
- Impact to Significant Vegetation

**Habitat trees (+600mm DBH)**

- Tree Removed for Stage S (20)
- Tree Retained for Stage S
- Existing Stormwater Pipe
- Proposed Stormwater Infrastructure
- Property Boundaries

**Significant Vegetation**

- 1 Open Forest (RE 12.5.2)
- 2 Open Forest (RE 12.5.3)
- 3 Open Forest - Modified Understory (RE 12.5.3)
- 4 Open Forest (RE 12.3.11)
- 5 Open Forest - Modified Understory (RE 12.3.11)
- 6 Open Forest (Non-remnant)
- 7 Open Forest - Modified Understory (RE 12.3.11)
- 8 Riverine Open Forest (RE 12.3.7)
- 9 Open Woodland (non-remnant)
- 10 Closed Forest (Non-remnant)

| Issue Date | Dwg No. | Author |
|---|---|---|
| 15 May 2020 | 2017-057-ERP-003 | RF |
| **Approved** | **Revision Note** | |
| MT | | |

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1:1500

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N

Maximum extent of disturbance area totals 705 m2.
Based on a 2:1 ratio for impact to Significant Vegetation, a total of 1,410 m2 of ecological restoration will be required to adequately compensate for the proposed works in accordance with the FBMP.

Pipe

Works south of PDA Boundary not considered under this application.

**Carseldine Urban Village - Pedestrian Bridge** **Legend**

## Sheet 4 - Impact for Pedestrian Bridge

28 South Project Ref: 2017-057

Data Sources: Nearmap Aerial Imagery (Nearmap May 2019); Digital Cadastre Database (Dept. Natural Resources and Mines, 2019); Baseline Roads (DNRME 2017); Waterways (DNRME 2018).

28ºS ENVIRONMENTAL

- Disturbance within PDA (492 m2)
- Earthworks Batters subject to Landscaping
- Significant Vegetation (VC8 - 12.3.7)
- Significant Vegetation (VC4 - 12.3.11)
- Proposed concrete path
- Rock Armouring
- Habitat Trees (Retained)
- Carseldine Urban Village Site Boundary
- Property Boundaries (Cadastre)
- Waterway Centreline
- Existing Pipe
- Existing Gravel Pathway

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| Issue Date | Dwg No. | Author |
|---|---|---|
| 31 March 2020 | 2019-057-ERP-004 | RF |
| **Approved** | **Revision Note** | |
| MT | | |

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STAGE V
STAGE 4
STAGE 4
STAGE 1
STAGE 2
STAGE 3A
STAGE 2
STAGE 3B
STAGE S
STAGE S
Cabbage Tree Creek
Cabbage Tree Creek
Cabbage Tree Creek
Cabbage Tree Creek

# Carseldine Village - Ecological Restoration

## Sheet 5 - Stage 1 Impact Plan

28 South Project Ref: 2017-057

Data Sources: Nearmap Aerial Imagery (Nearmap March 2020); Digital Cadastre Database (Dept. Natural Resources and Mines, 2020); Baseline Roads (DNRME 2020); Waterways (DNRME 2019).

28°S ENVIRONMENTAL

**Legend**

- Carseldine Village Site Boundary
- Impact to Significant Vegetation
- Entry pit (tunnel bore for Sewer)
- Proposed Sewer
- Existing Sewer
- Stormwater Pipe
- Stage Boundaries
- Watercourse
- Tree to be retained subject to Arborist review
- Tree to be removed
- Tree to be retained

**Significant Vegetation**

- 1 Open Forest (RE 12.5.2)
- 2 Open Forest (RE 12.5.3)
- 3 Open Forest - Modified Understory (RE 12.5.3)
- 4 Open Forest (RE 12.3.11)
- 5 Open Forest - Modified Understory (RE 12.3.11)
- 6 Open Forest (Non-remnant)
- 7 Open Forest - Modified Understory (RE 12.3.11)
- 8 Riverine Open Forest (RE 12.3.7)
- 9 Open Woodland (non-remnant)
- 10 Closed Forest (Non-remnant)

| Issue Date | Dwg No. | Author |
|---|---|---|
| 19 November 2020 | 2017-057-ERP | RF |
| **Approved** | **Revision Note** | |
| MT | | |

(A3) GDA 94 MGA 56
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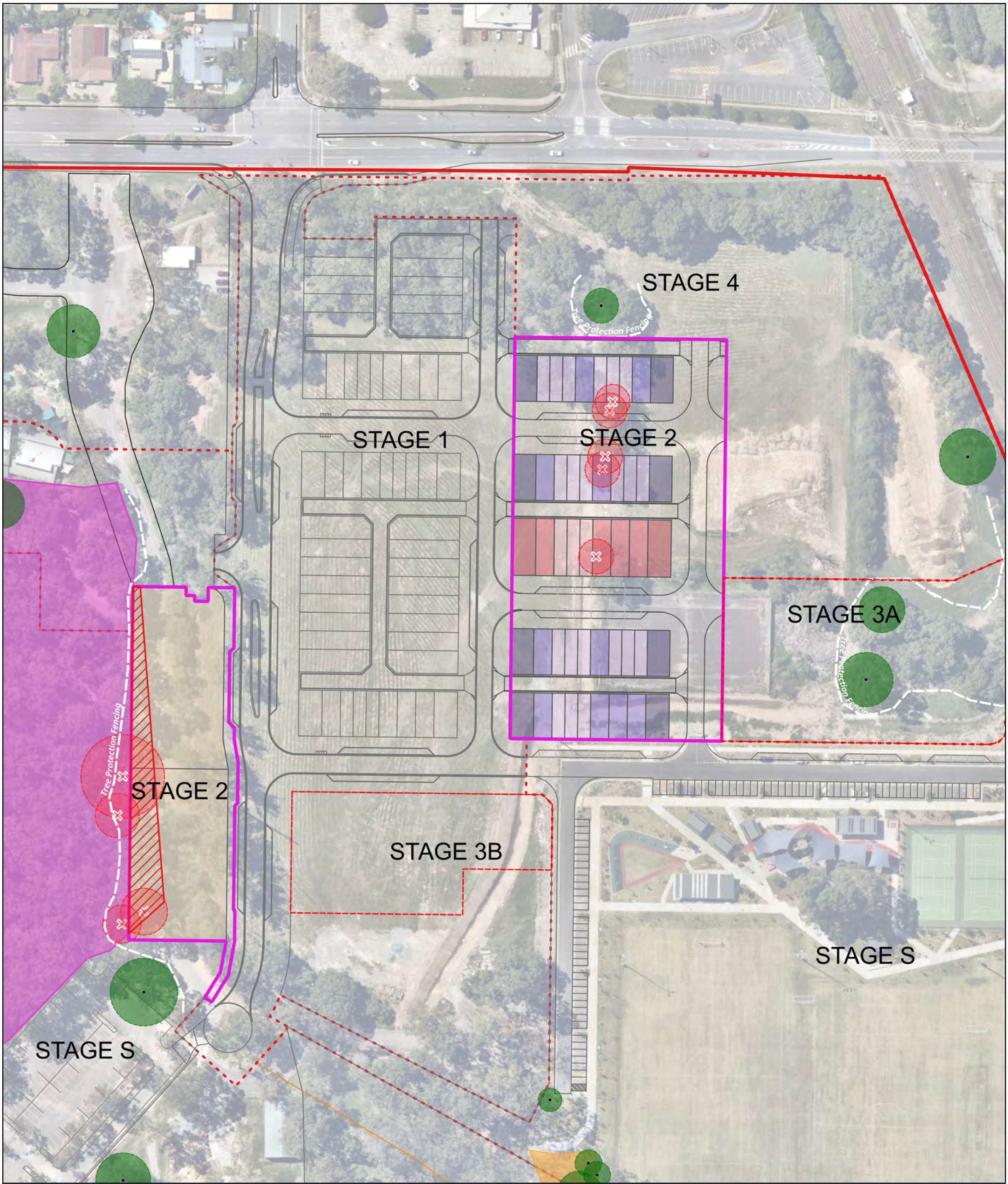


**Carseldine Village - Ecological Restoration** **Legend**

## Sheet 6 - Stage 2 Impact Plan

28 South Project Ref: 2017-057

Data Sources: Nearmap Aerial Imagery (Nearmap March 2020); Digital Cadastre Database (Dept. Natural Resources and Mines, 2020); Baseline Roads (DNRME 2020); Waterways (DNRME 2019).

