



AMENDED SITE REVEGETATION AND REGENERATION PLAN

Lot 1 DP 570076, Lot 2 DP 566529, Lot 1 DP 562222, Lot 1 DP
570077, Lot 1 823679, Lots 46, 54, 55, 199, 200, 201, 202, 205,
206, 209, 228 & 305 DP 755740

Cobaki Estate, Tweed Heads

A Report Prepared for
Leda Manorstead Pty Ltd

JANUARY 2020

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1 Introduction

1.1 Background

JWA Pty Ltd (JWA) was engaged by LEDA Manorstead Pty Ltd to prepare a Site Regeneration and Revegetation Plan (SRRP) for the proposed Cobaki Estate development in October 2008 in response to the Director-General's Environmental Assessment Requirements (DGEAR's) issued 21st August 2007. The SRRP was placed on public exhibition along with various other reports required under the DGEARs. Following submissions from the public and State agencies, some amendments occurred to the Concept Plan. A "Revised Site Regeneration and Revegetation Plan" was then prepared (JWA April 2013).

More recently, detailed engineering design and identification of conflicts in approvals revealed that further amendments were necessary to the Concept Plan. Furthermore, as part of an application pursuant to Section 75W of the *Environmental Planning and Assessment Act (1979)* to modify the Concept Approval (MP 06_0316 MOD 9), specific offset areas have been identified in order to ensure that the development meets all requirements in terms of retaining and protecting Endangered Ecological Communities (EECs) i.e. communities listed in schedules of the TSC Act (now the BC Act) and other native vegetation communities.

This Amended SRRP has been prepared to reflect changes to the Concept Plan, identify and quantify EEC offset areas agreed during the recent Section 75W modification process (a copy of the relevant Court Order is provided as ANNEXURE 1), and provide additional information on proposed compensatory revegetation works where required.

This Amended SRRP provides for a combination of regeneration and revegetation techniques. These techniques will ensure restoration of degraded areas and offsets for any vegetation removal. The level of significance of any loss of EEC's or Threatened species habitat has been assessed by using the provision of the relevant legislation at the time i.e. Section 5a of the TSC Act (7-part test) (JWA 2013).

The aims of this management plan are to:

- Provide an overview plan for the revegetation and regeneration of the Cobaki Estate development site;
- Identify areas of retained vegetation that will be maintained through weed control and general maintenance;
- Identify areas that will be rehabilitated using natural regeneration or enhancement plantings;
- Provide management guidelines for the revegetation, natural regeneration and weed control to be implemented;
- Outline a maintenance and monitoring program for the site; and
- Provide management guidelines for the on-going conservation of vegetation on the site.

1.2 The Cobaki Estate Site

The Subject site is described as the amalgamation of seventeen (17) lots covering approximately 605 ha. The site is located approximately 5 km west of Tweed Heads, and is situated adjacent to Crown Lands forming the NSW/QLD border (FIGURE 1).

The Subject site consists of land described as Lot 1 DP 570076, Lot 2 DP 566529, Lot 1 DP 562222, Lot 1 DP 570077, Lot 1 823679, Lots 46, 54, 55, 199, 200, 201, 202, 205, 206, 209, 228 and 305 DP 755740, Cobaki Estate, off Pigabeen Road, Tweed Heads (FIGURE 2).

The site lies adjacent to private landholdings to the north-west and south-east, and comprises a large portion of land cleared for agricultural purposes (i.e. grazing) throughout which a number of vegetation communities occur. Extensive clearing and subsequent slashing over the drainage basin has resulted in the recruitment of a combination of native and introduced grass species in place of native plants. Forested Crown lands which form the NSW-QLD border also form the northern and western boundary of the Cobaki Estate development site.

FIGURE 2 shows an aerial photograph of the site. Currently sixteen (16) broad vegetation associations comprising twenty-two (22) vegetation communities occur on the site.

1.3 The Proposed Development

The Cobaki Estate development site is proposed to be developed into a master planned residential community. A concept plan (as modified) for the development is shown in FIGURE 3. The proposed development will include the following:

- Development area comprising:
 - Town centre/Neighbourhood centre,
 - Residential precincts, and
 - Community facilities/Education/Infrastructure;
- Public open space; and
- Environmental protection areas.

1.4 Overview of Management Intent

1.4.1 Management Precincts

The proposed conservation areas on the Subject site have been divided into thirteen (13) rehabilitation/management precincts (FIGURE 4). Detailed Regeneration and Revegetation Plans are to be completed for each of the management precincts at the Development Application stage and are to be read in conjunction with this Amended Site Regeneration and Revegetation Plan (SRRP).

The individual Precinct plans will generally address the following issues:

- Performance criteria;

- Assessment of regeneration potential;
- Weed species assessment;
- Detailed regeneration strategy;
- Detailed revegetation strategy;
- Maintenance and monitoring; and
- Timing and responsibilities.

1.4.2 Relationship with Other Management Plans

It should be noted that a number of plans have been prepared to direct the management of vegetation within specific areas of the Subject site as follows:

- Saltmarsh Rehabilitation Plan (SMEC 2017);
- Vegetation Management Plan (JWA 2009); and
- Freshwater Wetland Compensatory Habitat Management Plan (SMEC 2013) - provides details for the proposed onsite offset of approximately 2 ha area of Freshwater Wetland.

The above plans contain management requirements for specific areas of the Subject site. This Amended SRRP will not cover these areas, however, should be read in conjunction with the above management plans.

1.4.3 Performance Objectives

The performance objectives of the detailed Regeneration and Revegetation Plans to be prepared for each management precinct will be to:

- enhance vegetation to be conserved and provide offsets for EECs to be impacted by the proposed development;
- revegetate disturbed areas with endemic species, including threatened plants;
- obtain at least 70% native canopy cover within regeneration/revegetation areas;
- buffer the retained vegetation (including threatened flora species) from edge effects and other disturbance related impacts;
- improve the value of the Subject site as habitat for fauna groups; and
- To manage weeds using plantings of endemic species and best practice control methods.

2 Methodology

The following methods were utilised in the development of this plan:

- Desktop review and assessment of the existing records (e.g. threatened species, NSW OEH BioNet wildlife database) and other documents, including the Tweed LEP, etc.
- Numerous site inspections were completed between June 2007 and March 2017. The purpose of these inspections was to determine the location of threatened flora species and to record the site conditions (i.e. weeds, natural regeneration, etc.).
- The Subject site was divided into thirteen (13) management precincts based on vegetation type, elevation and detailed analysis of aerial photography.
- Each precinct was traversed by one (1) qualified bush regenerator and two (2) environmental scientists to determine the restoration potential. Vegetation was divided into six (6) different categories based on restoration potential. This will ensure that regeneration and revegetation resources will be utilised in the most efficient way by focusing on those areas that contain particular management issues (i.e. weed infestations, lack of canopy cover, poor species diversity) and matching the appropriate restoration methods for those issues.
- Threatened flora species were located and surveyed using a handheld GPS and mapped on the survey plan.

3 Flora Values of the Cobaki Estate Site

3.1 Background

Cobaki Estate has been comprehensively studied over the last twenty-five (25) years. The following significant ecological values have been recorded on the site:

- Sixteen (16) broad vegetation associations comprising twenty-two (22) vegetation communities;
- Six (6) EECs; and
- Eight (8) Threatened flora species.

3.2 Vegetation

Extensive vegetation mapping for Cobaki Estate was completed by JWA (2008). Subsequent to the completion of the 2008 Ecological Assessment, existing earthworks approvals have been implemented in some portions of the Subject site and existing use rights (i.e. cattle grazing) have continued. In 2013, the 2008 vegetation mapping was overlaid on a recent aerial photograph and mapped boundaries checked. In areas where vegetation extent was not clear on the aerial photograph, ground-truthing was completed. Vegetation mapping has been further amended as necessary during subsequent site assessments (2014 - 2017).

Vegetation communities on site are shown in FIGURE 5 and are described as:

- 1a Very Tall Open/Closed Sclerophyll Forest (*Eucalyptus pilularis*, +/- *E. microcorys* +/- *E. propinqua*, +/- *Corymbia intermedia*);
- 1b Tall Open/Closed Sclerophyll Forest (*E. propinqua*);
- 1c Tall Open Sclerophyll Woodland (*E. pilularis*);
- 1d Tall Open Sclerophyll Forest (*E. pilularis*, +/- *E. siderophloia* +/- *E. tereticornis*);
- 2a Tall Closed Forest (*Lophostemon confertus* +/- *Araucaria cunninghamii*);
- 2b Tall Open Forest (*Archontophoenix cunninghamiana*);
- 2c Very Tall Closed Forest (*Araucaria cunninghamii*);
- 2d Mid-high Open/Closed Forest (Riparian species +/- mixed species);
- 3 Tall/Very Tall Open/Closed Forest (*Lophostemon confertus* +/- Mixed rainforest species);
- 4 Closed Scrub (*Banksia aemula*, *E. racemosa* +/- *Leptospermum* spp.);
- 5 Mid-high Open Woodland (Mixed rainforest species);
- 6 Mid-high Open Woodland (*Eucalyptus robusta*);
- 7 Mid-high Open Woodland (*Eucalyptus racemosa*);
- 8 Mid-high Open Woodland (*Eucalyptus siderophloia*);
- 9 Low Closed Forest (Re-vegetation areas +/- Mixed *Eucalyptus* species);

- 10 Low Closed Grassland with Scattered Trees (Pastoral grasses +/- Mixed species);
- 11 Low Closed Grassland (*Sporobolus virginicus*, *Triglochin striata*, + /- *Casuarina glauca*);
- 12 Brackish Area (Mixed aquatic species);
- 13 Low to Mid-high Open Mangrove Forest (*Avicennia marina* var. *australasica* / *Aegiceras corniculatum* +/- *Casuarina glauca*);
- 14 Dam and Drainage Lines (Mixed aquatic species);
- 15 Low open forest/woodland (*Casuarina glauca* +/- Mixed species); and
- 16 Slashed Grassland/Heath land/Sedgeland (Mixed species).

3.3 Endangered Ecological Communities

Six (6) EECs¹ have been identified on the on the site (FIGURE 6). These are as follows:

- Lowland rainforest on floodplain - occurring at various locations generally in association with drainage lines and depressions;
- Lowland rainforest - occurring on Mt. Woodgee and on lower slopes in the northern portion of the Subject site;
- Freshwater wetlands - occurring in the central and eastern portions of the site;
- Swamp oak floodplain forest - occurring in association with drainage lines in the south-east of the site; and
- Coastal saltmarsh in the NSW North Coast bioregion - occurring in the south-east of the site; and
- Swamp sclerophyll forest on coastal floodplain.

3.4 Threatened Flora Species

Eight (8) Threatened² flora species have been recorded in the most recent vegetation survey (FIGURE 7A-D). Threatened flora species recorded include:

- White yiel yiel (*Grevillea hilliana*) - Endangered (BC Act);
- Scented acronychia (*Acronychia littoralis*) - Endangered (BC Act and EPBC Act);
- Fine-leaved tuckeroo (*Lepiderema pulchella*) - Vulnerable (BC Act);
- Spiny gardenia (*Randia moorei*) - Endangered (BC Act and EPBC Act);
- Marblewood (*Acacia bakeri*) - Vulnerable (BC Act);
- Brush cassia (*Cassia brewsteri* var. *marksiana*) - Endangered (BC Act);
- Coolamon (*Syzygium moorei*) - Vulnerable (BC Act and EPBC Act); and

¹ As listed within schedules of the BC Act (2016).

² As listed within schedules of the BC Act (2016) and EPBC Act (1999).

- Green-leaved rose walnut (*Endiandra muelleri* subsp. *bracteata*) - Endangered (BC Act).

ANNEXURE 2 contains detailed Threatened species profiles for all Threatened flora species recorded from the Subject site including a botanical description, a discussion of the distribution, habitat and ecology of each species, identification of threats to the species and a discussion of recovery actions (NWPS 2002).

In addition, two (2) ROTAP species have been recorded on the site (**FIGURES 7A-7D**). ROTAP species recorded include:

- Smooth scrub turpentine (*Rhodamnia maideniana*); and
- Black walnut (*Endiandra globosa*).

4 Offset Requirements

It has been identified that offsets will be necessary in order to ensure that the Cobaki Estate development meets all requirements in terms of retaining and protecting EECs (i.e. communities listed in schedules of the BC Act) and other native vegetation.

This Amended SRRP provides for a combination of regeneration and revegetation techniques to offset EEC and other native vegetation communities. These techniques in combination will ensure restoration of degraded areas and offsets for any vegetation removal, with a particular focus on offsetting the removal of degraded EECs. Proposed EEC and other native vegetation community offsets have been reconfigured following detailed engineering design and identification of conflicts in approvals in accordance with Concept Approval (MP 06_0316 MOD 9). Proposed overall offsets combining regeneration of degraded areas and revegetation works are as follows:

- Freshwater Wetland - 2 ha of Freshwater Wetland will be regenerated/revegetated on the Subject site (**FIGURE 8**) to partially offset the loss of 24.12 ha. Revegetation and management of Freshwater wetlands will occur in accordance with a Freshwater Wetland Compensatory Habitat Management Plan (SMEC 2013). Offsite offsets have been satisfied via the payment of cash in accordance with VPA dated 10/11/2013.
- Lowland rainforest on floodplain - 8.41 ha of Lowland rainforest on floodplain will be regenerated/revegetated on the Subject site (**FIGURE 8**) to offset the loss of 0.01 ha. The proposed offsets will result in a net gain of 8.40 ha of this EEC on the Subject site.
- Lowland rainforest - 4.90 ha of Lowland rainforest will be regenerated/revegetated on the Subject site (**FIGURE 8**) to offset the loss of 0.1 ha. The proposed offsets will result in a net gain of 4.89 ha of this EEC on the Subject site.
- Swamp Sclerophyll Forest - 6.77 ha of Swamp sclerophyll forest will be regenerated/revegetated on the Subject site (**FIGURE 8**) as a partial offset for the loss of 3.8 ha. Further offsets will also be provided off-site. In accordance with Condition C19 of Concept Approval (MP 06_0316 MOD 9), the Applicant must retire 150 Swamp Sclerophyll Forest EEC biodiversity credits prior to the commencement of site preparation works. The retirement of the credits can be achieved by:
 - i. retiring "biodiversity credits" within the meaning of the Biodiversity Conservation Act 2016;
 - ii. making payments into an offset fund that has been developed by the NSW Government; or
 - iii. providing supplementary measures as agreed with OEH.

5 Regeneration and Revegetation Strategy

5.1 Introduction

JWA have completed various vegetation assessments at the Subject site and have also reviewed literature relevant to revegetation and regeneration activities. Supporting documents are provided in annexures to this plan (**ANNEXURES 3 - 8**) and provide information utilised in preparation of regeneration and revegetation strategies for each management precinct on the Subject site.

5.2 Ecological Restoration Principles

Ecological restoration aims to restore pre-existing indigenous ecosystems and ecological processes on disturbed sites, while maintaining and developing the natural ecosystem ability to self-perpetuate.

These ecological restoration principles are the underlying principles behind the overall direction of this regeneration and revegetation plan. The ecological restoration principles aim to restore the vegetation communities to the highest practical extent using natural and assisted revegetation to develop a system that is sustainable in the long term.

A review of Ecological Restoration Principles has been completed and is included as **ANNEXURE 3**. This assessment forms the basis of restoration principles and approaches considered in the preparation of each revegetation and restoration plan.

5.3 Timing of Rehabilitation Works

5.3.1 Regeneration and Revegetation

Regeneration and revegetation works within each rehabilitation/management precinct (**FIGURE 4**) will occur as detailed in Court Order 2018/00206081 and Concept Approval 06-0316 namely, "prior to registration of any plan of residential subdivision for adjacent land" and in accordance with future precinct specific Site Regeneration and Revegetation Plans. It is noted however, that commencement of rehabilitation work is to occur in EEC offset areas (**FIGURE 8**) prior to any impact occurring on those EEC's.

The timing of rehabilitation works (including weed control in accordance with **SECTION 5.6**) will occur in an environmental area at the commencement of bulk earthworks in the preceding development precinct. For example (see **TABLE 1**) when Precinct 8 is being developed and Precinct 2 is the next development stage the environmental areas adjacent Precinct 2 will be rehabilitated, in this example EA's 2 & 3 adjacent Precinct 2 will be rehabilitated whilst residential development occurs in Precinct 8.