28ºS ENVIRONMENTAL

- Carseldine Village Site Boundary
- Stage 2 Boundary

**Habitat Trees (+600mm DBH)**

- To be retained as part of Stage 2
- To be removed as part of Stage 2(9)
- Stage Boundaries
- Tree Protection Fencing
- Impact to Significant Vegetation as part of Stage 2 (930.7m2)

**Significant Vegetation**

- 1 Open Forest (RE 12.5.2)
- 2 Open Forest (RE 12.5.3)
- 3 Open Forest - Modified Understory (RE 12.5.3)
- 4 Open Forest (RE 12.3.11)
- 5 Open Forest - Modified Understory (RE 12.3.11)
- 6 Open Forest (Non-remnant)
- 7 Open Forest - Modified Understory (RE 12.3.11)
- 8 Riverine Open Forest (RE 12.3.7)
- 9 Open Woodland (non-remnant)
- 10 Closed Forest (Non-remnant)

| Issue Date | Dwg No. | Author |
|---|---|---|
| 19 November 2020 | 2017-057-Stg2-FFMP | RF |
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| MT | | |

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STAGE 4

STAGE 1

STAGE 2

STAGE 3A

STAGE 2

STAGE 3B

STAGE S

STAGE S

Cabbage Tree Creek

# Carseldine Village - Ecological Restoration

## Sheet 7 - Stage 3 Impact Plan

28 South Project Ref: 2017-057

Data Sources: Nearmap Aerial Imagery (Nearmap March 2020); Digital Cadastre Database (Dept. Natural Resources and Mines, 2020); Baseline Roads (DNRME 2020); Waterways (DNRME 2019).

28ºS ENVIRONMENTAL

**Legend**

- Carseldine Village Site Boundary
- Stage 3 Boundary
- Stage Boundaries
- Watercourse
- Tree to be removed (2)
- Tree to be retained

**Significant Vegetation**

- 1 Open Forest (RE 12.5.2)
- 2 Open Forest (RE 12.5.3)
- 3 Open Forest - Modified Understory (RE 12.5.3)
- 4 Open Forest (RE 12.3.11)
- 5 Open Forest - Modified Understory (RE 12.3.11)
- 6 Open Forest (Non-remnant)
- 7 Open Forest - Modified Understory (RE 12.3.11)
- 8 Riverine Open Forest (RE 12.3.7)
- 9 Open Woodland (non-remnant)
- 10 Closed Forest (Non-remnant)

| Issue Date | Dwg No. | Author |
|---|---|---|
| 19 November 2020 | 2017-057-3FFMP-00 | RF |
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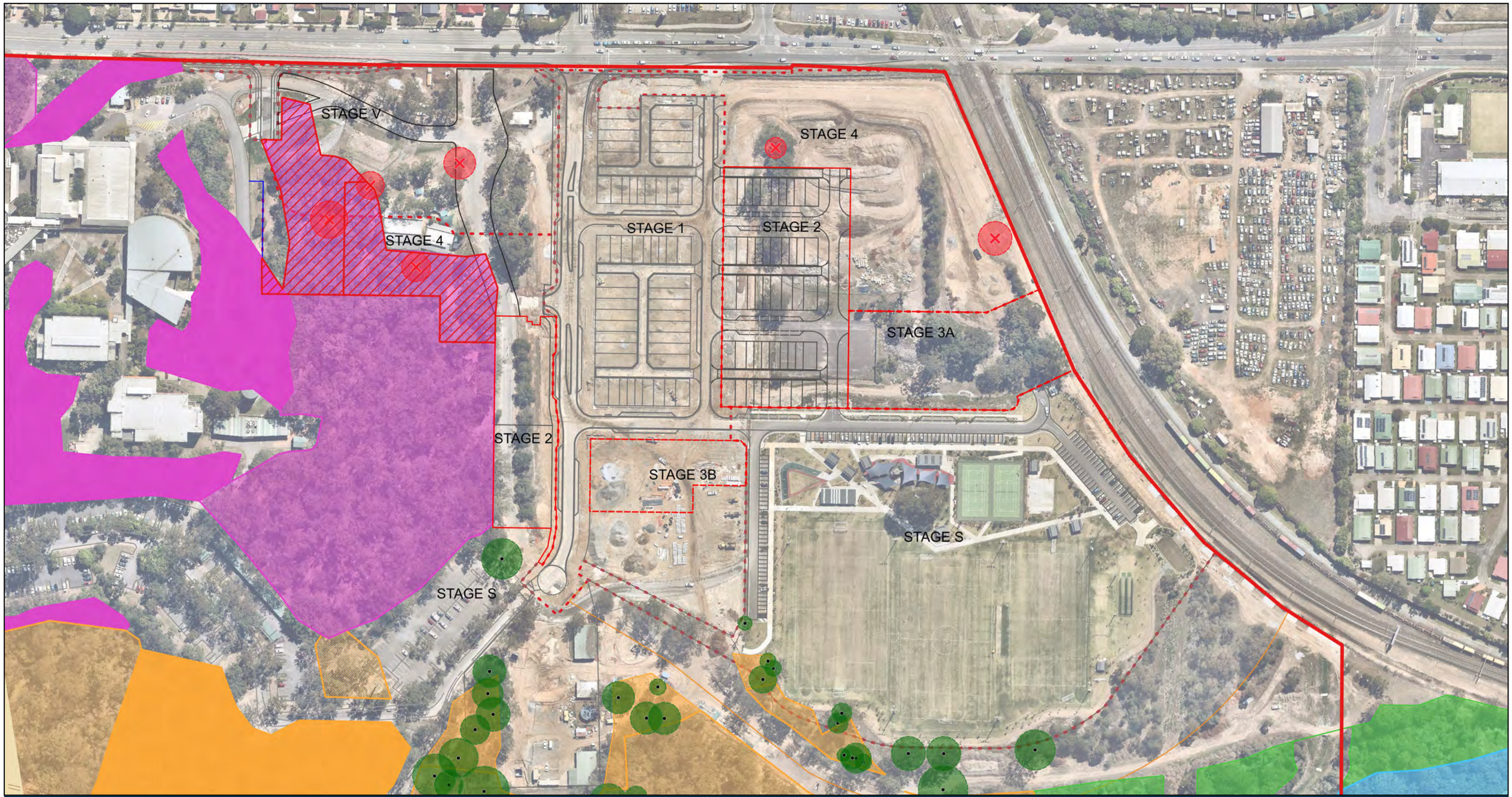


**Carseldine Village - Ecological Restoration** **Legend**

## Sheet 8 - Future Stages Impact Plan

28 South Project Ref: 2017-057

Data Sources: Nearmap Aerial Imagery (Nearmap March 2020); Digital Cadastre Database (Dept. Natural Resources and Mines, 2020); Roads (DNRME, 2020).

28ºS ENVIRONMENTAL

- Carseldine Village Site Boundary
- Stage Boundaries
- Tree Removed for Future Stage (6)
- Tree Retained
- Future Impact to Significant Vegetation

**Significant Vegetation**

- 1 Open Forest (RE 12.5.2)
- 2 Open Forest (RE 12.5.3)
- 3 Open Forest - Modified Understory (RE 12.5.3)
- 4 Open Forest (RE 12.3.11)
- 5 Open Forest - Modified Understory (RE 12.3.11)
- 6 Open Forest (Non-remnant)
- 7 Open Forest - Modified Understory (RE 12.3.11)
- 8 Riverine Open Forest (RE 12.3.7)
- 9 Open Woodland (non-remnant)
- 10 Closed Forest (Non-remnant)

| Issue Date | Dwg No. | Author |
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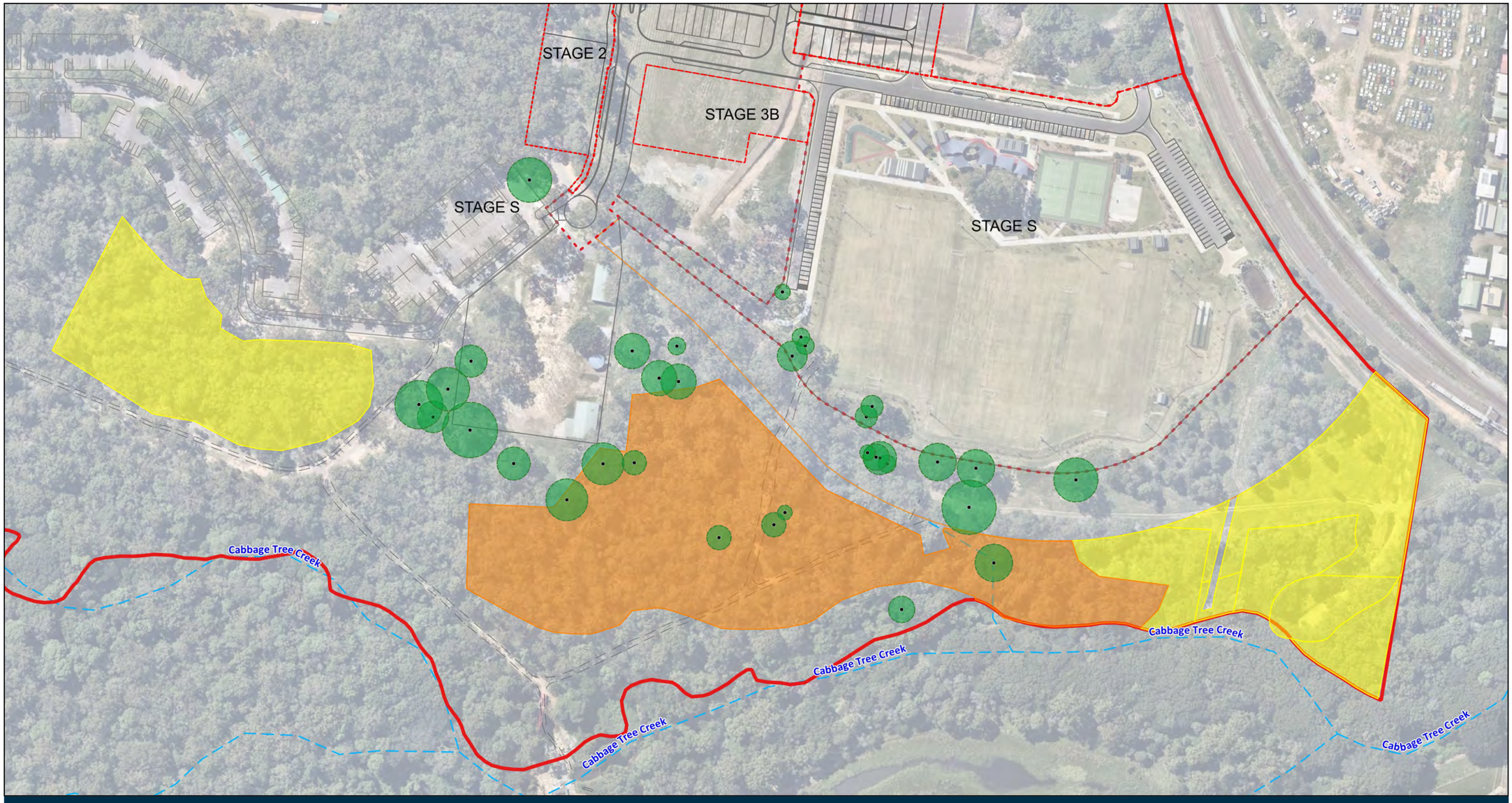


**Carseldine Village - Ecological Restoration**

**Legend**

## Sheet 9 - Focus Areas for Rehabilitation

28 South Project Ref: 2017-057

Data Sources: Nearmap Aerial Imagery (Nearmap March 2020); Digital Cadastre Database (Dept. Natural Resources and Mines, 2020); Roads (DNRME, 2020).

28ºS ENVIRONMENTAL

- Carseldine Village Site Boundary
- Pedestrian Trail
- Stage Boundaries
- Future Busway Corridor

**Focus Area for Rehabilitation and Restoration Efforts**

- Non-remnant areas to be subject to Rehabilitation (2.25 hectares)
- Remnant areas to be subject to Rehabilitation (2.25 hectares)
- Retained Habitat Trees

| Issue Date | Dwg No. | Author |
|---|---|---|
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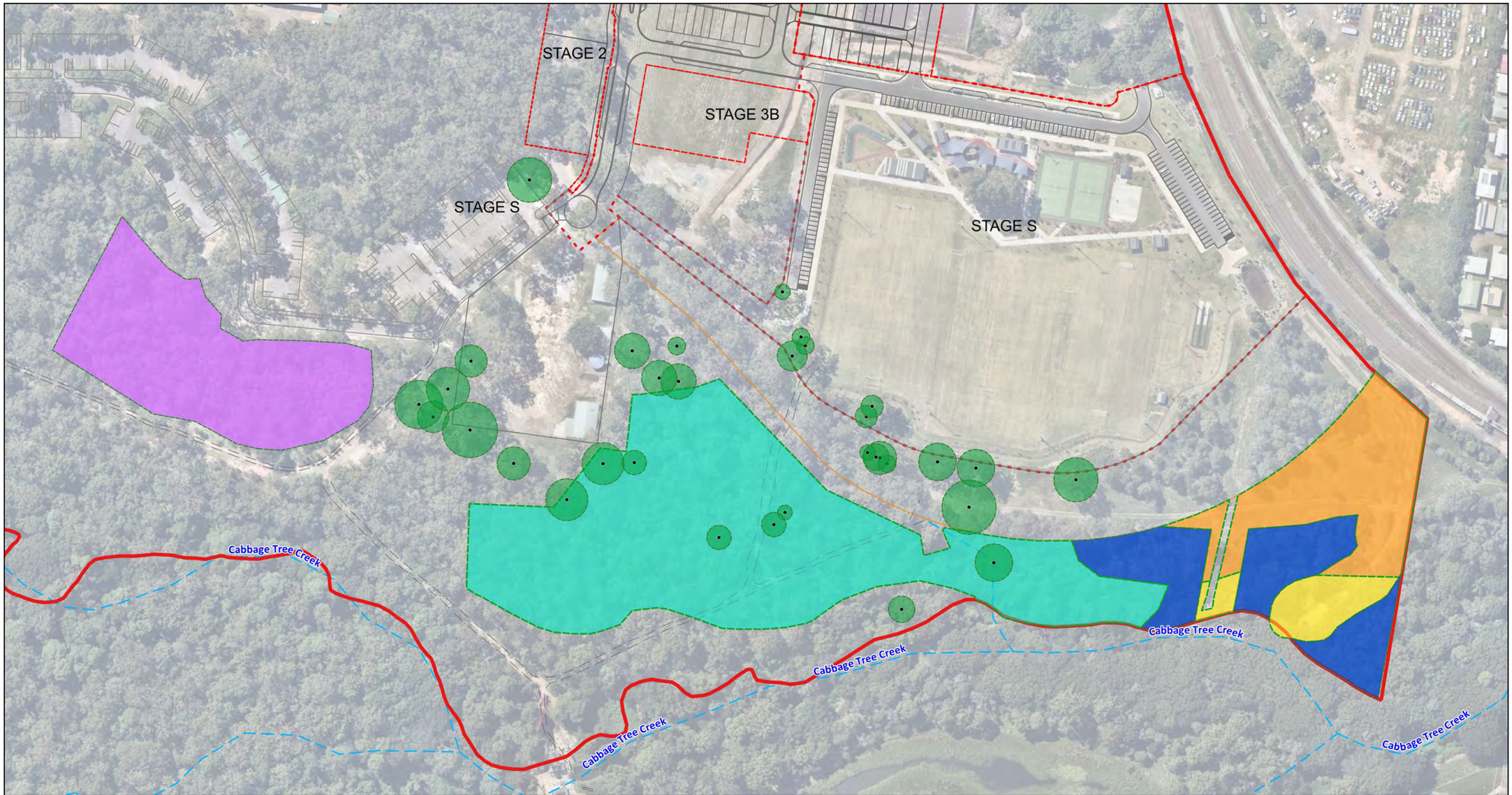


**Carseldine Village - Ecological Restoration**

## Sheet 10 - Rehabilitation Management Units

28 South Project Ref: 2017-057

Data Sources: Nearmap Aerial Imagery (Nearmap March 2020); Digital Cadastre Database (Dept. Natural Resources and Mines, 2020); Roads (DNRME, 2020).