The order of construction shown in **TABLE 1** is currently the best estimate for sequencing however if this sequencing changes in the future the basic principle of rehabilitation occurring one step ahead of development construction will remain and be detailed in the future precinct specific Site Regeneration and Revegetation Plans.

Note: Swamp Sclerophyll Forest (SSF) rehabilitation works in environmental areas 10 and 11 will be commenced prior to the removal of the 3.8 ha of existing SSF located in Precinct 5, 6 & 7. Environmental area 7B containing SSF will be commenced when development precinct 9 is constructed.

**TABLE 1
TIMING OF REGENERATION AND REVEGETATION WORKS**

Environmental Area	Development Precincts in Order of Construction
E10A	6 - 7*
E10B	6 - 7*
E11	6 - 7*
E1	7 - 8*
E2A	7 - 8*
E2B	7 - 8*
E2C	7 - 8*
E2D	7 - 8*
E2E	7 - 8*
E3	7 - 8*
E4C	2
E4D	2
E4D	2
E8	1
E9	1
E12	3*
	5A*
	5B*
E7A	9
E7B	9
E6	10
E5A [#]	11
E5B	11
E5C	11
E4A	17
E4B	17*
	4*
	16*
	13*
E13A	Revegetation works commenced and at Year 3 of revegetation
E13C	
Notes: * Whichever is developed first [#] No rehabilitation works are proposed within the section of management precinct E5A adjacent to the north of P14.	

5.3.2 Additional Weed Control

The control of weeds is an essential component of an effective program to ensure the long-term survival of retained vegetation. The timely management of weeds across the site will ensure the many threatened plants and ecological communities occurring have initial weed control works undertaken as early as possible to ensure these significant biodiversity features are at least maintained on site during the long development process. Early weed control measures are likely to save time and resources for future weed management needs.

In addition to the rehabilitation works to be completed on a precinct by precinct basis as discussed in **SECTION 5.3.1** above, weed management activities are proposed in areas of the site where active rehabilitation has not yet commenced. Weed control will target weeds listed on the Weeds of National Significance (WONS), the NSW DPI Priority Weeds for the North Coast (Biosecurity Act 2015) and those listed in **SECTION 5.6**. The designated Environmental Areas across Cobaki Estate will be the subject of each management event. The trigger for the weed management program will be the issue of the first Construction Certificate (CC) on the development site following approval of this plan. The program must be commenced within 21 days of the issue of the CC. The weed management program will occur on an annual basis and will continue for the duration of the project or until the relevant land is dedicated to Tweed Shire Council. Annual reporting will be included as part of the approved detailed SRRP for each development precinct. Weed management methods will be in accordance with **SECTION 5.6** and **ANNEXURES 6** and **7**.

5.4 Regeneration and Revegetation Approach

5.4.1 Introduction

The regeneration and revegetation approach involves a variety of different methods that will need to be employed on a precinct specific basis. The overall methods to be implemented in the rehabilitation of the Subject site are outlined in **ANNEXURE 4**.

At the completion of the establishment period³, all regeneration and revegetation areas will be protected via a conservation agreement in perpetuity or rezoned to Environmental Protection and dedicated to Council or the relevant State Government Department (subject to their agreement).

5.4.2 Condition Assessment

To determine which areas of vegetation (including offset areas) should be the focus of regeneration and revegetation activities, vegetation within each precinct was mapped and divided into six (6) different categories based on restoration potential. This ensures that regeneration and revegetation resources will be utilised in the most efficient way by focusing on those areas that contain particular management issues (i.e. weed infestations, lack of canopy cover, poor species diversity) and matching the appropriate restoration methods for those issues.

³ "Establishment period" means the period during which initial environmental repair, restoration and monitoring works are undertaken. The establishment period ends when the works meet the establishment period performance criteria (detailed in **Section 5.8**).

Overall condition assessments were completed and updated during site visits between 2008 and 2017. A detailed condition assessment of the precincts will be produced in each of the precinct-specific management plans.

The areas that are considered to have a restoration potential of:

- Grade 1 - Very Good condition;
- Grade 2 - Good condition; and
- Grade 3 - Moderate condition;

will be managed using only assisted regeneration in the form of exclusion fencing, weed control/eradication, and continued maintenance and monitoring.

The areas that are considered to have a restoration potential of:

- Grade 4 - Poor condition;
- Grade 5 - Very poor condition; and
- Grade 6 - Nil native vegetation;

will be managed using assisted regeneration as described above, as well as revegetation involving plantings of endemic species.

5.4.3 Regeneration Areas

The proposed regeneration areas will use natural regeneration techniques to rehabilitate and improve areas with some native flora species. Areas that have the potential to naturally regenerate will be maintained and allowed to regenerate with only minimal maintenance (i.e. weed control). The areas that will be allowed to regenerate naturally are shown in **FIGURE 4**. The areas chosen for natural regeneration are considered to have an adequate soil seed bank that will adequately regenerate with the correct management (i.e. exclusion fencing and weed control).

5.4.4 Revegetation Areas

The proposed revegetation areas will use enhancement plantings to embellish and improve areas, which are currently void of any native vegetation community. The areas that will require enhancement plantings (revegetation) are shown in **FIGURE 4** and will include:

- Revegetation works to offset the loss of old growth trees at a ratio of 10:1 in accordance with the Amended Offset Strategy (JWA July 2019).
- The propagation and replanting of some of the Threatened flora species that occur naturally on the site. **ANNEXURE 5** lists some of the Threatened species that occur on site, comments on the ease of propagation for each species and the fruiting times for each Threatened species.
- Offsets for the removal of EECs i.e. communities listed in schedules of the BC Act.

It should be noted that several of these areas have previously undergone filling activities (in accordance with previous approvals). Removal of fill may be necessary in some instances to achieve natural ground level prior to revegetation works occurring. Earthworks to remove fill may require a construction certificate to complete.

Any revegetation works including Threatened flora species on the Subject site may require the preparation of a Threatened Species Management Plan and the relevant licence (i.e. a threatened species licence, a class of biodiversity conservation licence under Part 2 of the BC Act, is required for harvesting seeds).

5.4.5 Summary

Details of the assessment of restoration potential for each management precinct are provided in ANNEXURE 4. Also discussed are the site regeneration and revegetation strategies (including weed management, propagation techniques, planting program, etc.).

5.5 Identification of Significant Ecological Values

EECs, Threatened flora species and habitat for Threatened fauna species will generally be retained within Environmental Protection Areas. Various offset proposals have been designed to compensate for any loss of EECs and/or Threatened species habitat. In some areas EECs and/or Threatened flora species occur within or immediately adjacent to proposed regeneration and/or revegetation areas.

Further detailed assessment of the ecological values of proposed regeneration and revegetation areas will be completed during the preparation of detailed Regeneration and Revegetation Plans to be completed for each of the thirteen (13) rehabilitation/management precincts at the Operational Works stage. The detailed Regeneration and Revegetation Plans will include the following details:

- location and extent of EECs;
- location of Threatened flora species; and
- location of fauna habitat features.

Measures to retain and protect these significant ecological values will be discussed where necessary. Amelioration measures for impacts on these features may also be determined on a case by case basis.

5.6 Weed Control Methods

Exotic weed invasion is a management issue affecting the Subject site. Weeds can suppress the natural process of succession that enables forest to expand and repair damage caused by natural or human disturbance.

Much of the Cobaki Estate development site is subject to minor invasion by exotic weeds. The control of weeds is an essential component of an effective program to ensure the long-

term survival of retained vegetation including the dry sclerophyll forest, sub-tropical rainforest remnants and revegetation plantings.

Some of the weeds that are currently occurring at Cobaki Estate include:

- Camphor Laurel (*Cinnamomum camphora*);
- Lantana (*Lantana camara*);
- Purple top (*Verbena bonariensis*);
- Wild tobacco tree (*Solanum mauritianum*);
- Black-berry nightshade (*Solanum nigrum*);
- Brazilian nightshade (*Solanum seaforthianum*);
- White passionflower (*Passiflora subpeltata*);
- Cork/Small passionfruit (*Passiflora suberosa*);
- Mickey mouse plant (*Ochna serrulata*);
- Large-leaved privet (*Ligustrum lucidum*);
- Small-leaved privet (*Ligustrum sinense*);
- Umbrella tree (*Schefflera actinophylla*);
- Redhead cotton bush (*Asclepias curassavica*);
- Narrow- leafed cotton bush (*Gomphocarpus fruticosus*);
- Balloon cotton bush (*Gomphocarpus physocarpus*);
- Crofton weed (*Ageratina adenophora*);
- Mistflower (*Ageratina riparia*);
- Blue billygoat weed (*Ageratum houstonianum*);
- Thickhead (*Crassocephalum crepidioides*);
- Brazilian fire weed (*Erechtites valerianifolia*);
- Flatweed (*Hypochoeris radicata*);
- Fireweed (*Senecio madagascariensis*);
- Bindii (*Soliva pterosperma*); and
- Stinking roger (*Tagetes minuta*).

Weed removal and eradication programs must be completed for successful regeneration to occur. Initial weed control works will be completed as the first step in the regeneration/revegetation process, prior to any planting, and regular follow up maintenance will be required. A detailed weed removal strategy will be incorporated into the Regeneration and Revegetation Plans be completed for each of the thirteen (13) rehabilitation/ management precincts. The weed control methods to be implemented during primary and follow up weeding are discussed in detail in ANNEXURES 6 and 7.

5.7 Maintenance

Regular maintenance is essential for assessing the long-term condition and health of the regeneration and revegetation areas. Regular maintenance is required to ensure that primary weeding has the best chance of success.

A detailed maintenance schedule will be incorporated into the Regeneration and Revegetation Plans be completed for each of the thirteen (13) rehabilitation/ management precincts. **ANNEXURE 7** outlines maintenance requirements and timing of maintenance works.

5.8 Monitoring

Monitoring is necessary to demonstrate that work carried out has achieved the desired outcomes, and to evaluate the relative success of the different methods used.

A monitoring program is to be put in place by the proponent and will be continued for three (3) years after completion of regeneration and revegetation works in each precinct.

A detailed monitoring program will be incorporated into the detailed Regeneration and Revegetation Plans be completed for each of the thirteen (13) rehabilitation/management precincts. **ANNEXURE 8** outlines the monitoring requirements for each management precinct, including timing, basic indicators to be monitored, and reporting of results. The following indicative performance objectives and completion criteria (**TABLE 2**) will generally apply to each rehabilitation/management precinct (to be determined on a case by case basis during the preparation of relevant detailed Regeneration and Revegetation Plans).

TABLE 2
INDICATIVE PERFORMANCE OBJECTIVES AND COMPLETION CRITERIA

Performance Indicator	Target - Establishment period ¹	Target - Maintenance period ²
Survival and continued growth of seedlings (i.e. planted stock)	>90% survival of plantings during all monitoring events	>90% survival of plantings during all monitoring events
Floristic diversity maintained	100% of floristic diversity (included plantings) maintained	100% of floristic diversity (included plantings) maintained
Establishment of native canopy cover within revegetation areas	Plants are substantially established ³	>70% canopy cover of native tree species >1.5 m in height
All identified weeds controlled to an acceptable level	Foliage Projective Cover (FPC) (%) assessed using eye estimates or photo points: <ul style="list-style-type: none"> • FPC of weeds reduced to <10% within first year; • <10% in second year; 	Foliage Projective Cover (FPC) (%) assessed using eye estimates or photo points maintained at <5%.

Performance Indicator	Target - Establishment period ¹	Target - Maintenance period ²
	<ul style="list-style-type: none"> <5% in the third year 	
Fully structured vegetation communities (with reference to relevant PCT benchmarks) are provided through assisted regeneration and revegetation plantings	Planted trees are substantially established ³	<p>Assisted regeneration and revegetation plantings achieve the following Vegetation Integrity Benchmark levels⁴ for primary attributes of biodiversity for relevant PCTs:</p> <ul style="list-style-type: none"> • Composition - 100%; • Structure - 50%; • Function - 25%.
Infrastructure (e.g. protection fencing, signage, erosion and sediment control devices) functional and well-maintained	Relevant infrastructure maintained	Relevant infrastructure in condition suitable for hand over to Tweed Shire Council
<p><u>Notes:</u></p> <p>¹ "Establishment period" means the period during which initial environmental repair, restoration and monitoring works are undertaken. The establishment period ends when the works meet the establishment period performance criteria.</p> <p>² "Maintenance period" means the period of environmental management and monitoring works commencing immediately after the end of the establishment period.</p> <p>³ "Substantial establishment" of the plantings means the plantings have progressed beyond the need for intensive maintenance e.g. weed control, watering etc. and are clearly established by way of persisting through a recognised growth period.</p> <p>⁴ Generally, offsets utilising the BAM (OEH 2017) have a 20 year timeframe in which to reach PCT benchmarks. The maintenance and monitoring of rehabilitation areas at the Cobaki Estate site will generally occur until handover to the relevant authorities. In this regard, target PCT benchmarks have been adapted to reflect this shorter monitoring and maintenance timeframe.</p>		

6 Summary

This Amended Site Regeneration and Revegetation Plan has been updated in accordance with Concept Approval (MP 06_0316 MOD 9). This plan (and supporting documents) contains an overview of regeneration and revegetation strategies that will be implemented on the Cobaki Estate development site. This plan should be read in conjunction with detailed plans prepared for each management precinct. Each precinct specific detailed Regeneration and Revegetation Plan will contain:

- A detailed set of directions on the most appropriate methods of:
 - Weed control;
 - Regeneration techniques;
 - Monitoring procedures;
- Measurable performance objectives and completion criteria.

By achieving the objectives outlined in these plans via the suggested strategies, all conservation areas are to be successfully regenerated or revegetated.

Areas with an intact canopy considered to be of good to medium condition will be subject to regeneration works. Revegetation will occur in areas considered to be in poor to very poor condition. This will provide improved and extended habitat for a variety of flora and fauna within the locality.

The Performance Objectives and Completion Criteria to be included within each precinct plan will contain measures designed to allow the applicant to demonstrate that revegetation objectives are being achieved, and to allow Council to sign off on the success of the program.