28ºS ENVIRONMENTAL

**Legend**

- Carseldine Village Site Boundary
- Pedestrian Trail
- Stage Boundaries
- Future Busway Corridor
- Retained Habitat Trees

**Focus Area for Rehabilitation and Restoration Efforts**

- MU 1A - Cleared Areas and Open Grass Expanses (RE12.3.7)
- MU 1B - Cleared Areas and Open Grass Expanses (RE12.3.11b)
- MU 2 - Degraded Alluvial Terrace of Cabbage Tree Creek (RE12.3.7)
- MU 3 - Regrowth (non-remnant) Open Forest (12.3.11)
- MU 4 - Assisted Natural Regeneration (Remnant Forest) (RE12.3.11)
- MU 5 - Waterway Rehabilitation Area (RE12.3.7)

| Issue Date | Dwg No. | Author |
|---|---|---|
| 19 November 2020 | 2017-057-ERP | RF |
| **Approved** | **Revision Note** | |
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### 3.1 Management Units

**Management Unit 1 – Areas subject to recent construction works**

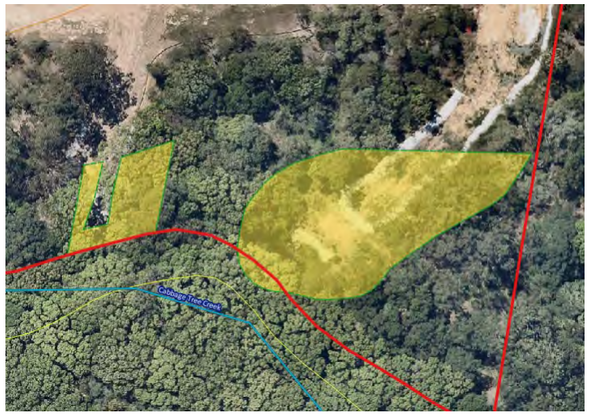
As part of the recently constructed Stage S works and some components of Stage 1, small tracts of bushland have been cleared to construct and install stormwater management devices and associated infrastructure. These areas are located to the south of Stage S, in the far south eastern extent of the CV Site boundary. Adjoining these areas is a similar open grass expanse that has been subject to historic clearing activities. This MU is considered to be non-remnant vegetation for the purposes of satisfying the compensation requirements under the FBMP.

Inspections indicated that these areas now support a vast array of opportunistic exotic grasses or disturbed soil associated with recent tree clearing activities. This MU has been spilt into 3 sub-units based on each sub-units location, however the management for the sub-units remains the same. This MU totals 0.869 hectares and due to its degraded nature will require a considerable effort with the intent being to re-establish a fully functional open forest community through ecological restoration efforts.

MU1 Sub-unit A will utilise the planting species and densities prescribed in **Table 2** (derived from RE 12.3.7). MU1 Sub-unit B will utilise the planting species and densities prescribed in **Table 3** (derived from RE 12.3.11b). This forms compliance with Item a) iv) of Condition 32 for Stage 1.

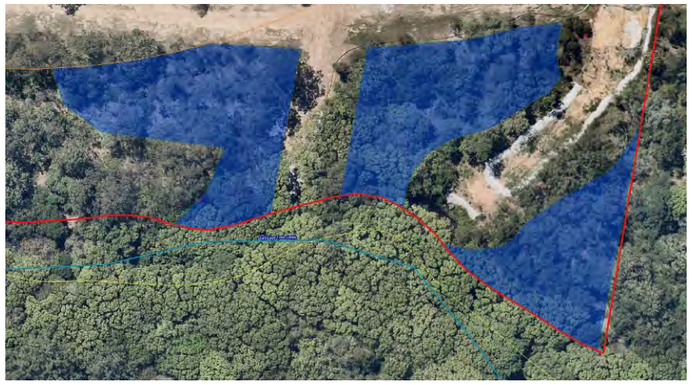
Regular maintenance of this MU should be undertaken to ensure that the pest plant species, particularly grass species, are excluded or appropriately suppressed. Where pest plant species are currently existing within this MU, mechanical and chemical treatment methods are prescribed, and it is at the discretion of the restoration contractor to use the most suitable method. All weed treatment and removal methods should be in accordance with the methods specified in the South East Queensland Ecological Restoration Framework Manual.

**Inset 1 – View of MU1A - area subject to recent clearing for stormwater management for Stage S.**




**Inset 2 – MU1A Areas illustrating the extent of clearing works within the riparian areas of Cabbage Tree Creek (Preclear RE12.3.7)**

**Inset 3 – MU1B Open grassy expanses on the upper alluvial terraces (Preclear RE12.3.11b)**



**Inset 4 – MU2 and the degraded alluvial terrace**

**Management Unit 2 – Degraded alluvial terrace and banks of Cabbage Tree Creek**

MU 2 is located within the far south eastern extent of the CV boundary and encompasses an existing patch of highly degraded vegetation. The existing vegetation is dominated by *Cinnamomum camphora** (camphor laurel), a highly invasive woody weed species with some highly scattered juvenile native canopy trees. This MU is considered to be non-remnant vegetation for the purposes of satisfying the compensation requirements under the FBMP and is a total of 0.59 hectares

The primary objective for this MU is to undertake targeted pest plant treatment and removal within the riparian corridor associated with Cabbage Tree Creek. Specific focus is given to the mature camphor laurel dominating the canopy and sub-canopy strata. The mature camphor laurel should be stem-injected and left in-situ to avoid detrimental impacts to soil stability. Monitoring of the treated camphor laurel should be undertaken to ensure the stem-injection was successful and re-seeding will not occur. Juvenile camphor laurel should be cut, and the stump treated to ensure re-shooting does not occur. Where treatment of dense camphor laurel occurs canopy gaps are likely to transpire upon the eventual deterioration and decay of the camphor laurel. In these instances, installation of advanced *Ficus rubiginosa* (rock fig) planting is prescribed. This will encourage the replacement of potential canopy gaps and soil stability over time as the rock figs mature. *Eucalyptus tereticornis* (Queensland blue gum) should also be planted where existing canopy gaps occur.

Whilst this MUs focus is on the treatment and removal of camphor laurel, other exotic plant species are to be targeted as necessary and as prescribed in **Table 8**. Rock fig planting should be undertaken in areas where a future canopy gap may be larger than 225m$^2$ (i.e. 15m spacing).The establishment of rock figs will further provide foraging and resources for fauna species, specifically frugivores including bats and frugivorous birds. Further, the Queensland blue gums will build upon the existing winter flowering resources across the locality. Plantings should be at 40m$^2$ (6m spacing or greater and defined based on the canopy gaps created through weed tree treatments. Refer to **Table 4** for further detail regarding the prescribed planting palette for this MU. This forms compliance with Item a) iv) of Condition 32 for Stage 1.

**Inset 5 – View of MU2 and the significant areas dominated by camphor laurel**

**Management Unit 3 – Regrowth open forest**

MU 3 is associated with a patch of regrowth open forest situated centrally within the Bushland and Open Space precinct and adjoins the ring road for the existing office facilities within the CV Site and the existing pedestrian path and cycleway. The existing vegetation community is dominated by stands of semi-mature *Acacia species* (wattles) over an exotic grassy understory. There are occasional scattered mature canopy species throughout the community, however they are not considered to meet the 50% coverage threshold for a remnant community. As such, this MU is considered to be non-remnant vegetation for the purposes of satisfying the compensation requirements under the FBMP and is a total of 1.065 hectares.

The primary objective for this MU is to retain and enhance the existing regrowth community and actively encourage the natural regeneration of native species and further ecological and habitat complexity. The main focus within this MU is to control, treat and remove the pest plant species that are occurring within the groundcover strata. Further, it will be necessary to undertake thinning of the dense stands of Acacia. This will encourage regeneration of other native species that are currently being supressed by the dense Acacia stands.

Mechanical and chemical methods for weed removal are prescribed and it is at the discretion of the restoration contractor to use the most suitable method. The restoration contractor will undertake an initial intensive weed management program to identify the pest plants occurring at the time of the commencement of the restoration works program. All weed treatment and removal methods should be in accordance with the methods specific in the South East Queensland Ecological Restoration Framework Manual.

Where canopy gaps occur as a result of thinning activities, and/or native recruitment is limited after the initial 3 months of intensive Assisted Natural Regeneration (**ANR**) management works, infill planting will be undertaken. This will involve the planting of locally sourced native tube stock derived from **Table 5** which is derived from RE12.3.11. It is expected that a level of in-fill planting will be required, mainly for the ground cover strata. This forms compliance with Item a) iv) of Condition 32 for Stage 1.

**Inset 6 – View of MU3 and the expanse of regrowth forest**

**Inset 7 – View of regrowth forest (MU3) and the dense stands of Acacia**

**Inset 8 – View of remnant open forest community (MU 4)**

**Management Unit 4 – Assisted Natural Regeneration of Remnant Open Forest**

MU 4 is associated with the existing remnant open forest community situated to the south of Stage S and Stage 1. This MU is considered to be remnant vegetation for the purposes of satisfying the compensation requirements under the FBMP and is a total of 2.25 hectares.

MU 4 Sub-unit A is dominated by a mature canopy of *Eucalyptus racemosa* (scribbly gum), *Eucalyptus tereticornis* (Queensland blue gum), *Corymbia intermedia* (pink bloodwood) and occasional *Eucalyptus siderophloia* (northern grey ironbark). The sub-canopy and shrub strata are sparse to mid dense in areas. The shrub and groundcover support varying levels of pest plant infestations including *Lantana camara** (lantana), *Megathyrsus maximus var. maximus** (guinea grass), *Passiflora suberosa** (corky passion), *Ochna serrulate** (ochna) and *Asparagus species** (asparagus ferns).

This community has a strong natural resilience and will benefit from weed management measures. The intent for this MU is to retain and enhance the open forest communities through natural regeneration methods. The main focus within this MU is to control, treat and remove the pest plant species, most notably the exotic understory. There are numerous exotic species present that will require attention the majority of which are listed in **Table 8.**

Mechanical and chemical methods for weed removal are prescribed and it is at the discretion of the restoration contractor to use the most suitable method. The restoration contractor will undertake an initial intensive weed management program to identify the pest plants occurring at the time of the commencement of the restoration works program. All weed treatment and removal methods should be in accordance with the methods specific in the South East Queensland Ecological Restoration Framework Manual. Given the natural resilience of these communities, no planting is prescribed for this MU. This forms compliance with Item a) iv) of Condition 32 for Stage 1.


**Inset 9 – View of MU4 and the extent of remnant vegetation to be subject to ANR**

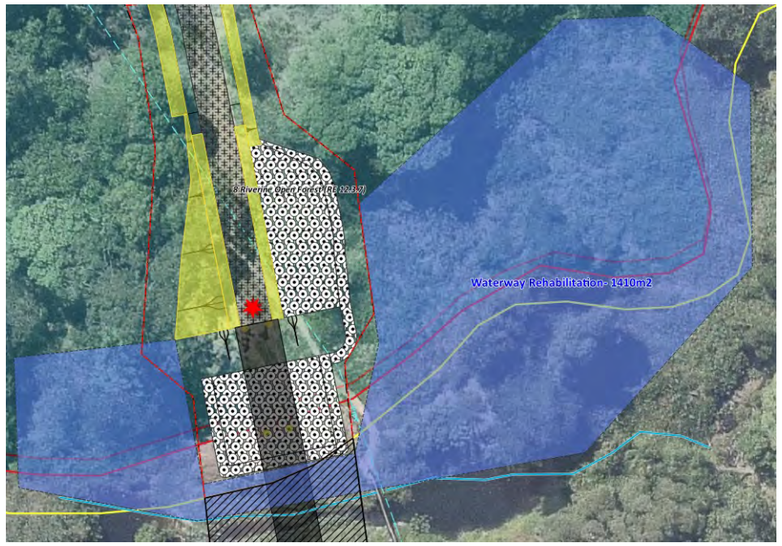
**Management Unit 5 – Degraded alluvial terrace and banks of Cabbage Tree Creek**

This MU encompasses the areas identified for rehabilitation works as part of the Pedestrian Bridge - *Compliance Assessment* and the Waterway Rehabilitation Plan (prepared by 28 South to satisfy Condition 17 of DEV2019/1070). No changes have been made to the management of this area since the submission of the separate WRP. The MU has been added to this whole-of-Masterplan ERP for a holistic approach to rehabilitation efforts across the CV.

The MU encompasses the northern banks of Cabbage Tree Creek, either side of the Pedestrian Bridge (**Sheet 4**) and is 0.1410 hectares. This MU occurs within a mapped remnant community but exists as a highly degraded area with significant pest plant infestations adjoining remnant vegetation to the north and west. The location of this restoration work is strategically position at the fringe areas of the existing remnant vegetation with the aim at expanding the extent of remnant vegetation, consolidating and normalising its edge and sealing it off from adjoining exotic vegetation. It will, in time improve and extent remnant native canopy and forest along Cabbage Tree Creek's riparian corridor and assist in improving fauna movement opportunities along this corridor.

The areas proposed for ecological restoration works have been identified as being dominated by low growing weeds, namely Singapore daisy, green panic and elephant grass within an area is not considered to align with any remnant vegetation communities.

The ultimate intent of this MU is to undertake ecological restoration works and encourage native regeneration through sensitive treatment of pest plants. Further, plantings of shrub and canopy species is prescribed for this area where shrub and canopy strata gaps occur, which is the vast majority of the MU. Plantings will be established at densities specified in **Table 6** below and will require regular maintenance to manage emergent pest plants. **Table 6** forms compliance with part b) vi) of Condition 17 of DEV2019-1070.




**Inset 10 – View of MU5 adjoining the Pedestrian Bridge**

**3.2 Planting Palettes**

**Table 2: Planting Palette for MU 1 A derived from RE 12.3.7 - Riverine Open Forest**

| Species | Common Name | Density % | Density to be achieved ($m^2$) | Tube stock (based on area of MU and density) |
|---|---|---|---|---|
| | | ***Canopy*** | | |
| *Eucalyptus tereticornis* | Queensland Blue Gum | 30% | 1 per 40$m^2$ (6.3 m spacing) | |
| *Corymbia tessellaris* | Moreton Bay Ash | 15% | | |
| *Corymbia intermedia* | Pink Bloodwood | 15% | | |
| *Araucaria cunninghamii* | Hoop Pine | 10% | | |
| *Castanopsermum australe* | Moreton Bay Chestnut | 10% | | |
| *Flindersia Australis* | Crow's ash | 10% | | |
| *Ficus rubiginosa* | Rock fig | 10% | | |
| | | | **Total** | 50 Canopy |
| | | **Shrub** | | |
| *Melaleuca bracteata* | Black Teatree | 15% | 1 per 16m2 (4m spacing) | |
| *Melaleuca viminalis* | Weeping Bottlebrush | 15% | | |
| *Lophostemon suaveolens* | Swamp Box | 5% | | |
| *Waterhousea floribunda* | Weeping Lilly Pilly | 5% | | |
| *Casuarina cunninghamiana* | River oak | 5% | | |
| *Banksia robur* | Swamp banksia | 10% | | |
| *Cupaniopsis anacardioides* | Tuckeroo | 15% | | |
| *Elaeocarpus obovatus* | Hard Quandong | 10% | | |
| *Trema tomentosa* | Poison peach | 5% | | |
| *Macaranga tanarius* | Macaranga | 5% | | |
| *Guioa semiglauca* | Guioa | 5% | | |
| *Syzygium australe* | Lily Pilly | 5% | | |
| *Ficus coronata* | Sandpaper Fig | 5% | | |
| *Glochidion ferdinandi* | Cheese Tree | 5% | | |
| *Mallotus philippensis* | Red Kamala | 5% | | |
| | | | **Total** | 126 shrubs |
| | | **Groundcovers/Vines** | | |
| *Lomandra hystrix* | Creek mat rush | 15% | 1 per 1m2 (1m spacing) | |
| *Lomandra longifolia* | Mat rush | 15% | | |
| *Gahnia aspera* | Rough Saw Sedge | 10% | | |
| *Oplismenus aemulus* | Graceful grass | 10% | | |
| *Themeda triandra* | Kangaroo grass | 15% | | |
| *Lepidosperma laterale* | Variable Sword Sedge | 5% | | |
| *Dianella caerulea* | Blue Flax Lily | 5% | | |
| *Commelina diffusa* | Native Wandering Jew | 5% | | |
| *Imperata cylindrica* | Blady grass | 5% | | |
| *Hardenbergia violacea* | False Sarsaparilla | 5% | | |
| *Eustrephus latifolius* | Wombat Berry | 5% | | |
| *Stephania japonica* | Tape vine | 5% | | |
| | | | **Total** | 1850 groundcovers |