References

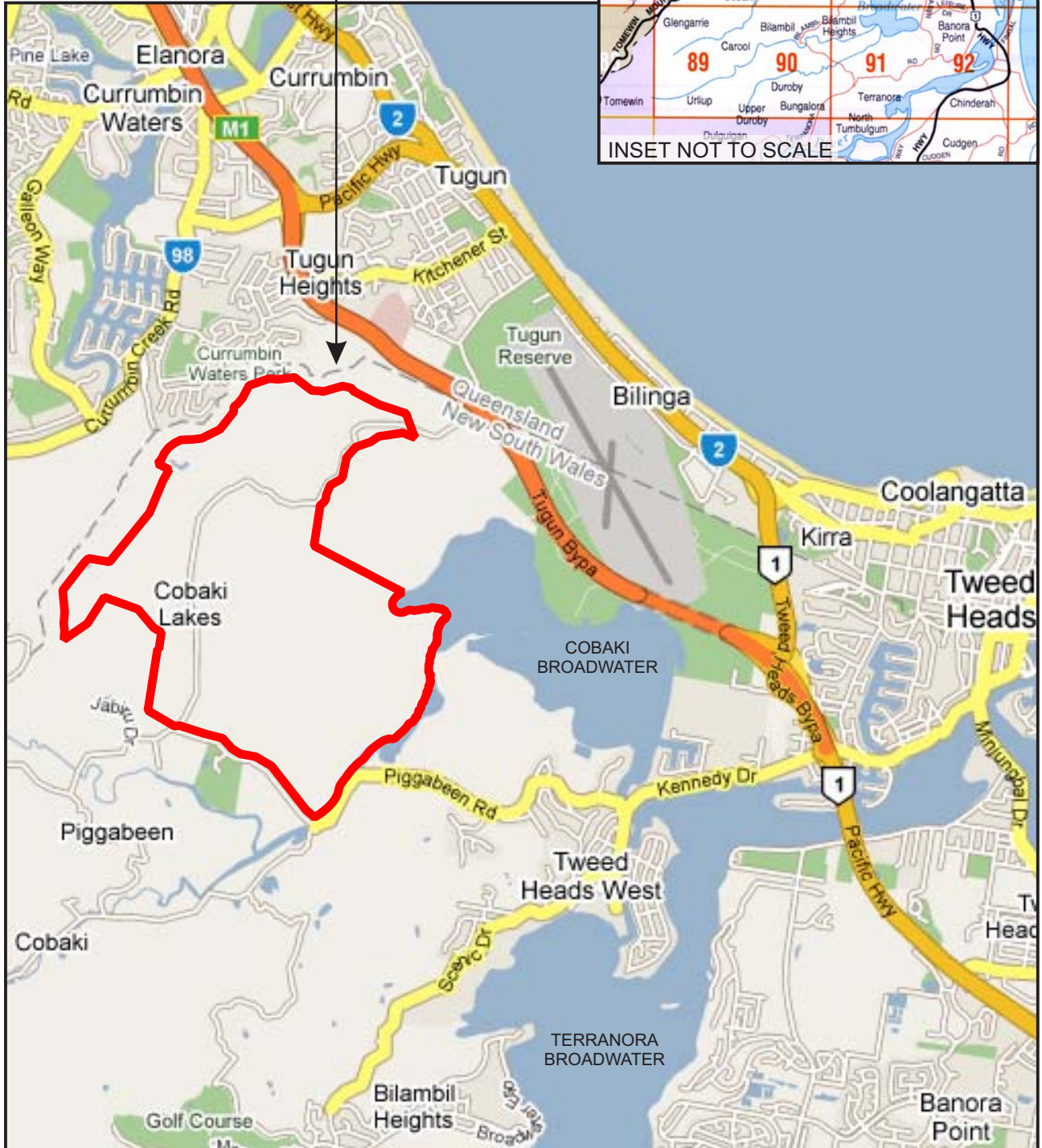
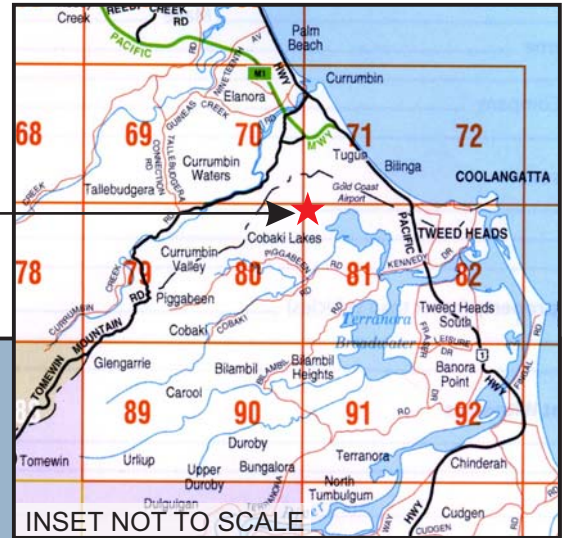
- JWA (2008) Response to the Director General's Environmental Assessment Requirements COBAKI LAKES VOLUME 1 - Ecological Assessment. A Report to Leda Manorstead Pty Ltd.
- JWA (2009) Vegetation Management Plan. Cobaki Lakes - Preferred Project Report. A report to Leda Manorstead Pty Ltd.
- JWA (2010) Revised Freshwater Wetland Rehabilitation Plan. Cobaki Lakes - Preferred Project Report. A report to Leda Manorstead Pty Ltd.
- JWA (April 2013) Revised Site Regeneration and Revegetation Plan. Cobaki Lakes. A report prepared for Leda Manorstead Pty Ltd.
- JWA (2013) Revised Assessment of Significance (7-part test). Cobaki Lakes. A report prepared for Leda Manorstead Pty Ltd.
- JWA (July 2019) Amended Offset Strategy - Cobaki Estate. A report prepared for Leda Manorstead Pty Ltd.
- OEH (2017) Biodiversity Assessment Method. Published by the Office of Environment and Heritage on behalf of the NSW Government.
- SMEC (2013) Freshwater Wetland Compensatory Habitat Management Plan. Report for LEDA Manorstead Pty Ltd. SMEC Australia Pty Ltd.
- SMEC (2017) Saltmarsh Rehabilitation Plan, Cobaki Lakes. Version 4 (July 2017). A report prepared for Leda Manorstead Pty Ltd. SMEC Australia Pty Ltd.

Figures



LEGEND
 Subject Site

SUBJECT SITE



SOURCE: Google Maps

SCALE: 1 : 50 000 @ A4

JWA PTY LTD
 Ecological Consultants

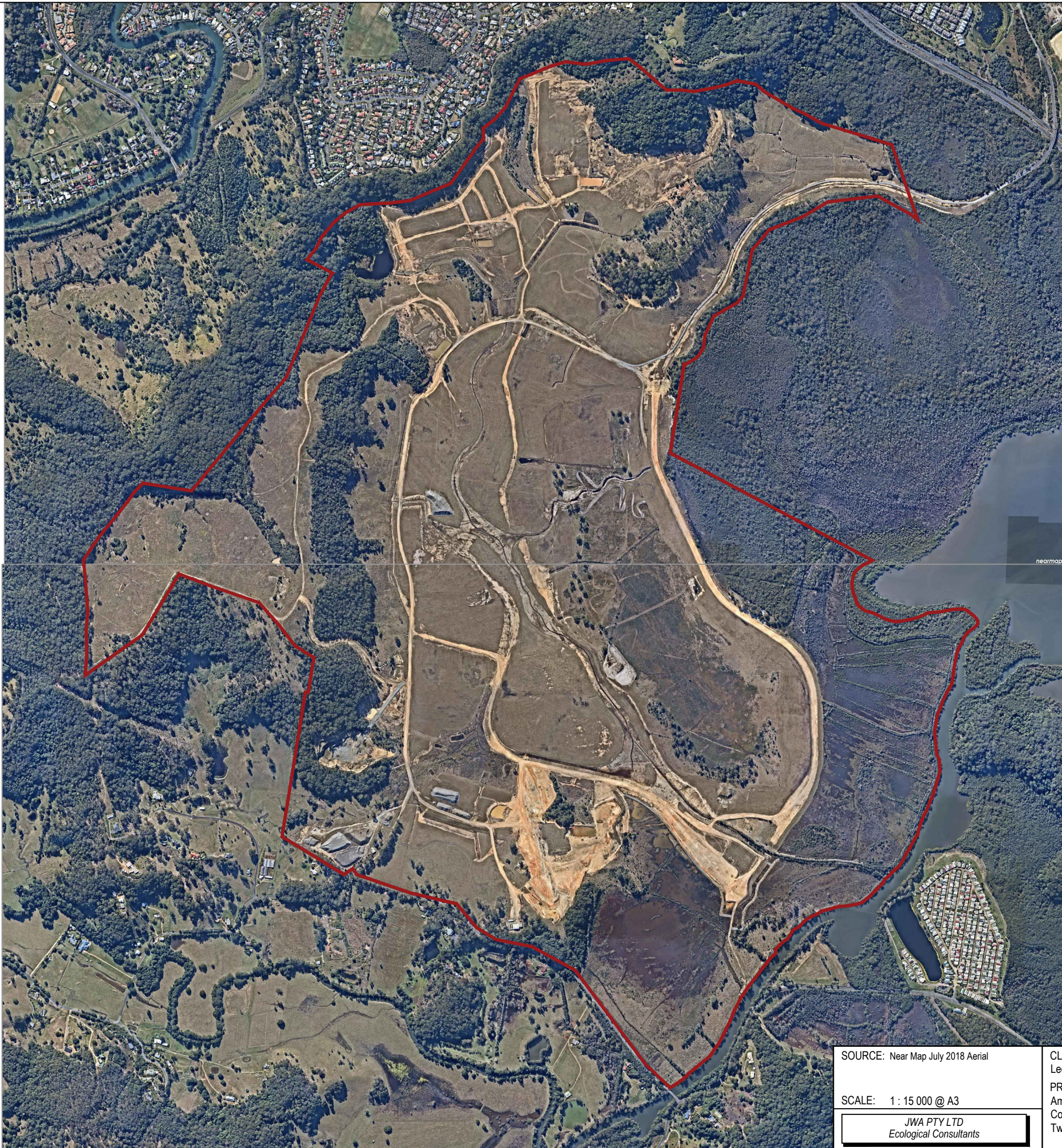
CLIENT
 Leda Manorstead Pty Ltd
 PROJECT
 Amended Site Regen & Reveg Plan
 Cobaki Estate, Cobaki, NSW
 Tweed Shire Council LGA

FIGURE 1

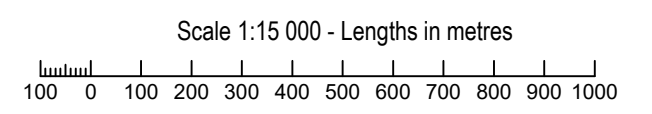
PREPARED: BW
 DATE: 31 July 2019
 FILE: 97038_Locality.cdr

TITLE

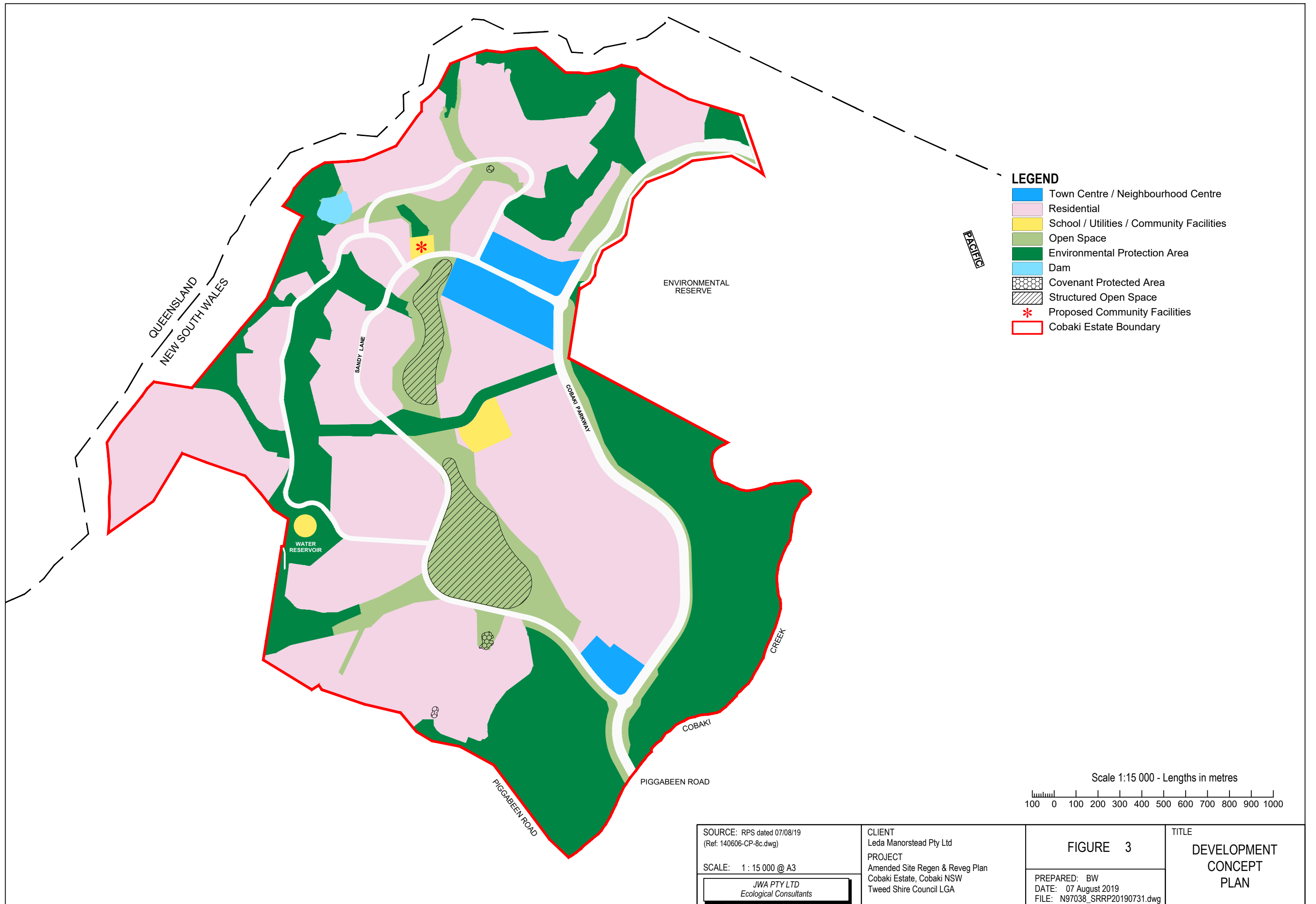
**LOCALITY
 PLAN**



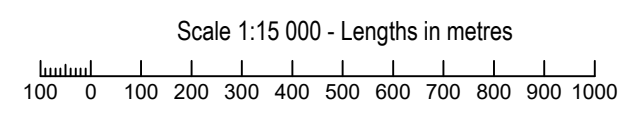
LEGEND
Cobaki Estate Boundary



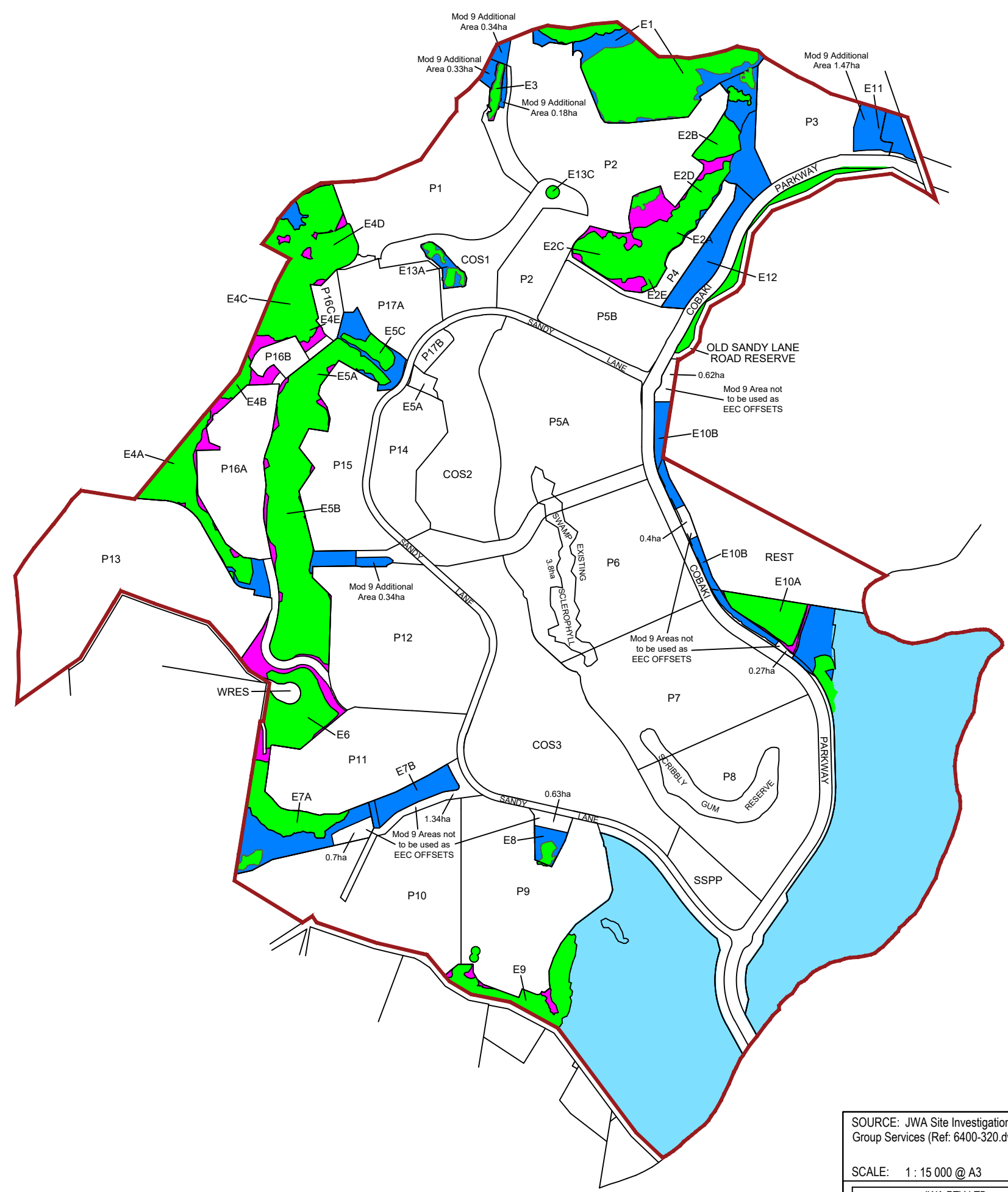
SOURCE: Near Map July 2018 Aerial	CLIENT Leda Manorstead Pty Ltd	FIGURE 2	TITLE AERIAL PHOTOGRAPH
SCALE: 1: 15 000 @ A3	PROJECT Amended Site Regen & Reveg Plan Cobaki Estate, Cobaki, NSW Tweed Shire Council LGA		
JWA PTY LTD Ecological Consultants		PREPARED: BW DATE: 31 July 2019 FILE: N97038_Condition 50.dwg	