**Table 3: Planting Palette for MU 1B (derived from 12.3.11b - Open Forest)**

| Species | Common Name | Density % | Density to be achieved ($m^2$) | Tube stock (based on area of MU and density) |
|---|---|---|---|---|
| | | ***Canopy*** | | |
| *Eucalyptus tereticornis* | Queensland blue gum | 40% | 1 per 36$m^2$ (6 m spacing) | 74 |
| *Eucalyptus racemosa* | Scribbly gum | 40% | | 74 |
| *Corymbia intermedia* | Pink bloodwood | 5% | | 10 |
| *Eucalyptus siderophloia* | Northern grey ironbark | 5% | | 10 |
| *Angophora leiocarpa* | Smooth-barked apple | 5% | | 10 |
| *Corymbia tessellaris* | Moreton bay ash | 5% | | 10 |
| | | | **Total** | 188 canopy |
| | | **Shrub** | | |
| *Lophostemon suaveolens* | Swamp box | 15% | 1 per 12m2 (3.5m spacing) | 85 |
| *Melaleuca quinquenervia* | Borad-leaved paperbark | 15% | | 85 |
| *Allocasuarina littoralis* | Black she-oak | 10% | | 56 |
| *Alphitonia excelsa* | Red ash | 15% | | 85 |
| *Banksia integrifolia* | Coast banksia | 10% | | 56 |
| *Glochidion sumatranum* | Cheese tree | 5% | | 27 |
| *Elaeocarpus obovatus* | Hard quandong | 5% | | 27 |
| *Melaleuca salicina* | Willow bottlebrush | 5% | | 27 |
| *Notolaea longifolia* | Broad-leaved olive | 5% | | 27 |
| *Jagera pseudorhus* | Foambark | 5% | | 27 |
| *Leptospermum polygalifolium* | Tea tree | 5% | | 27 |
| *Hakea florulenta* | Willow hakea | 5% | | 27 |
| | | | **Total** | 556 Shrubs |
| | | **Groundcovers/Vines** | | |
| *Imperata cylindrica* | Blady grass | 15% | 1 per 1m2 (1m spacing) | 890 |
| *Themeda triandra* | Kangaroo grass | 15% | | 890 |
| *Heteropogon contortus* | Black spear grass | 10% | | 595 |
| *Lomandra longifolia* | Mat rush | 10% | | 595 |
| *Cymbopogon refractus* | Barbed wire grass | 5% | | 296 |
| *Entolasia stricta* | Wiry panic | 5% | | 296 |
| *Lepidosperma laterale* | Variable sword sedge | 5% | | 296 |
| *Oplismenus aemulus* | Graceful grass | 5% | | 296 |
| *Gahnia aspera* | Red Saw Sedge | 5% | | 296 |
| *Brunnoniella australis* | Blue trumpet | 5% | | 296 |
| *Dianella caerulea* | Blue flax lily | 5% | | 296 |
| *Eustrephus latifolius* | Wombat berry | 5% | | 296 |
| *Stephania japonica* | Tape vine | 5% | | 296 |
| *Googenia rotundifolia* | Star goodenia | 5% | | 296 |
| | | | **Total** | 5930 groundcovers |

**Table 4: Planting Palette for MU 2 (derived from 12.3.7 – Riverine Open Forest)**

| Species | Common Name | Density % | Density to be achieved ($m^2$) |
|---|---|---|---|
| ***Canopy*** | | | |
| *Eucalyptus tereticornis* | Queensland Blue Gum | 30% | To be established within canopy gaps created through weed treatment greater than 40$m^2$ (6.3m spacing) |
| *Corymbia tessellaris* | Moreton Bay Ash | 15% | |
| *Corymbia intermedia* | Pink Bloodwood | 15% | |
| *Araucaria cunninghamii* | Hoop Pine | 10% | |
| *Castanopsermum australe* | Moreton Bay Chestnut | 10% | |
| *Flindersia Australis* | Crow's ash | 10% | |
| *Ficus rubiginosa* | Rock fig | A minimal of 10 advanced plantings (120 lt pots) should be established in this MU. | To be established in larger canopy gaps created through weed treatment greater than 225$m^2$ (15m spacing). |
| **Shrub** | | | |
| *Melaleuca bracteata* | Black Teatree | 15% | To be established within canopy gaps created through weed treatment greater than 16$m^2$ (4m spacing) |
| *Melaleuca viminalis* | Weeping Bottlebrush | 15% | |
| *Lophostemon suaveolens* | Swamp Box | 5% | |
| *Waterhousea floribunda* | Weeping Lilly Pilly | 5% | |
| *Casuarina cunninghamiana* | River oak | 5% | |
| *Acacia disparrima* | Hickory Wattle | 10% | |
| *Cupaniopsis anacardioides* | Tuckeroo | 15% | |
| *Elaeocarpus obovatus* | Hard Quandong | 10% | |
| *Trema tomentosa* | Poison peach | 5% | |
| *Macaranga tanarius* | Macaranga | 5% | |
| *Guioa semiglauca* | Guioa | 5% | |
| *Syzygium australe* | Lily Pilly | 5% | |
| *Ficus coronata* | Sandpaper Fig | 5% | |
| *Glochidion ferdinandi* | Cheese Tree | 5% | |
| *Mallotus philippensis* | Red Kamala | 5% | |
| **Groundcovers** | | | |
| *Lomandra hystrix* | Creek mat rush | 30% | 1 per 2m2 (1.5m spacing) |
| *Lomandra longifolia* | Mat rush | 30% | |
| *Gahnia aspera* | Rough Saw Sedge | 20% | |
| *Lepidosperma laterale* | Variable Sword Sedge | 10% | |
| *Dianella caerulea* | Blue Flax Lily | 10% | |

**Table 5: Planting Palette for MU 3 (derived from 12.3.11 - Open Forest)**

| Species | Common Name | Density % | Density to be achieved ($m^2$) |
|---|---|---|---|
| ***Canopy*** | | | |
| *Eucalyptus tereticornis* | Queensland blue gum | 40% | To be established within canopy gaps created through weed treatment greater than 36$m^2$ (6m spacing) |
| *Eucalyptus racemosa* | Scribbly gum | 40% | |
| *Corymbia intermedia* | Pink bloodwood | 5% | |
| *Eucalyptus siderophloia* | Northern grey ironbark | 5% | |
| *Angophora leiocarpa* | Smooth-barked apple | 5% | |
| *Corymbia tessellaris* | Moreton bay ash | 5% | |
| **Shrub** | | | |
| *Lophostemon suaveolens* | Swamp box | 15% | To be established within canopy gaps created through weed treatment greater than 12$m^2$ (3.5m spacing) |
| *Melaleuca quinquenervia* | Borad-leaved paperbark | 15% | |
| *Allocasuarina littoralis* | Black she-oak | 10% | |
| *Alphitonia excelsa* | Red ash | 15% | |
| *Banksia integrifolia* | Coast banksia | 10% | |
| *Glochidion sumatranum* | Cheese tree | 5% | |
| *Elaeocarpus obovatus* | Hard quandong | 5% | |
| *Melaleuca salicina* | Willow bottlebrush | 5% | |
| *Notolaea longifolia* | Broad-leaved olive | 5% | |
| *Jagera pseudorhus* | Foambark | 5% | |
| *Leptospermum polygalifolium* | Tea tree | 5% | |
| *Hakea florulenta* | Willow hakea | 5% | |
| **Groundcovers/Vines** | | | |
| *Imperata cylindrica* | Blady grass | 15% | 1 per 1m2 (1m spacing) |
| *Themeda triandra* | Kangaroo grass | 15% | |
| *Heteropogon contortus* | Black spear grass | 10% | |
| *Lomandra longifolia* | Mat rush | 10% | |
| *Cymbopogon refractus* | Barbed wire grass | 5% | |
| *Entolasia stricta* | Wiry panic | 5% | |
| *Lepidosperma laterale* | Variable sword sedge | 5% | |
| *Oplismenus aemulus* | Graceful grass | 5% | |
| *Gahnia aspera* | Red Saw Sedge | 5% | |
| *Brunnoniella australis* | Blue trumpet | 5% | |
| *Dianella caerulea* | Blue flax lily | 5% | |
| *Eustrephus latifolius* | Wombat berry | 5% | |
| *Stephania japonica* | Tape vine | 5% | |
| *Googenia rotundifolia* | Star goodenia | 5% | |

**Table 6: Planting Palette for MU 5 – Waterway Rehabilitation associated with the Pedestrian Bridge (derived from 12.3.11 - Open Forest)**

| Species | Common Name | Density % | Density to be achieved ($m^2$) |
|---|---|---|---|
| ***Canopy*** | | | |
| *Casuarina cunninghamiana* | River She-oak | 40% | 1/16m2 |
| *Eucalyptus tereticornis* | Queensland Blue Gum | 40% | |
| *Corymbia tessellaris* | Moreton Bay Ash | 5% | |
| *Corymbia intermedia* | Pink Bloodwood | 5% | |
| *Lophostemon suaveolens* | Swamp Box | 5% | |
| *Waterhousea floribunda* | Weeping Lilly Pilly | 5% | |
| **Shrub** | | | |
| *Melaleuca bracteata* | Black Teatree | 15% | 1/8m2 |
| *Melaleuca viminalis* | Weeping Bottlebrush | 15% | |
| *Acacia disparrima* | Hickory Wattle | 10% | |
| *Cupaniopsis anacardioides* | Tuckeroo | 15% | |
| *Elaeocarpus obovatus* | Hard Quandong | 10% | |
| *Geijera salicifolia* | Scrub Wilga | 5% | |
| *Macaranga tanarius* | Macaranga | 5% | |
| *Melaleuca linariifolia* | Narrow-leaved Paperbark | 5% | |
| *Syzygium australe* | Lily Pilly | 5% | |
| *Ficus coronata* | Sandpaper Fig | 5% | |
| *Glochidion ferdinandi* | Cheese Tree | 5% | |
| *Mallotus philippensis* | Red Kamala | 5% | |
| **Groundcovers** | | | |
| *Lomandra hystrix* | Creek Matrush | 20% | 1/m2 |
| *Eustrephus latifolius* | Wombat Berry | 20% | |
| *Gahnia aspera* | Rough Saw Sedge | 20% | |
| *Juncus usitatus* | Common Rush | 10% | |
| *Philydrum lanuginosum* | Woolly Frogs Mouth | 10% | |
| *Lepidosperma laterale* | Variable Sword Sedge | 5% | |
| *Dianella caerulea* | Blue Flax Lily | 5% | |
| *Commelina diffusa* | Native Wandering Jew | 5% | |
| *Hardenbergia violacea* | False Sarsaparilla | 5% | |

**Ecological Restoration and Reconstruction Goals**

The primary objectives and performance criteria for this ecological restoration plan is to:

- 228 nest boxes must be established as part of the initial works program of this ERP;
- 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 reduce fragmentation within the Bushland and Open Space Precinct and the broader Cabbage Tree Creek ecological corridor;
- Ensure WoNS and weed species listed under the *Biodiversity Act 2014* are not present within ecological corridor;
- Observe evidence of significant reductions in the presence of other exotic species; Perform all weed treatment in a manner that does not promote erosion;
- Public access is encouraged and limited to the areas identified to support recreation and open space uses, including pedestrian pathways and the local parks.
- Routine monitoring the rehabilitation area must identify and rectify the following impacts:
    - Litter and/or rubbish dumping;
    - Plant theft;
    - Fauna impacts;
    - Soil compaction; and
    - Erosion.

**Monitoring Program**

Each MU will require a minimum of 1 monitoring point to be established as part of this ERP. In order to illustrate achieve the success criteria within **Table 7** below and compliance with part a) vi) of Condition 32 for Stage 1, it is important to monitor the restoration progress through collecting a range of data. Monitoring should be undertaken at 6, 12 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 EDQ. 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 plants within the restoration area where planted (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;
- percentage of planted specimens survived;
- notation of all natural death or illegal removal of any native plants; and
- 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 eat 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 a pro-forma for the collection of relevant monitoring information during all events to ensure consistency and comparability between surveys. This also provides sufficient evidence to be submitted to EDQ for compliance with Condition 32 c).

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 in the Landscape Specifications below.

**Timeframes and Success Criteria**

The governing timeframes outlined for the rehabilitation methods to be met by the Rehabilitation Contractors for the prescribed MUs have been identified in **Table 3**.

**Table 7: Timeframes and Success Criteria**

| Phase | Action | Timeframe | Applicable MU |
|---|---|---|---|
| ESTABLISHMENT | | | |
| 1 | Initial inspection of the Ecological Restoration 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 and Planting as per **Table 2-4** and **Table 6**.<br><br>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.<br><br>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.<br><br>All plantings that don't strike, are killed or damaged must be replaced during this period. | Every 3 months after on-maintenance is achieved, an inspection with the Assessment Manager is to occur. | All MUs |
| OFF-MAINTENANCE | | | |
| 4 | The following success criteria must be met to achieve off-maintenance:<br><br>• WoNS, weed species listed under the *Biosecurity Act 2014* and weeds identified in the *Brisbane Invasive Species Management Plan 2013-2017* are not to be present in MUs;<br><br>• 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 ERP 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. | 2 years | All MUs |
| | - MUs planted out according to species and densities specified in **Table 2-4.**<br>- Should pest plants establish after 12months from the commencement of this ERP, the understory planting density should be increased to 2/m2 (0.5m spacing); and<br>- All plantings must have been established and likely to persist without assistance going forward. | 2 years | All MU |

**Success Criteria**

Successful parameters for the entirety of the ecological corridor subject to this conceptual rehabilitation management plan should reflect the following:

- Average of 1 native plant per 1m2 (or establishment of leaf litter/natural debris and/or foliage projection cover typical to surrounding areas of the overarching regional ecosystem 12.3.5, 12.5.3);
    - It is recommended that rehabilitation works aim to also achieve 1 koala habitat tree per 40m2 and 1 native shrub per 16m2;
    - Native sedge species and other native emergent macrophytes can be counted as native plants.

Corrective actions to manage areas which have failed to meet the above success criteria are defined below.

**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; and
- Where planted specimens within the establishment and monitoring period fail to strike, supplementary planting is to be undertaken.

## LANDSCAPE SPECIFICATIONS

### Maintenance

The minimum following maintenance measures are required to be undertaken by the rehabilitation 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;
- Recurrent listed WoNS or *Biosecurity Act* weeds within regeneration areas are to be removed (weed management measures are outlined within **Table 8**); and

### Planting Requirements

**Table 2-6** identify the appropriate species to be selected for planting as well as the density criteria to be achieved. It is noted that not all species proposed may be available at the time of works. Subsequent species listed under the Regional Ecosystem Definition Data (REDD) prepared by the Queensland Herbarium should be consulted to identify other appropriate species for planting. If all species required for planting are not available, a staged planting may be required. This must be supporting in writing from the Assessment Manager/Team.

### 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; and
- items of rubbish and litter.

It is noted that site surveys did not identified any significant waste material. Contractors should be made aware of any contaminates or waste material prior to undertaking works.

### Sediment and Erosion Control

The rehabilitation contractor must install silt control fencing as required on site, in addition to Engineering silt fencing or prevention measures, to prevent soil material from entering rehabilitation areas or leaving rehabilitation areas. Refer to Engineering drawings for sediment and erosion control measures for civil areas. It should be noted, that it is the responsibility of the engaged contractor to comply with the erosion and sediment control measures of the Civil areas and areas adjoining the MUs. If soil stabilisation measures are required within the MUs to assist in the avoidance, minimisation and mitigation of soil loss, they should be sympathetic to the specific situation and only utilise appropriate measures such as sediment fencing, coir logs, native mulch or hydromulch style soil binding agents with a native seed mix derived from **Table 2-6**.

The engaged rehabilitation contractor will not be responsible for Erosion and Sediment Control from areas outside of the MUs. Should sedimentation or erosion issues occur as a result of construction works, the rehabilitation contractor is to liaise with the engineering and civil contractors to rectify any works.

### Specification for Topsoil Management

Topsoil management is an important component of successful rehabilitation. Much of the rehabilitation works will be working with insitu soils; however, may require treatment specific to earthwork requirements. At this point in time it is too difficult to predict the quality of topsoil medium within areas subject to rehabilitation works. No sub-soils should be exposed or utilised in the rehabilitation areas. On site topsoil should also consider the following:

- Topsoil contains important seedbank and plant regeneration material that may be used for regeneration at low cost following its removal from construction areas.
- Topsoil may be stockpiled on site and later spread in cleared, degraded or bare areas, or as determined through site assessment, to encourage regeneration of native plants.
- Topsoil from the development area, where possible, should be stripped to a depth between 100-300mm and stockpiled for use in rehabilitation areas which are not left in situ. Topsoil piles should be no greater than 2m high covered with an appropriate mesh/bonding material to avoid loss.

### Fire Ant Movement Controls

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. Penalties apply for non-compliance with the movement controls. If the engaged contractors are unsure of their obligations under the *Biosecurity Act 2014* they should contact the relevant Queensland State Government Department.

### Contractor Requirements

All weed treatment must be safely undertaken by a suitably qualified contractor and utilise appropriate chemicals and all contractors must have Conservation and Land Management Certification 4 or equivalent experience and an ACDC licence. This RMP has been based on best practices from the SEQ Ecological Restoration Framework and significant practical experience in restoration implementation projects.