- LEGEND**
- Town Centre / Neighbourhood Centre
 - Residential
 - School / Utilities / Community Facilities
 - Open Space
 - Environmental Protection Area
 - Dam
 - Covenant Protected Area
 - Structured Open Space
 - * Proposed Community Facilities
 - Cobaki Estate Boundary



SOURCE: RPS dated 07/08/19 (Ref: 140606-CP-8c.dwg) SCALE: 1 : 15 000 @ A3 <div style="border: 1px solid black; padding: 2px; text-align: center;"> JWA PTY LTD Ecological Consultants </div>	CLIENT Leda Manorstead Pty Ltd PROJECT Amended Site Regen & Reveg Plan Cobaki Estate, Cobaki NSW Tweed Shire Council LGA	FIGURE 3	TITLE DEVELOPMENT CONCEPT PLAN
		PREPARED: BW DATE: 07 August 2019 FILE: N97038_SRRP20190731.dwg	

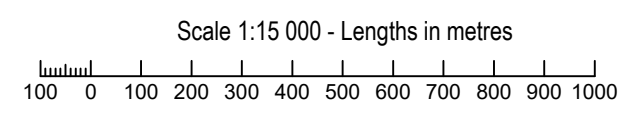


LEGEND

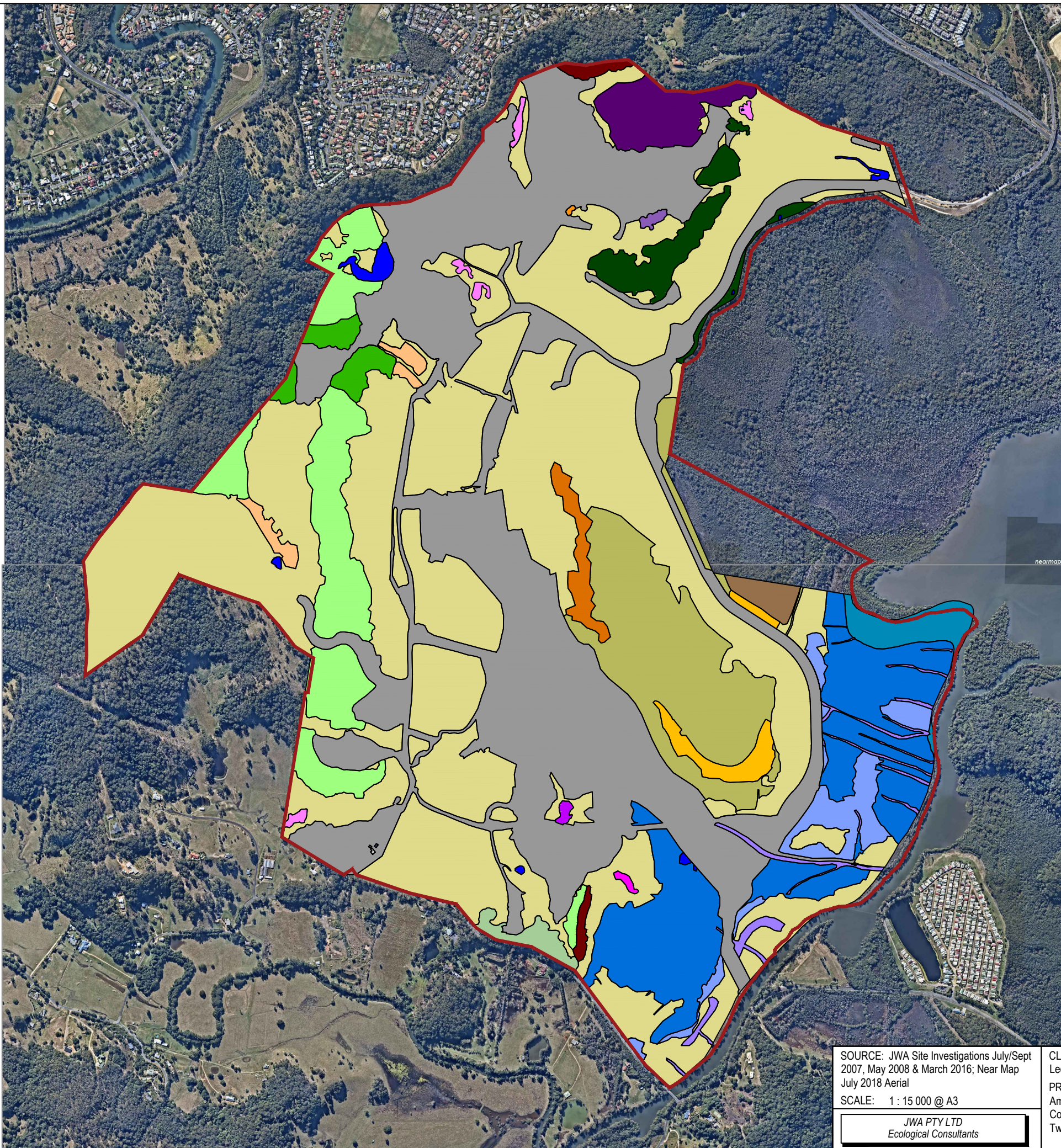
- Precinct Boundaries
- Cobaki Estate Boundary

Rehabilitation Areas

- Proposed Revegetation Areas
- Proposed Natural Regeneration Areas
- Retained Vegetation
- Saltmarsh Rehabilitation Area



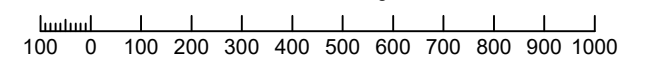
SOURCE: JWA Site Investigations; Michel Group Services (Ref: 6400-320.dwg) SCALE: 1: 15 000 @ A3 	CLIENT Leda Manorstead Pty Ltd PROJECT Amended Site Regen & Reveg Plan Cobaki Estate, Cobaki NSW Tweed Shire Council LGA	FIGURE 4	TITLE REHABILITATION & MANAGEMENT PRECINCTS
		PREPARED: BW DATE: 31 July 2019 FILE: N97038_SRRP Base.dwg	



LEGEND

- Cobaki Estate Boundary
- Community 1 - Dry sclerophyll communities**
- Community 1a - Very tall open/closed sclerophyll forest (*Eucalyptus pilularis* +/- *E. microcorys*, *E. propinqua* +/- *Corymbia intermedia*)
- Community 1b - Tall open/closed sclerophyll forest (*E. propinqua*)
- Community 1c - Tall open sclerophyll woodland (*E. pilularis*)
- Community 1d - Tall open sclerophyll forest (*E. pilularis* +/- *E. siderophloia* +/- *E. tereticornis*)
- Community 2 - Rainforest communities**
- Community 2a - Tall closed forest (*Lophostemon confertus* +/- *Araucaria cunninghamii*)
- Community 2b - Tall open forest (*Archontophoenix cunninghamiana*)
- Community 2c - Very tall closed forest (*A. cunninghamii*)
- Community 2d - Mid-high open/closed forest (Riparian species +/- Mixed species)
- Community 3 - Tall/very tall open/closed forest (*L. confertus* +/- Mixed rainforest species)
- Community 4 - Low closed forest (Heathland)
- Community 5 - Mid-high open woodland (Mixed rainforest species)
- Community 6 - Mid-high open woodland (*E. robusta*)
- Community 7 - Mid-high open woodland (*E. racemosa*)
- Community 8 - Mid-high open woodland (*E. siderophloia*)
- Community 9 - Low closed forest (Revegetation areas +/- Mixed *Eucalyptus* species)
- Community 10 - Low closed grassland with scattered trees (Pastoral grasses +/- Mixed species)
- Community 11 - Low closed grassland (*Sporobolus virginicus*, *Triglochin striata* +/- *Casuarina glauca*)
- Community 12 - Rushland/sedgeland/grassland (Mixed aquatic species)
- Community 13 - Low to mid-high open mangrove forest (*Avicennia marina* var *australasica* / *Aegiceras corniculatum* +/- *Casuarina glauca*)
- Community 14 - Dams & drainage lines (Mixed aquatic species)
- Community 15 - Low open forest/woodland (*Casuarina glauca* +/- Mixed species)
- Community 16 - Slashed grassland/heathland/sedgeland (Mixed species)
- Unvegetated land

Scale 1:15 000 - Lengths in metres



SOURCE: JWA Site Investigations July/Sept 2007, May 2008 & March 2016; Near Map July 2018 Aerial

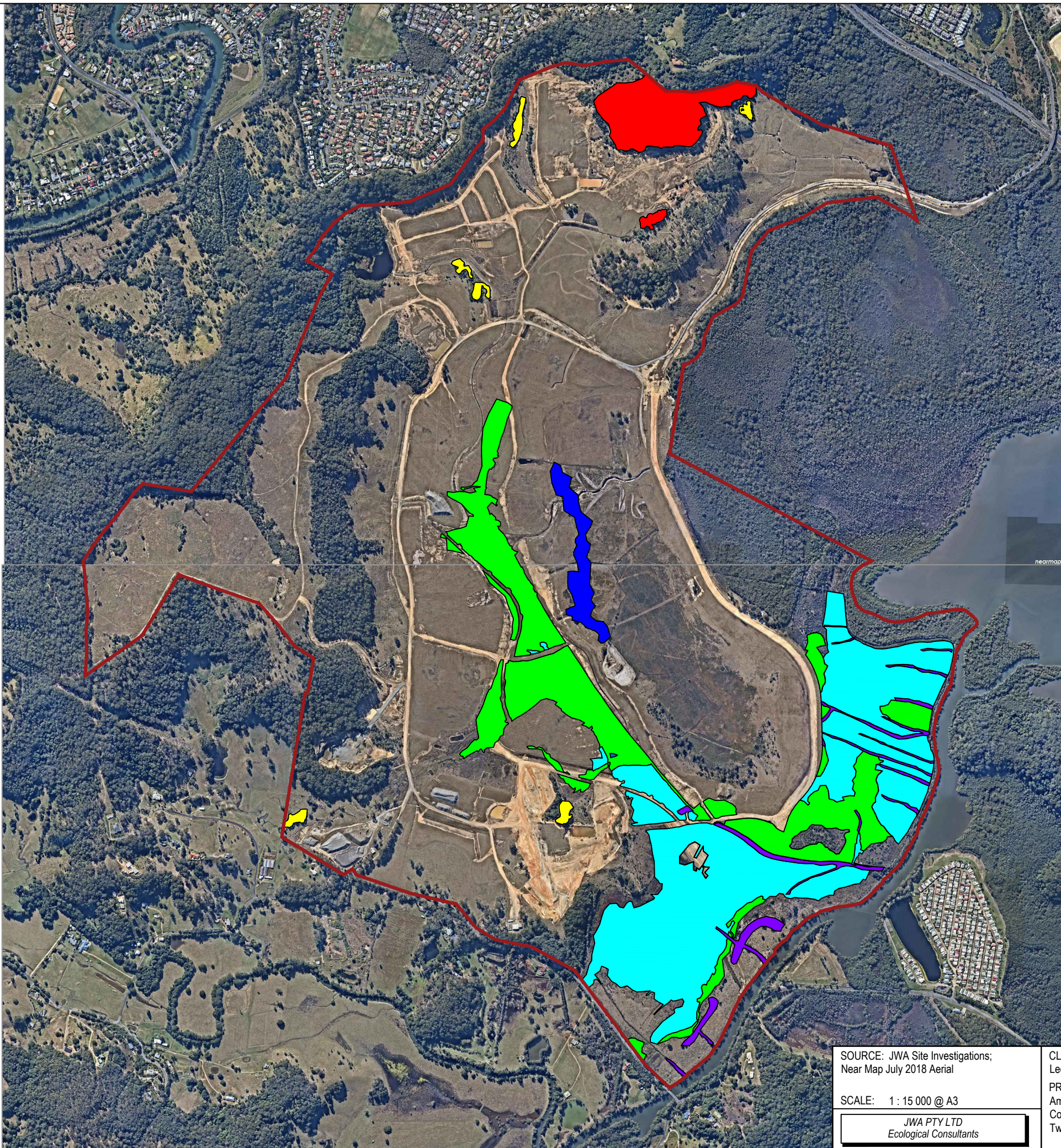
SCALE: 1 : 15 000 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Leda Manorstead Pty Ltd
PROJECT
Amended Site Regen & Reveg Plan
Cobaki Estate, Cobaki NSW
Tweed Shire Council LGA

FIGURE 5
PREPARED: BW
DATE: 31 July 2019
FILE: N97038_SRRP Base.dwg

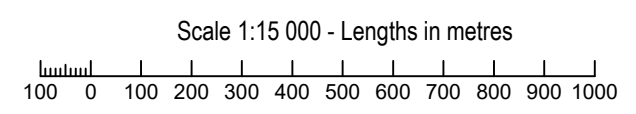
TITLE
VEGETATION COMMUNITIES



LEGEND

- Cobaki Estate Boundary

- Endangered Ecological Communities
- Lowland Rainforest
- Lowland Rainforest on Floodplain
- Swamp Oak Floodplain Forest
- Freshwater Wetland (Degraded)
- Saltmarsh
- Swamp Sclerophyll Forest (Swamp mahogany)



SOURCE: JWA Site Investigations;
Near Map July 2018 Aerial

SCALE: 1: 15 000 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Leda Manorstead Pty Ltd

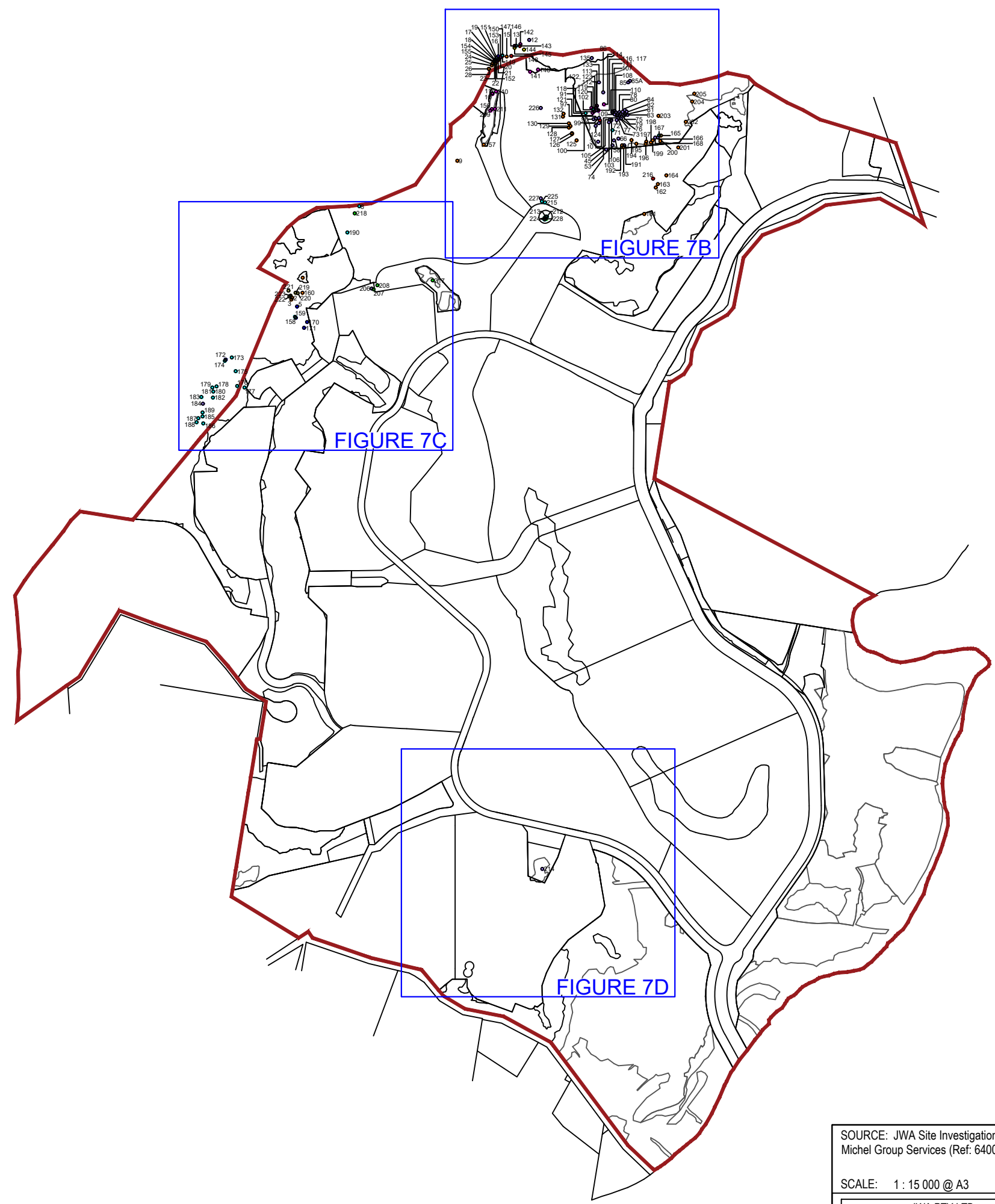
PROJECT
Amended Site Regen & Reveg Plan
Cobaki Estate, Cobaki NSW
Tweed Shire Council LGA

FIGURE 6

PREPARED: BW
DATE: 31 July 2019
FILE: N97038_SRRP Base.dwg

TITLE

ENDANGERED
ECOLOGICAL
COMMUNITIES

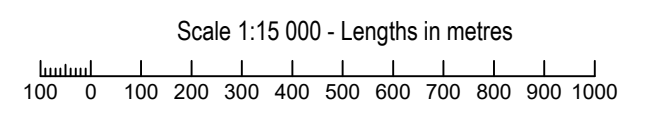


LEGEND

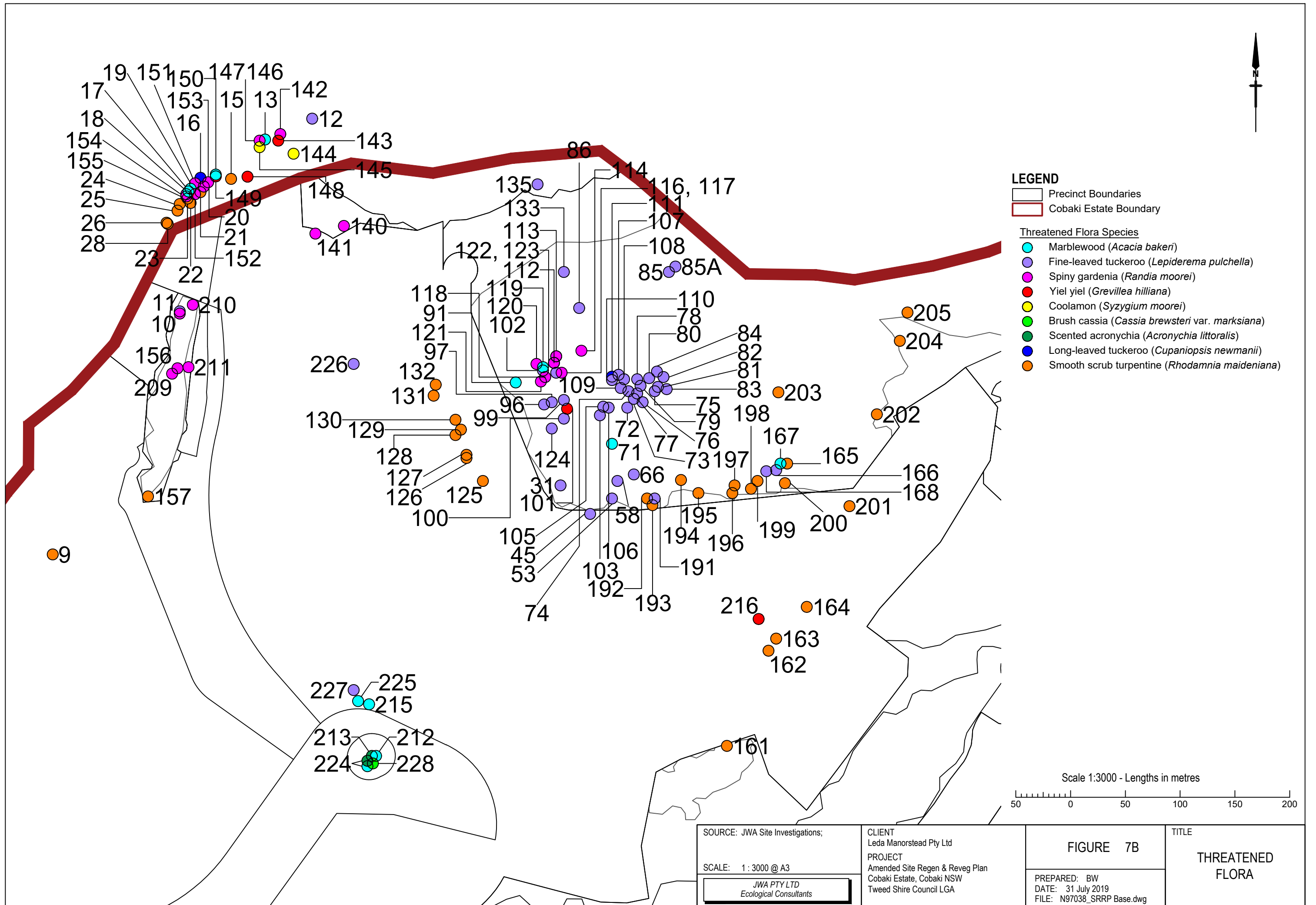
- Precinct Boundaries
- Cobaki Estate Boundary

Threatened Flora Species

- Marblewood (*Acacia bakeri*)
- Fine-leaved tuckeroo (*Lepiderema pulchella*)
- Spiny gardenia (*Randia moorei*)
- Yiel yiel (*Grevillea hilliana*)
- Coolamon (*Syzygium moorei*)
- Brush cassia (*Cassia brewsteri* var. *marksiana*)
- Scented acronychia (*Acronychia littoralis*)
- Green-leaved rose walnut (*Endiandra muelleri* subsp. *bracteata*)
- Long-leaved tuckeroo (*Cupaniopsis newmanii*)
- Smooth scrub turpentine (*Rhodammia maideniana*)



SOURCE: JWA Site Investigations; Michel Group Services (Ref: 6400-304B.dwg) SCALE: 1 : 15 000 @ A3 	CLIENT Leda Manorstead Pty Ltd PROJECT Amended Site Regen & Reveg Plan Cobaki Estate, Cobaki NSW Tweed Shire Council LGA	FIGURE 7A	TITLE THREATENED FLORA
		PREPARED: BW DATE: 31 July 2019 FILE: N97038_SRRP Base.dwg	



LEGEND

Precinct Boundaries
 Cobaki Estate Boundary

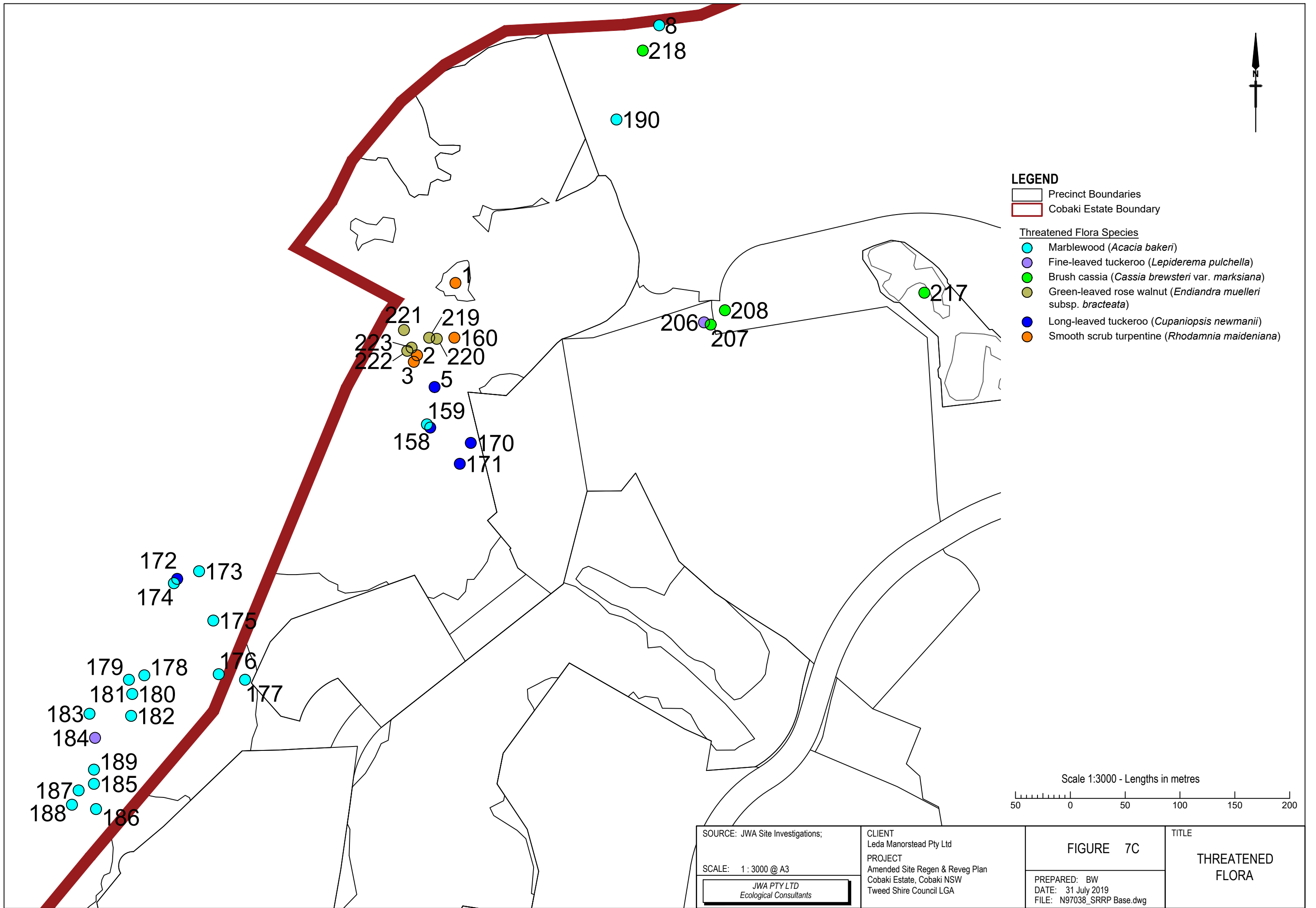
Threatened Flora Species

- Marblewood (*Acacia bakeri*)
- Fine-leaved tuckeroo (*Lepiderema pulchella*)
- Spiny gardenia (*Randia moorei*)
- Yiel yiel (*Grevillea hilliana*)
- Coolamon (*Syzygium moorei*)
- Brush cassia (*Cassia brewsteri* var. *marksiana*)
- Scented acronychia (*Acronychia littoralis*)
- Long-leaved tuckeroo (*Cupaniopsis newmanii*)
- Smooth scrub turpentine (*Rhodammia maideniana*)

Scale 1:3000 - Lengths in metres

50 0 50 100 150 200

SOURCE: JWA Site Investigations; SCALE: 1: 3000 @ A3 <div style="border: 1px solid black; padding: 2px; text-align: center;"> JWA PTY LTD Ecological Consultants </div>	CLIENT Leda Manorstead Pty Ltd PROJECT Amended Site Regen & Reveg Plan Cobaki Estate, Cobaki NSW Tweed Shire Council LGA	FIGURE 7B	TITLE THREATENED FLORA
		PREPARED: BW DATE: 31 July 2019 FILE: N97038_SRRP Base.dwg	

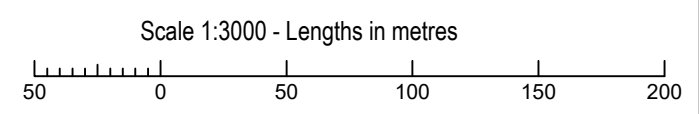


LEGEND

- Precinct Boundaries
- Cobaki Estate Boundary

Threatened Flora Species



- Marblewood (*Acacia bakeri*)
- Fine-leaved tuckeroo (*Lepiderema pulchella*)
- Brush cassia (*Cassia brewsteri* var. *marksiana*)
- Green-leaved rose walnut (*Endiandra muelleri* subsp. *bracteata*)
- Long-leaved tuckeroo (*Cupaniopsis newmanii*)
- Smooth scrub turpentine (*Rhodammia maideniana*)




SOURCE: JWA Site Investigations; SCALE: 1: 3000 @ A3 <div style="border: 1px solid black; padding: 2px; text-align: center;"> JWA PTY LTD Ecological Consultants </div>	CLIENT Leda Manorstead Pty Ltd PROJECT Amended Site Regen & Reveg Plan Cobaki Estate, Cobaki NSW Tweed Shire Council LGA	FIGURE 7C	TITLE THREATENED FLORA
		PREPARED: BW DATE: 31 July 2019 FILE: N97038_SRRP Base.dwg	

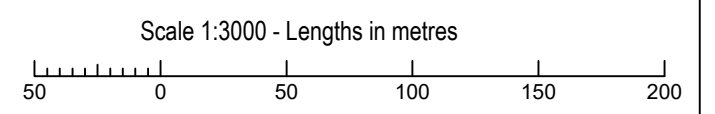
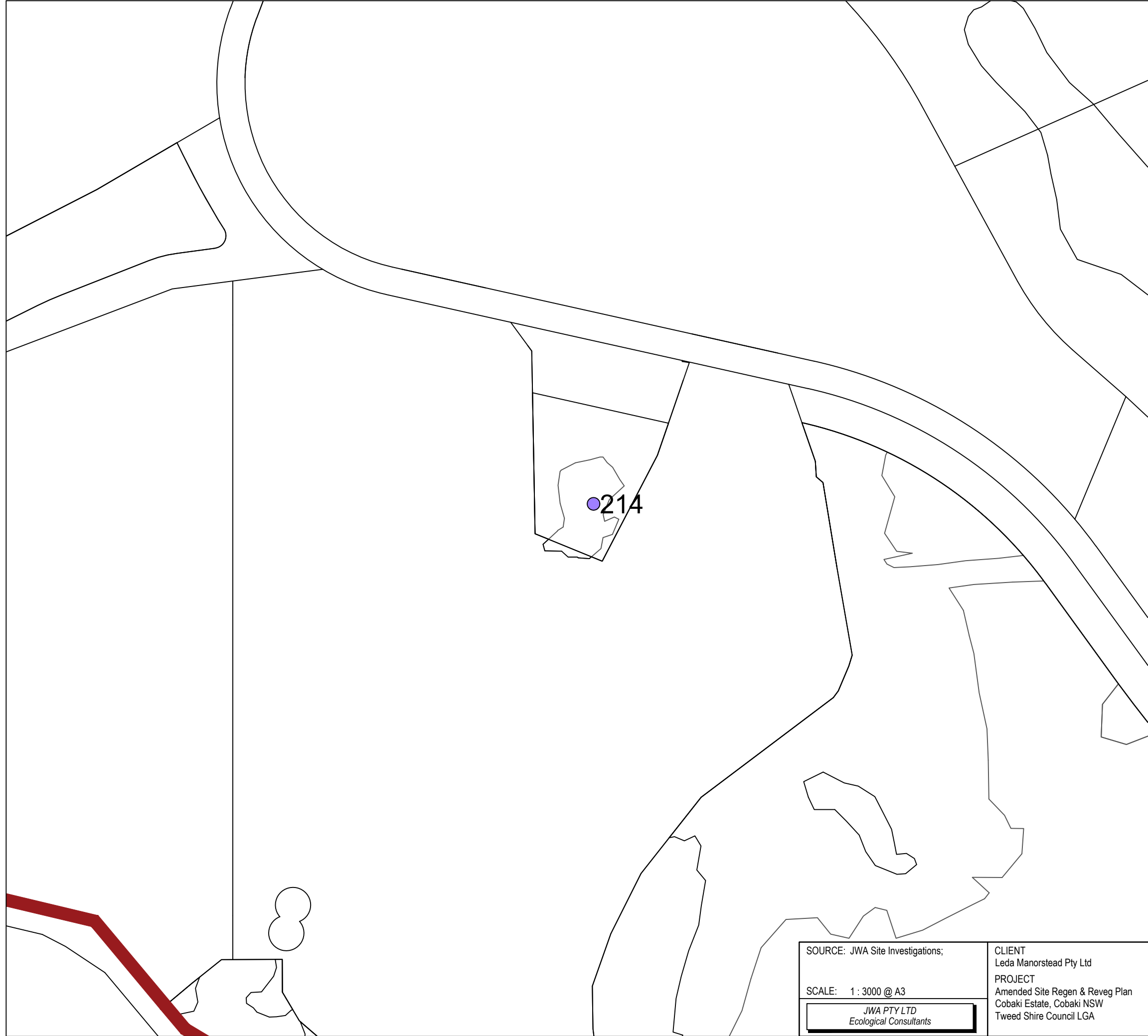