### Landscape Specification Notes for 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. Install a 0.5m ring of 50mm depth added site mulch (or clean native mulch locally sourced) to each tube stock plant. 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 rehabilitation areas.
4. All Management Units are revegetated using native species of local provenance where practicable. Should species be unavailable within the planting pallet tables assigned to MUs, the contractor should contact 28 South Environmental or EDQ to identify an appropriate replacement species. This should at first be sought from the REs technical descriptions.
5. Any additional native species found regenerating through the soil seed bank and the seed found in the cleared, mulched material should be retained and protected as a part of the rehabilitation maintenance.
6. No tree or shrub plantings should occur 2 metres of property boundaries and kept a safe distance away from built structures, being minimum of ten metres.
7. Rehabilitation areas must first utilise existing native mulch material already available on-site, after shredding, before using mulch from another source. Stockpiled native vegetation should be mulched on site and spread in the rehabilitation areas to the extent required by point 2 above.
8. All imported or site-based mulch is to be aged appropriately before use.
9. Mulch is to be placed in a manner that does not smother existing native grasses and groundcovers.

### Services

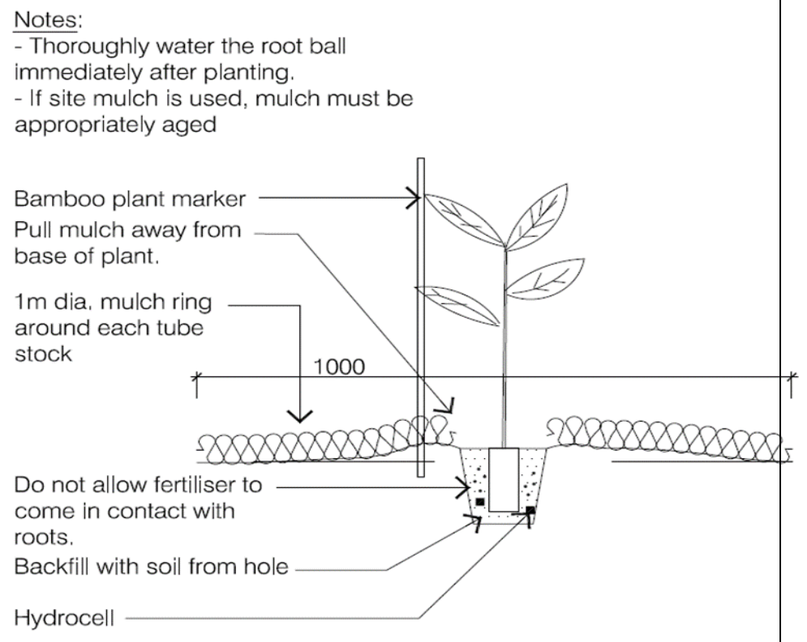
The contractor shall make themselves aware of all underground and overhead services prior to the commencement of works. The contractor shall also be responsible for determining the locations of as-built and to be constructed services during the course of the works. No services have been identified on these drawings.

### Controlling Domestic Pets and Wildlife

It is important to exclude domestic pets and wildlife from rehabilitation areas during the formative periods of the rehabilitation efforts. This will help avoid the loss of tube stock or regenerating vegetation from being impacted and or loss through foraging.

### Rehabilitation Area Restrictions

- 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; and
- No general foot access of construction staff unless specifically related to Rehabilitation Activities.




1 TUBESTOCK PLANTING
SCALE: 1:10 @ A1; 1:20 @ A3

Each specimen will be watered-in with at least 5 litres of water; fertiliser and water crystals; and surrounding with a 0.5m ring of clean native mulch to a depth of 50mm. Landscape specifications for plants are outlined below and within *Tube Stock Planting Note 1*.

**Weeding and Management Specifications**

Weed control methods of all identified weed species within the FBMP are included in **Table 8** and 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 rehabilitation contractor must undertake detailed site inspections prior to works commencing to identify target weed species, their location and extent for treatment. Table 8 below specifically includes management methods relating to Singapore daisy, and in compliance with part b) iii) of Condition 17.

**Table 8: Control Techniques and Herbicide Application Rates for Particular Weed Species**

| Common Name | Scientific Name | Application Method | Chemical | Application Rate |
|---|---|---|---|---|
| ***Trees*** | | | | |
| Umbrella Tree | *Schefflera actinophylla* | Spot Spray | Glyphysate + Metsulfuron Methyl | |
| | | Cut Scrape Paint | Glyphosate | |
| | | Stem Inject | Glyphosate | |
| Camphor Laurel | *Cinnamomum camphora* | Stem Inject | Glyphosate | |
| | | Cut Scrape Paint | Glyphosate | |
| | | Basal Bark | Fluroxypyr | |
| | | Spot Spray | Glyphosate | |
| Cadaghi | *Corymbia torelliana* | Cut Scrape Paint | Glyphosate | |
| | | Stem Inject | Glyphosate | |
| | | Basal Bark | Fluroxypyr | |
| | | Spot Spray | Glyphosate | |
| Chinese Elm | *Celtis sinensis* | Spot Spray | Glyphosate or Glyphosate + Metsulfuron Methyl | |
| | | Cut Scrape Paint | Glyphosate | |
| | | Stem Inject | Glyphosate | |
| Broad-leaved Peppertree | *Schinus terebinthifolius* | Spot Spray | Glyphosate or Glyphosate + Metsulfuron Methyl | |
| | | Cut Scrape Paint | Glyphosate | |
| | | Basal Bark | Fluroxypyr | |
| ***Shrubs*** | | | | 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. |
| Orange Blossom | *Murraya paniculata* | Spot Spray | Glyphosate | |
| | | Cut Scrape Paint | Glyphosate | |
| | | Stem Inject | Glyphosate | |
| Mickey Mouse Plant | *Ochna serrulata* | Basal Bark | Fluroxypyr | |
| | | Spot Spray | Fluroxypyr or Glyphosate + Metsulfuron Methyl | |
| | | Cut Scrape Paint | Glyphosate + Metsulfuron Methyl | |
| Lantana | *Lantana camara* | Cut, Scrape and Paint | Glyphosate | |
| | | Spot-spray | Fluroxypyr | |
| | | Spray (spot spray and | Glyphosate | |
| Groundsel | *Baccharis halimifolia* | Spot Spray, Stem Inject, Cut Scrape Paint | Glyphosate | |
| | | Spot Spray | 2,4-D | |
| Leucaena | *Leucaena leucocephala* | Cut Scrape Paint | Glyphosate | |
| | | Spot Spray | Fluroxypyr | |
| Prickly Pear | *Opuntia sp.* | Spot Spray | Glyphosate + Metsulfuron Methyl | |
| ***Groundcovers*** | | | | |
| Singapore Daisy | *Sphagneticola trilobata* | Spot-spray | Glyphosate + Metsulfuron Methyl | |
| | | | Metsulfuron Methyl | |
| Mother of Millions | *Bryophyllum delagoense* | Spot Spray | 2,4-D | |
| | | | Metsulfuron Methyl | |
| Blue Billy Goats | *Ageratum houstonianum* | Spot Spray | Glyphosate | |
| | | | Metsulfuron Methyl | |
| Red Natal, South African Pigeon Grass, Guinea Grass, Elephant Grass | *Melinis repens, Setaria sphacelata, Megathyrsus maximus, Pennisetum* | Spot Spray | Glyphosate | |

| | | | |
|---|---|---|---|
| | *purpureum* | | |
| ***Vines*** | | | |
| Cat's Claw Creeper | *Macfadyena unguis-cati* | Spot Spray | Glyphosate or Glyphosate + Metsulfuron Methyl |
| | | Cut Scape Paint | Glyphosate |
| Climbing Asparagus, Basket Asparagus | *Asparagus aethiopicus, Asparagus africanus* | Basal Bark | Fluroxypyr |
| | | Spot Spray | Glyphosate |
| Glycine, Morning Glory | *Neonotonia wightii, Ipomoea indica* | Spot Spray | Glyphosate or Glyphosate + Metsulfuron Methyl |
| | | | 2,4-D |
| | | Cut Scrape Paint | Glyphosate |
| Creeping Lantana | *Lantana montevidensis* | Spot-spray | Glyphosate + Metsulfuron Methyl |
| | | | Metsulfuron Methyl |
| | | | 2,4-D |
| ***** Abbreviations*** | | | |
| Gly | Glyphosate | | eg. Weedmaster Duo®, Roundup |
| MM | Metsulfron methyl | | eg. Brushoff®, Brushkiller®, Associate® |
| S | Surfactant | | eg. L1700®, Prosil®, Pulse® |
| A | Spray Adjuvant | | eg. Agral®, Protec®, Codacide® |
| D | Colour Marking Dye | | eg Herbi (red or blue) Liquid Dye® |