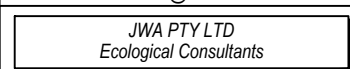
LEGEND

-  Precinct Boundaries
-  Cobaki Estate Boundary


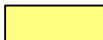



Threatened Flora Species

-  Fine-leaved tuckeroo (*Lepiderema pulchella*)



SOURCE: JWA Site Investigations;	CLIENT Leda Manorstead Pty Ltd	FIGURE 7D	TITLE
SCALE: 1:3000 @ A3 	PROJECT Amended Site Regen & Reveg Plan Cobaki Estate, Cobaki NSW Tweed Shire Council LGA	PREPARED: BW DATE: 31 July 2019 FILE: N97038_SRRP Base.dwg	THREATENED FLORA

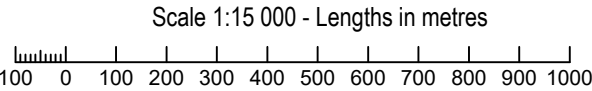
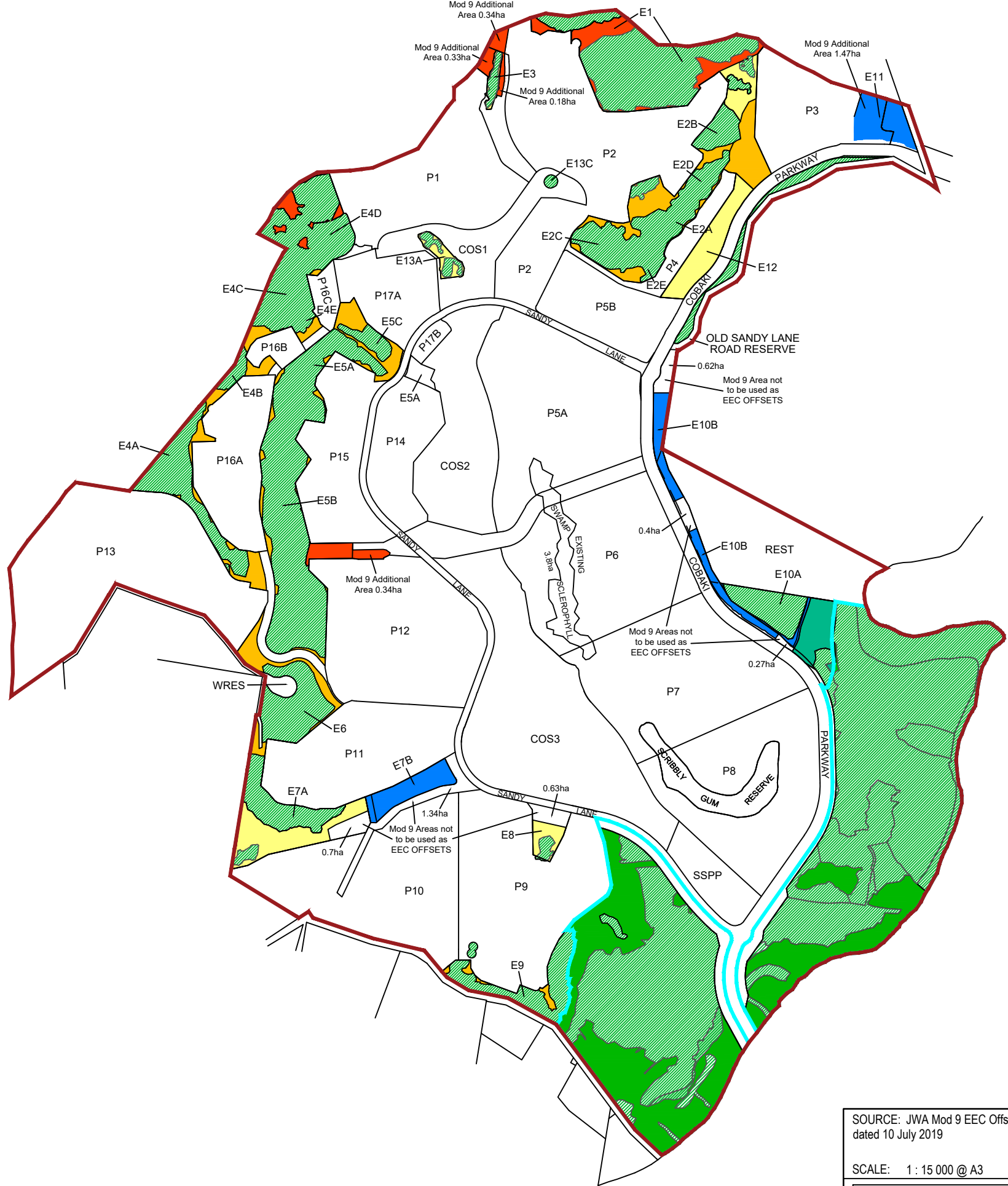
LEGEND


ENDANGERED ECOLOGICAL COMMUNITIES (EEC) OFFSET AREAS			
	Existing Retained Vegetation (ha)	Approved Revegetation (ha)	Total (ha)
 Lowland Rainforest	9.15	4.90	14.05
 Lowland Rainforest on Floodplain	1.70	8.41	10.11
Total Lowland Rainforest			
 Swamp Sclerophyll Forest on Floodplain	-	6.77	6.77
 Freshwater Wetlands	9.68	2.00	11.68
 Swamp Sheoak Floodplain Forest/Saltmarsh	51.68	25.88	77.56

OTHER

-  Mixed Sclerophyll Forest
-  Retained Vegetation
-  Salt Marsh Rehabilitation Area
-  Site Outline

" Areas proposed to be used for bio-retention basins 9 and 10 in rehabilitation areas 8 and 7 (respectively) on this Plan are indicative only and their inclusion is not taken to be approval of areas proposed to be used for bio-retention basins or to derogate from the ability of Leda Manorstead Pty Ltd and Tweed Shire Council to negotiate matters such as the location, design and maintenance of bio-retention basins 9 and 10 during the planning approval process."



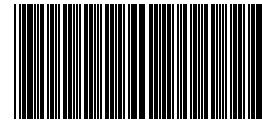
SOURCE: JWA Mod 9 EEC Offset Areas dated 10 July 2019 SCALE: 1 : 15 000 @ A3 	CLIENT Leda Manorstead Pty Ltd PROJECT Amended Site Regen & Reveg Plan Cobaki Estate, Cobaki NSW Tweed Shire Council LGA	FIGURE 8	TITLE ENDANGERED ECOLOGICAL COMMUNITIES OFFSET AREAS
		PREPARED: BW DATE: 31 July 2019 FILE: N97038_SRRP20190731.dwg	

Annexure 1 - Land and Environment Court (2018/00206081)

Section 34 Agreement



Filed: 16 July 2019 5:00 PM



D00015P967

Section 34 Agreement

COURT DETAILS

Court	Land and Environment Court of NSW
Division	Class 1
Registry	Land and Environment Court Sydney
Case number	2018/00206081

TITLE OF PROCEEDINGS

First Applicant	Leda Manorstead Pty Ltd
First Respondent	Minister for Planning

FILING DETAILS

Filed for	Leda Manorstead Pty Ltd, Applicant 1
-----------	--------------------------------------

Legal representative	SEAN AARON GADIEL
Legal representative reference	
Telephone	02 8035 7918
Your reference	AXGS/KEDS/3318984

ATTACHMENT DETAILS

In accordance with Part 3 of the UCPR, this coversheet confirms that both the Lodge Document, along with any other documents listed below, were filed by the Court.

Section 34 Agreement (Executed Section 34 agreement July 2019.pdf)

[attach.]

Form 1 (version 4)
Section 34(3)(a) and (b),
Land and Environment Court Act 1979

AGREEMENT BETWEEN THE PARTIES

COURT DETAILS

Court Land and Environment Court of New South Wales
Class Class 1
Case number 2018/206081

TITLE OF PROCEEDINGS

Applicant **Leda Manorstead Pty Ltd**

Respondent **Minister for Planning**

FILING DETAILS

Filed for **Leda Manorstead Pty Ltd, Applicant**

Legal representative Aaron Gadiel
Mills Oakley
Level 7
151 Clarence Street
SYDNEY NSW 2000

Legal representative reference AXGS/KEDS/3318984

Contact name and telephone Kalinda Doyle 02 8035 7918

Contact email kdoyle@millssoakley.com.au

AGREEMENT BETWEEN THE PARTIES

- 1 The parties have reached an agreement as to the terms of a decision in the proceedings that would be acceptable to the parties (being a decision that the Court could have made in the proper exercise of its functions).
- 2 The terms of the decision are as follows:
 - (a) The Court is satisfied that the requested modification falls within the scope of former section 75W of the *Environmental Planning and Assessment Act 1979*, as continued in force by clause 3C of schedule 2 of the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017*.
 - (b) The appeal is upheld.
 - (c) The requested modification ('MOD 9') lodged by the Applicant on 3 July 2017 to modify concept plan approval MP06_0316 is determined by approving the modification set out in the Annexure.

3 Pursuant to section 34(3)(a) of the *Land and Environment Court Act 1979* the parties request the Commissioner to dispose of these proceedings in accordance with the terms of the decision set out in paragraph 2 above.

Dated July 2019

SIGNATURE – COMMISSIONER

Signature of Commissioner

SIGNATURE – APPLICANT

Signature of legal representative

Capacity

Date


Solicitor
16-7-19

SIGNATURE – RESPONDENT

Signature of legal representative

Capacity

Date


Solicitor for Crown Solicitor

16 July 2019

ANNEXURE

- (a) Schedule 2 Part A – Administrative Conditions, Condition A2 is amended by the insertion of the **bold and underlined** words and deletion of the ~~struckout~~ words/numbers as follows:

A2 Project in Accordance with Plans

....

<u>Endangered Ecological Communities Offset Areas</u>	<u>JWA Pty Ltd</u>	<u>97038 EA Base.dwg</u>	<u>10 July 2019</u>
--	---------------------------	---------------------------------	----------------------------

- (b) Schedule 2 Part C – Requirements for Future Applications, Condition C19 is amended by the insertion of the **bold and underlined** words and deletion of the ~~struckout~~ words/numbers as follows:

C19 Biodiversity Offsets

- ~~(1) Details of biodiversity offsets for the loss of Swamp Sclerophyll Endangered Ecological community on the site must be submitted with any development application for works in Precinct 6.~~
- ~~(2) Total offsets for Swamp Sclerophyll on Coastal Floodplain must be as follows:~~
- ~~a. 6.77ha on site in accordance with the approved Revised Ecological Assessment, April 2013; plus~~
- ~~b. additional lands¹ either on site and/or off site to compensate for the loss of the offset (as a result of 06_0316 MOD 1) of an area as agreed with OEH~~
- ~~¹Note: The department has noted that using the biobanking calculator, this offset could be in the order of 16 hectares.~~

- (1) To offset the loss of 3.8 ha of Swamp Sclerophyll forest Endangered Ecological Community (EEC) the Proponent shall:**
- a. provide a 6.77 ha on-site offset in the locations identified in Amended Site Revegetation and Regeneration Plan approved by the Secretary under Condition C19A;**
- b. revegetate 6.77 ha of Swamp Sclerophyll Forest EEC in accordance with the Amended Site Revegetation and Regeneration Plan approved by the Secretary under Condition C19A; and**
- c. Prior to the commencement of site preparation works, including but not limited to clearing, earth moving, excavation and construction, the Applicant must retire 150 Swamp Sclerophyll Forest EEC biodiversity credits to the satisfaction of the OEH. The retirement of the credits must be carried out in accordance with the NSW Biodiversity Offsets Policy for Major Projects and can be achieved by:**
- (i) acquiring and retiring “biodiversity credits” within the meaning of the Biodiversity Conservation Act 2016; or**
- (ii) making payments into an offset fund that has been developed by the NSW Government; or**
- (iii) providing supplementary measures, as agreed with OEH.**

Note: Following repeal of the Threatened Species Conservation Act 1995 on 25 August 2017, “biodiversity credits” created under that Act are taken to be “biodiversity credits” under the *Biodiversity Conservation Act 2016*. The above credits are expressed as credits under the former *Threatened Species Conservation Act 1995*. Accordingly, the Environment Agency Head may determine the biodiversity credits under the *Biodiversity Conservation Act 2016* that

are reasonably equivalent to those credits (as per clause 22(3) of the *Biodiversity Conservation (Savings and Transitional) Regulation 2017*).

(2) To offset the loss of 0.11 ha of Lowland Rainforest vegetation, the Proponent shall:

- a. **provide a 13.3 ha on-site offset in accordance with the Amended Site Revegetation and Regeneration Plan approved by the Secretary under Condition C19A ; and**
- b. **revegetate 13.3 ha of Lowland Rainforest vegetation on-site in accordance with the Amended Site Revegetation and Regeneration Plan approved by the Secretary under Condition C19A.**

(c) Schedule 2 Part C – Requirements for Future Applications, after Condition c19 add new Condition C19A as follows:

C19A Site Revegetation and Regeneration Plan

Within three months of the date of determination of MP 06 0316 MOD 9, the Proponent shall prepare and submit an Amended Site Revegetation and Regeneration Plan to the Secretary for approval. The amended plan must:

- a. **reflect the offset requirements identified in Term C19 of the Concept Approval;**
- b. **update Section 3.3 to identify the Swamp Sclerophyll Forest EEC located on-site;**
- c. **ensure no areas of Lowland Rainforest on Floodplain EEC within the on-site offset areas are reclassified; and**
- d. **be generally consistent with Plan No: 97038 EA Base.dwg dated 10 July 2019 to the extent that Plan No: 97038 EA Base.dwg dated 10 July 2019 reflects only the offset areas the subject of MP06 0316 MOD 9.**

The Amended Site Revegetation and Regeneration Plan must be approved by the Secretary prior to the commencement of site preparation works, including but not limited to clearing, earth moving excavation and construction. The approved amended plan must reflect all changes effected by MP06 0316 MOD 9.

C19B Concept plan

Within three months of the date of determination of MP 06 0316 MOD 9, the Proponent shall prepare and submit an Amended Concept Plan to the Secretary for approval. The only changes to the Concept Plan permitted under this Condition are those changes that are necessary to ensure that the Concept Plan is generally consistent with the Plan No: 97038 EA Base.dwg dated 10 July 2019 to the extent that Plan No: 97038 EA Base.dwg dated 10 July 2019 reflects only the offset areas the subject of MP06 0316 MOD 9. The approved amended plan must identify the offset areas in the Amended Site Revegetation and Regeneration Plan approved by the Secretary under Condition C19A as 'Environmental Protection Area'. The Concept Plan approved under this Condition is taken to be the approved Concept Plan, subject to any further modification of this Approval. The Amended Plan must be approved by the Secretary prior to the commencement of site preparation works, including but not limited to clearing, earth moving excavation and construction.

C19C Survey of EEC Offsets

Suitable evidence must be provided to Tweed Shire Council with any development application for works in each Precinct confirming the boundaries and quantum of any relevant EEC Offsets are consistent with the approved MP06 0316 MOD 9.

(d) Schedule 3 commitment 4.8.2 — omit all of the text in commitment 4.8.2.

End of Modification

LEGEND

TABLE 1: PRE-MOD #9 ENDANGERED ECOLOGICAL COMMUNITIES (EEC) OFFSET AREAS

Category	Existing Retained Vegetation (ha)	Approved Revegetation (ha)	Total (ha)
Lowland Rainforest	9.15	3.71	12.86
Lowland Rainforest on Floodplain	1.70	9.59	11.29
Total Lowland Rainforest	10.85	13.30	24.15
Swamp Sclerophyll Forest on Floodplain	-	6.77	6.77
Freshwater Wetlands	9.68	2.00	11.68
Swamp Sheoak Floodplain Forest/Saltmarsh	48.01	25.88	73.89

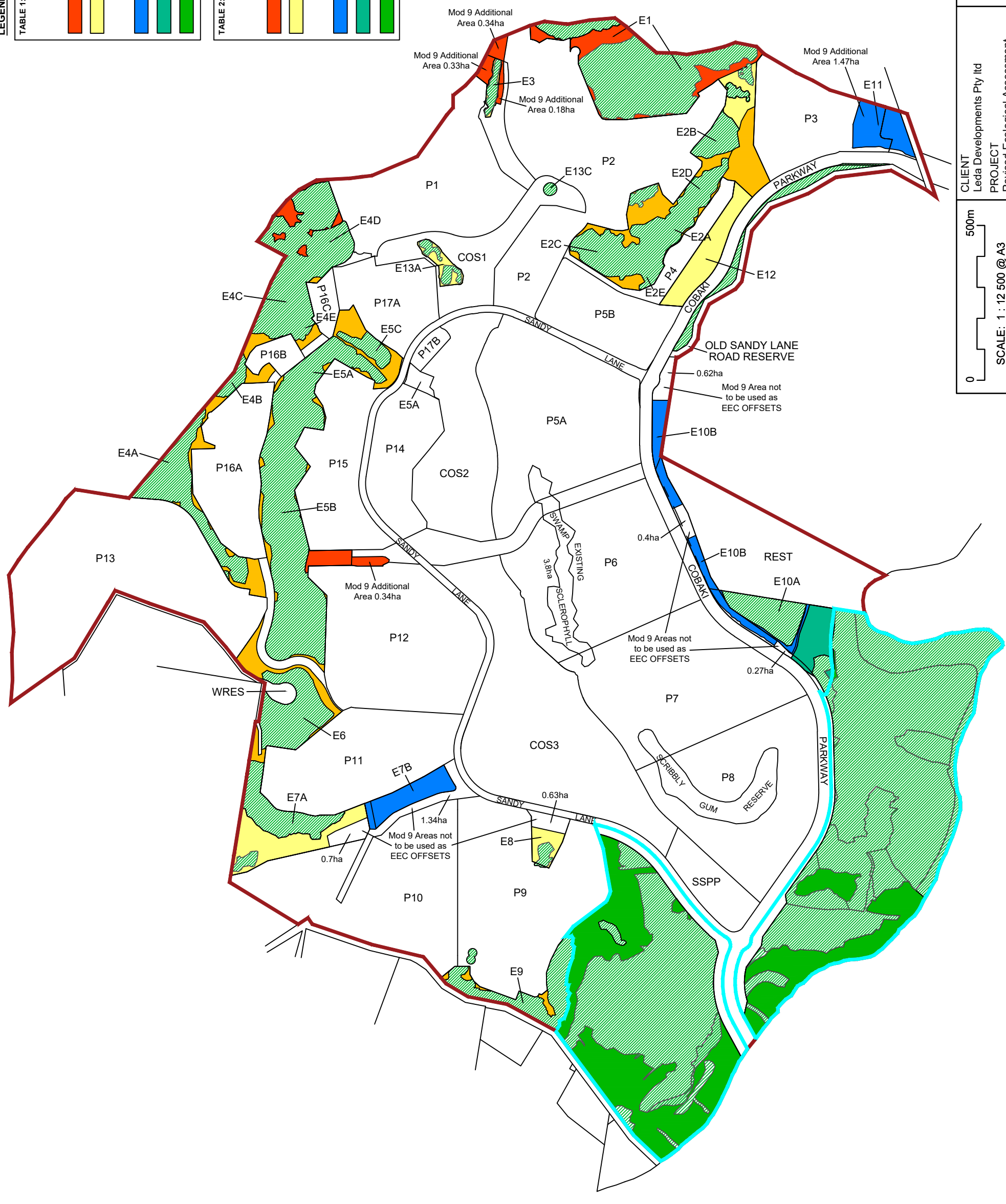
TABLE 2: MOD #9 ENDANGERED ECOLOGICAL COMMUNITIES (EEC) OFFSET AREAS

Category	Existing Retained Vegetation (ha)	Approved Revegetation (ha)	Total (ha)
Lowland Rainforest	9.15	4.90	14.05
Lowland Rainforest on Floodplain	1.70	8.41	10.11
Total Lowland Rainforest	10.85	13.31	24.16
Swamp Sclerophyll Forest on Floodplain	-	6.77	6.77
Freshwater Wetlands	9.68	2.00	11.68
Swamp Sheoak Floodplain Forest/Saltmarsh	51.68	25.88	77.56

- OTHER**
- Mixed Sclerophyll Forest
 - Retained Vegetation
 - Salt Marsh Rehabilitation Area
 - Site Outline

" Areas proposed to be used for bio-retention basins 9 and 10 in rehabilitation areas 8 and 7 (respectively) on this Plan are indicative only and their inclusion is not taken to be approval of areas proposed to be used for bio-retention basins or to derogate from the ability of Leda Manorstead Pty Ltd and Tweed Shire Council to negotiate matters such as the location, design and maintenance of bio-retention basins 9 and 10 during the planning approval process."

SOURCE: Michel Group (Ref: 6400-320.dwg)



SHEET 1 OF 1	TITLE ENDANGERED ECOLOGICAL COMMUNITIES OFFSET AREAS
CLIENT Leda Developments Pty Ltd	PROJECT Revised Ecological Assessment Cobaki Lakes, Cobaki, NSW Tweed Shire Council
SCALE: 1 : 12 500 @ A3 0 500m	PREPARED: BW DATE: 10 July 2019 FILE: 97038_EA_Base.dwg
JVA PTY LTD Environmental Consultants	

Annexure 2 - Threatened Species Profiles

Coolamon

Scientific name: *Syzygium moorei*

Conservation status in NSW: Vulnerable

National conservation status: Vulnerable

Description

Durobby, also known as Coolamon, is a tree growing up to 40 m tall, with dense dark foliage. The bark is red-brown, light grey or pinkish grey with soft papery scales. Its paired leaves are thick, oval-shaped or slightly elongated, 8-20 cm long and usually rounded at the tips. Flowers are showy, pink to red, fluffy, and clustered directly on older leafless branches and the trunk of the tree. The white fleshy fruits are edible but tasteless. They have a diameter of up to 6 cm and enclose a single seed.

Distribution

Found in the Richmond, Tweed and Brunswick River valleys in north-east NSW and limited occurrence in south-east Queensland.

Habitat and ecology

- Coolamon is found in subtropical and riverine rainforest at low altitude. Often occurs as isolated remnant paddock trees.

Threats

- Clearing and fragmentation of habitat for development, agriculture and road-works.
- Weed infestation and general degradation of rainforest habitats.
- Grazing and trampling of seedlings and saplings by domestic stock, particularly around remnant paddock trees.
- Illegal collection for horticulture.

Recovery strategies

Priority actions are the specific, practical things that must be done to recover a threatened species, population or ecological community. The Department of Environment and Conservation has identified 10 priority actions to help recover Coolamon in New South Wales.

What needs to be done to recover this species?

- Buy plants only from licensed nurseries.
- Fence rainforest remnants and isolated paddock trees to exclude grazing stock.
- Control weeds in known and potential habitat.
- Protect areas of suitable habitat from clearing or development.
- Expand and connect remnants of suitable habitat and encourage regeneration of habitat around isolated paddock trees.

Fine-leaved tuckeroo

Scientific name: *Lepiderema pulchella*

Conservation status in NSW: Vulnerable

Description

Fine-leaved Tuckeroo is a small rainforest tree growing to 15 m tall. It has hairless, light-green glossy leaves, 7-15 cm long, which are made up of 4-14 narrow leaflets with wavy or toothed margins. The flowers are 2-3 mm long and yellowy-orange. The 8-10 mm long fruit is orange. This opens into three lobes revealing shiny dark-brown seeds with a yellow fleshy covering at the base. The fruit is ripe in December.

Distribution

The NSW north coast north of Brunswick Heads, and in Queensland. Most records in NSW are from the Tweed Valley, and the majority of known populations are on private land.

Habitat and ecology

- Lowland subtropical rainforest in NSW.
- Found on infertile metasediments and on fertile basalts in the Tweed Valley.

Threats

- Invasion of habitat by introduced weeds.
- Clearing and fragmentation of habitat for development.
- Collection of seed for horticulture.

What needs to be done to recover this species?

- Buy plants only from licensed nurseries
- Remove weeds in known and potential habitat.
- Protect areas of lowland subtropical rainforest from clearing or fragmentation.
- Seek a permit from the DEC before collecting seed from wild plants.

Marblewood

Scientific name: *Acacia bakeri*

Conservation status in NSW: Vulnerable

Description

Marblewood is a tree of 5-30 m with wrinkled bark and a rounded canopy that is much darker and denser than that of most wattles. Its curved leaves are broad and dark green, with three to four prominent longitudinal veins, and thickened veins around the edges. The flower heads are small, round, and pale or golden yellow, and are followed by large bunches of flat, brown seed-pods containing several black seeds.

Distribution

Restricted to coastal south-east Queensland and north-east NSW, where it occurs north from Mullumbimby. Most plants are on private property.

Habitat and ecology

- In or near lowland subtropical rainforest, adjacent eucalypt forest or regrowth of both. Usually occurs in the understorey but may occur as a large canopy tree.

Threats

- Loss of habitat through land development and agriculture.
- Invasion by weeds, particularly Lantana.
- Fire, which kills adult trees and encourages weed growth.
- Visitor impacts in high use areas.

What needs to be done to recover this species?

- Support local Landcare groups and bush regeneration teams.
- Control fire in areas of known or potential habitat.
- Ensure walking tracks in tourist areas do not disturb known habitat and stay on established tracks in rainforest areas.
- Assist in control and removal of weeds from rainforest areas.
- Protect areas of rainforest and adjoining eucalypt forest from clearing and development.

Spiny gardenia

Scientific name: *Randia moorei*

Conservation status in NSW: Endangered

National conservation status: Endangered

Description

Spiny Gardenia is a tall shrub or small tree to about 8 m tall, often with coppice shoots and root suckers at the base. The paired leaves are mostly oval-shaped, and can be 2-6 cm long and 1-3 cm wide. The underside of the leaf is paler than the upper surface, and often has small pits in the angles of the veins. Flowers are small and white, with a strong sweet smell, and develop into round yellow to orange berries 6-9 mm long which eventually turn black. There are many seeds set in the pulp of each fruit.

Distribution

From Lismore in north-east NSW north to the Logan River in south-east Queensland. Sparsely distributed, with most records in the Tweed and Brunswick areas.

Habitat and ecology

- Subtropical, riverine, littoral and dry rainforest. In NSW, Hoop Pine and Brush Box are common canopy species.

Threats

- Clearing and fragmentation of habitat for development, agriculture and roadworks.
- Invasion of habitat by introduced weeds.
- Trampling by visitors.
- Fire.

What needs to be done to recover this species?

- Support local Landcare groups and bush regeneration teams.
- Keep to established tracks to avoid trampling on small plants.
- Protect rainforest areas from fire.
- Remove weeds where they threaten adult plants or regeneration.
- Protect areas of suitable habitat from clearing or development.
- Expand and connect remaining remnants of habitat.

Yiel yiel

Scientific name: *Grevillea hilliiana*

Conservation status in NSW: Endangered

Description

White Yiel Yiel is a rainforest tree 8-30 m tall. The young leaves are deeply lobed and mostly 25-40 cm long and 15-30 cm wide, while the adult leaves are often without lobes. The lower surface of both the young and the adult leaves is silvery and silky. The white to pale-green flower heads are cylindrical, 8-22 cm long and appear mainly during May to July.

Distribution

North from Brunswick Heads on the north coast of NSW and in Queensland. The only populations currently known in NSW are near Brunswick Heads and on the slopes of Mt Chincogan in Byron Shire and, in Tweed Shire in remnant patches of habitat, particularly around Terranora.

Habitat and ecology

- White Yiel Yiel grows in subtropical rainforest, often on basalt-derived soils.

Threats

- Risk of extinction because populations are small, and distribution is restricted.
- Loss of habitat through clearing for development.
- Habitat degradation through invasion by introduced weeds.
- Seed collection for horticulture.

What needs to be done to recover this species?

- Buy plants only from licensed nurseries.
- Prevent weeds and garden plants from invading habitat.
- Protect remnant rainforest areas from development.
- Seek a permit from the DEC before collecting seed from wild plants.
- Report new occurrences to the DEC.

Scented Acronychia

Scientific name: *Acronychia littoralis*
Conservation status in NSW: Endangered

Description

Scented Acronychia is a small tree to 6 m high with 5-16 cm long oval-shaped glossy leaves on a short stalk. The lower surface of the leaves is paler than the upper surface and there are many oil dots visible. They have a pleasant aromatic smell when crushed. The small four-petalled yellowish flowers are produced in summer on a stalk growing from the junction of the leaf and stem. The fruit that follows is creamy-lemon in colour and 10-20 mm in diameter. It is a flattened oval shape and has four lobes with shallow fissures between them.

Distribution

Scented Acronychia is found between Fraser Island in Queensland and Port Macquarie on the north coast of NSW.

Habitat and ecology

- Scented Acronychia grows in littoral rainforest on sand.

Threats

- Destruction of habitat as a result of coastal development.
- Damage caused by inappropriate use of four-wheel drive vehicles.
- Invasion by introduced weeds, particularly Lantana, Bitou Bush and exotic vines.
- Dieback caused by exposure to salt-laden winds.
- Recovery strategies

What needs to be done to recover this species?

- Always stay on designated four-wheel drive tracks.
- Assist with control and removal of weeds.
- Protect remaining areas of habitat.
- Initiate and support rehabilitation and regeneration of littoral rainforest, including planting of local rainforest species to protect Scented Acronychia from exposure to salt-laden winds.

Brush Cassia

Scientific name: *Cassia brewsteri* var. *marksiana*

Conservation status in NSW: Endangered

Description

Brush Cassia can be a spectacular tree when in bloom. It is similar to the Golden Shower Tree (*Cassia fistula*) of street-plantings but has smaller leaves and darker flowers. The golden-yellow summer flowers are fragrant and hang in large clusters from the fresh, lime-green foliage. Brown, cylindrical fruits, which develop in winter, are segmented and contain hard yellow-brown seeds, each enclosed in a cardboard-like envelope. The tree may grow to 25 m tall, but most are 5-10 m. Defoliating caterpillars often give it a briefly scruffy look.

Distribution

Occurs north from Brunswick Heads, around Murwillumbah, and north into south-east Queensland as far as Beenleigh.

Habitat and ecology

- Found in littoral and riverine rainforest, and in regrowth vegetation on farmland and along roadsides.
- It prefers more fertile soil-types and is often found in low and flat sites.

Threats

- Widening and maintenance of roads.
- Clearing and development of land.
- Browsing and trampling by stock.
- Invasion of habitat by introduced weeds.
- Damage to trees, and inhibition of regeneration, by seed-collectors.

What needs to be done to recover this species?

- Buy Brush Cassia plants only from appropriately licensed nurseries.
- Identify populations along roadsides and protect them during road-works.
- Protect from stock by fencing.
- Remove weeds from known and potential habitat.
- Protect known and potential habitat from clearing and development.
- Expand and connect remaining areas of habitat.

Green-leaved Rose Walnut

Scientific name: *Endiandra muelleri* subsp. *bracteata*

Conservation status in NSW: Endangered

Description

A tree up to 30 m tall with brown bark, often with loose round plates. Twigs and branchlets are covered in hairs. The moderately glossy leaves are oval or drawn out towards the tips, and measure 6-12 cm long and 3-5 cm wide, with three to five pairs of side veins. Flushes of new growth are pinkish-green. Flowers are small, yellowish and hairless, and are held in small clusters. The fleshy fruits are egg-shaped, 2.5-3 cm long and black when ripe.

Distribution

Occurs in Queensland and in north-east NSW south to Maclean. It is sparsely distributed within this range.

Habitat and ecology

- Subtropical rainforest or wet eucalypt forest, chiefly at lower altitudes.

Threats

- Clearing and fragmentation of habitat for coastal development, agriculture and road-works.
- Infestation of habitat by weeds.
- Frequent fire.
- Trampling by visitors.

What needs to be done to recover this species?

- Keep to established tracks in areas of habitat to avoid trampling small plants.
- Support local Landcare groups and bush regeneration teams.
- Protect rainforest and wet eucalypt forest from fire.
- Identify populations along roadsides and protect them during road-works.
- Remove weeds where they threaten adult plants or regeneration.
- Protect areas of suitable habitat from clearing or development.
- Expand and connect remaining habitat remnants.

Annexure 3 - Ecological Restoration Principles

Ecological restoration aims to restore pre-existing indigenous ecosystems and ecological processes on disturbed sites, maintaining and developing the natural ecosystem to self-perpetuate (Perkins 1992). Perkins (1992) put forward a *restoration continuum* spanning from assisted natural regeneration, the least interventionist, to reconstruction (of original communities on cleared sites) and fabrication (of new communities on changed sites). These activities are undertaken in different circumstances in the field, but the boundaries are blurred, allowing practitioners to consider sites on an individual basis, according to the level of disturbance and the restoration potential identified in the site. The aim of ecological restoration is to restore to the highest practicable extent, and to develop a system that is sustainable in the long term.

In disturbed areas that cannot solely rely on natural regeneration potential, revegetation can be undertaken to reconstruct the original forested communities. Cleared sites can be replanted with species grown from seed collected in nearby local native vegetation. The use of seed of local provenance (origin) is a key principle underpinning the integrity of the work, and avoids possible genetic pollution of local woodland when future pollen exchange takes place between remnant and replanted woodland.

Unfortunately the suite of species that is available is often narrow, determined by practicalities of seed collection, the ability to propagate in a nursery and limits on field establishment in the environmental conditions prevailing on cleared land. Conceptually, this is merely establishing a framework into which additional plant and animal diversity can recruit or be reintroduced once the environment is modified (Perkins 1992).

Cleared sites are seldom completely devoid of native species. It is common to observe paddocks supporting threads of the original ground cover vegetation. This is often apparent in paddocks historically sown with exotic grasses to improve pasture. While the introduced grasses are usually dominant, a surprising diversity of native grasses and groundcovers can often persist. They have remained through a history of sustained grazing and are by definition adapted to grazing. The act of excluding livestock or other management activities can threaten native diversity, as biomass from the introduced grasses smothers these plants. Alternative biomass reduction can be achieved with slashing and fire however these have different effects and their own practical limitations.

Total groundcover biomass is reduced under a developing canopy, a phenomenon also evident in re-growing forest communities. The vigour of exotic grasses is greatly diminished, and some are unable to grow, leaving room for native plants that are adapted to the woodland ecosystem. Of course some native plants lose vigour in the forest canopy as well. Revegetation is thus forming an important mechanism for grassland manipulation and as a tool for creating a variety of niches in the ground layer. At the same time, revegetation is achieving the obvious objectives of increasing habitat values, restoring normal hydrology and increasing the range of species available to recover in a site after disturbance. Revegetation needs to be used in combination with other techniques, and these processes will need to be studied in detail before they can be conclusively described as positive.

The mechanism of planting is likely to be a most important strategy in revegetation of the site, not as an end in itself, but as an important tool to ameliorate changed sites and release ecosystem resilience. While prolonged monitoring needs to be maintained in revegetation areas, there are indications that environmental conditions within the site will change in interesting ways as revegetation develops.

Reference

Perkins, I. 1992. *Land and Vegetation Management Plan for the Horsley Park Corridor*.

Annexure 4 - Regeneration and Revegetation Approach

1 Introduction

To determine which areas of vegetation should be the focus of regeneration and revegetation activities, vegetation within each management precinct was mapped and divided into six (6) different categories based on restoration potential. This was completed to ensure that regeneration and revegetation resources and methods will be utilised in the most efficient way by focusing on those areas that contain particular management issues (i.e. weed infestations, lack of canopy cover, poor species diversity) and matching the appropriate restoration measures for those issues.

The six (6) management categories are based on the McDonald (1996) vegetation restoration system⁴ and are shown in TABLE 1.

TABLE 1 - VEGETATION MANAGEMENT CATEGORIES AND ACTIONS

Management Categories (Based on restoration potential)	Management Actions
1 - Very good condition. Structure and composition of vegetation community generally intact. Low evidence of degradation. Likely to recover fully with passive intervention.	Maintenance
2 - Good condition. Structure somewhat altered by low level impacts. Likely to recover fully if casual factors and their secondary impacts are removed by active intervention. Likely to degrade further if no remedial action taken.	Natural or Assisted regeneration
3 - Moderate condition. Structure altered by high level impacts. High level visual impacts may be present. Likely to recover fully if causal factors and their secondary impacts removed by active intervention, but will take longer to recover than a site of higher condition.	Assisted regeneration
4 - Poor condition. Structure and/or composition highly altered. Sufficient biota remains for natural regeneration if causal factors and their secondary impacts are removed and dynamic processes reinstated. Reintroduction of some species (including Threatened species) may be required.	Assisted regeneration/ Revegetation
5 - Very poor condition. Structure and/or composition severely altered. Either insufficient biota remain for natural regeneration (except some ruderal species), or severe weed infestation occurs and is likely to prevent native regeneration.	Assisted regeneration/ Revegetation
6 - Nil native vegetation.	Revegetation

⁴ Degradation classification system used in McDonald, M. Christine, 1996. Ecosystem resilience and the restoration of damaged plant communities: A discussion focusing on Australian case studies. Ph.D. Dissertation, University of Western Sydney.

2 Site Regeneration Strategies

2.1 Introduction

The majority of vegetation on the Subject site (i.e. rehabilitation/management precincts) has experienced historical and current anthropogenic alterations principally due to impacts from clearing, cattle grazing and fire. This anthropogenic modification has provided opportunities for weed species to invade the natural vegetation communities. Exotic species have persisted and competed with native species for limited resources (e.g. light, nutrients and water). This acts as a limiting factor for regeneration of native species. Therefore, in order to enhance the natural values of the site, weed control and weed removal techniques are required for all identified vegetation management categories at varying levels.

The objectives of the site regeneration strategies for each precinct are to:

- Remove weeds utilising “best practice” protocols;
- Maintain and monitor the site to ensure success; and
- Improve the current ecological values of areas containing habitat for identified significant species.

2.2 Methods

Regeneration methods implemented are to be site specific and will be detailed in each individual precinct specific Regeneration and Revegetation Plan . The overall strategies are based on the principles of assisted regeneration and will include:

- Locating and marking clearly all Threatened species;
- Manual hand weeding 2 metres around threatened species;
- Selective Camphor Laurel poisoning;
- Primary weeding:
 - C, S and P Woody Weeds,
 - Small natives (less than 20 cm) are to be weeded around (50 cm), staked, and clearly marked, and
 - Selective spot spraying or blanket spraying if required;
- Follow up weeding and other maintenance to be completed until objectives are achieved; and
- Continued monitoring for the full maintenance timeframe (refer **ANNEXURE 7**).

A regular maintenance program will be implemented for each of the management precincts after primary weeding has occurred. The maintenance to be completed is discussed in **ANNEXURE 7**. The monitoring program is discussed in **ANNEXURE 8**.

3 Site Revegetation Strategies

3.1 Background

Within disturbed areas, competition between native propagules and exotic weeds often favours pioneering exotic species. Thus, in order to enhance the ecological function of areas degraded by exotic species, revegetation works will provide a framework by which indigenous species may reclaim lost habitat via the processes of natural recruitment and succession. Therefore, the aim of revegetation works within each precinct is to restore the historical ecological values of the site through the use of weed removal techniques and the provision of indigenous canopy species.

Revegetation will be required within areas graded 4, 5 or 6 as described in **TABLE 1**. It should be noted that several of these areas have previously undergone filling activities (in accordance with previous approvals). Removal of fill may be necessary in some instances to achieve natural ground level. Earthworks to remove fill may require a construction certificate to complete.

Revegetation will commence approximately three (3) months after the primary weeding has been completed. This will allow for any native seedlings to germinate naturally. Each management precinct will be regularly monitored. Two (2) months after primary weeding has occurred the site will be assessed for natural recruitment of native species. Any areas that are considered to have low native recruitment potential are suitable for revegetation.

Bi-annual assessment will be made of each of the precincts. In any areas within which the occurrence of native species is considered low, revegetation will be required.

Revegetation will continue on an as needed basis dependent upon the proponent's budgetary constraints.

3.2 Propagation

Seed collected for propagation will come from the site and immediate surrounds as well as local provenance (i.e. from local stock within 20 km of the Subject site). The following details will be collected from each source plant:

- Location (GPS position);
- Date of collection;
- Name of collector;
- Soil type;
- Health of plant; and
- Collection method.

Whenever possible, seed will be removed directly from plants by shaking or cutting branches over a tarpaulin. Secateurs will be sterilised between each use. Seed will be

placed in small envelopes with the collection details clearly marked. If the seed is extremely small it will be stored in glass or plastic vials to avoid undue loss.

It is expected that during the seed collection program, a site will be visited on several occasions to ensure optimum seed ripeness. The seed collection program will be prepared in consultation with Council and NSW National Parks and Wildlife Service (NPWS) prior to commencement. The program will be prepared by the Nursery/Revegetation team in consultation with the Horticulturist.

The amount of seed collected will not exceed 5% per plant. Seed will not be collected from isolated populations or rare plants.

The seed will be cleaned, its viability checked and prepared for storage. Seed that has lost viability will not be used in the revegetation works due to the dangers of genetic aberration.

If seed collection proves difficult or impossible, other forms of propagation, such as cuttings, may be attempted.

3.3 Planting Program

All exclusionary fencing will be in place before planting occurs.

Existing native trees and shrubs, which have regenerated since clearance, would be retained. These areas would be enhanced with plantings as deemed appropriate by the Horticulturist.

Planting will occur at the optimum time of the year when there is high soil moisture (between January and May), unless irrigation is available and accessible.

If required, the Horticulturist may make minor alterations to this revegetation strategy depending on the site requirements. The following strategy will be employed:

- Seedling sites will be spot sprayed with Glyphosate one (1) week prior to commencement;
- All seedlings will be soaked in water overnight prior to planting;
- All seedlings will be provided with a wetting agent such as rain-saver⁵ crystals;
- Weeds will be controlled, in the short term, through the application of suitable mulch around individual plantings and with spot applications of an appropriate herbicide.

⁵ Rain-saver is a polymer water crystal that has been specifically developed for plants. The polymer absorbs and holds water and nutrients at a specific tension which makes it available to plant roots but does not release to the soil. Rain-saver has proven very successful in more difficult environments (e.g. Roadside plantings on the Pacific Motorway between Brisbane and the Gold Coast and in frontal dunes at Pottsville (R. Keene *pers. comm.* 2000).

- All seedlings will be protected by a tree guard (commercial tubing or equivalent); and
- Watering will be undertaken after the seedlings have been planted on an 'as need basis'.

The plants growing medium would be soaked prior to planting and the plant cores should be buried to approximately 1-2 cm deep.

The seedlings shall be planted on the same day as their transport from the nursery. No seedlings will be left unprotected on the site whilst awaiting planting. Planted seedlings will be marked with a piece of biodegradable tape and staked.

Only nitrogenous fertilisers will be used to avoid the introduction of Phosphorous, Potassium and other micronutrients.

Planting in areas exposed to full sun or westerly sun will be avoided in the peak summer months, where possible.

Planting density may be inconsistent throughout the planting zone, due to occurrence of native seedlings and the condition of the planting medium (in large areas of the Subject site basalt boulders occur as ground cover, and revegetation may not be practical).

Annexure 5 - Propagation of Threatened Flora Species

To bolster the local populations of Threatened flora species, it is recommended that the revegetation include the replanting of some of the Threatened species that occur naturally on the site. Planting of threatened species is also required to offset the loss of individual plants as a result of the development. Listed below in **TABLE 1** are some of the Threatened species that occur on site and comments on the ease of propagation for each species. **TABLE 2** lists the fruiting times for each Threatened species.

Comments have been obtained from experienced local sources including:

- Mark Dunphy (Manager of the Firewheel Rainforest Nursery); and
- Brett O'Donovan (Manager of Terania Creek Nursery).

TABLE 1
LIST OF THREATENED SPECIES AND COMMENTS ON PROPAGATION

Common Name	Botanical name	Dunphy Comments	O'Donovan Comments
Coolamon	<i>Syzygium moorei</i>	Easy	Easy
Fine-leaved tuckeroo	<i>Lepiderema pulchella</i>	Easy	OK, usually only 20% of seed germinates
Marblewood	<i>Acacia bakeri</i>	Easy, but fruits seasonal	Easy
Spiny gardenia	<i>Randia moorei</i>	Easy, fruit may be hard to collect	Poor germination (10-20%). Birds love fruit
White yiel yiel	<i>Grevillea hilliana</i>	Easy, wind borne seed can be hard to collect	Hard to get good amount of seed

TABLE 2
FRUITING TIMES OF THREATENED FLORA ON THE SITE

Common Name	Botanical name	Fruiting period (Floyd)
Coolamon	<i>Syzygium moorei</i>	Fruit ripe March - May
Fine-leaved tuckeroo	<i>Lepiderema pulchella</i>	Fruit ripe December
Marblewood	<i>Acacia bakeri</i>	Fruit ripe Jan - April
Spiny gardenia	<i>Randia moorei</i>	Fruit ripe Dec - Aug
White yiel yiel	<i>Grevillea hilliana</i>	Fruit ripe Feb - July

Threatened Species Licence (Part 2 of the BC Act)

A threatened species licence, a class of biodiversity conservation licence under Part 2 of the *Biodiversity Conservation Act 2016*, may be required if an action is likely to result in:

- harm to an animal that is a threatened species or part of a threatened ecological community;
- picking a plant that is a threatened species or part of a threatened ecological community;

- damage to the habitat of a threatened species or threatened ecological community; and/or
- damage to a declared area of outstanding biodiversity value.

The Director - General cannot compel anyone to apply for a Threatened species licence. This is the choice of the potential applicants who must weigh up the risk of not being protected by a licence for actions which may result in the harming or picking of a threatened species, population or ecological community, and/or the damaging of habitat of a threatened species, population or ecological community.

Annexure 6 - Weed Control Methods

The following are control techniques that are to be utilised during site regeneration works:

- **Cut Stump Method** - This method involves cutting plant stems as close to ground level as possible and immediately painting the cut stump with herbicide. This treatment can also be applied as a basal bark application to the first 15-20 cm (entire circumference) of an uncut stem if the adult bark has not yet developed. Chemical use with this application is dependent on the proximity of the weed to naturally ponding water or waterways and whether or not the chemical is registered for aquatic use.
- **Stem Injection** - Herbicides may be applied directly to the plant via stem injection. This involves applying an herbicide to the plant directly by drilling a hole into the stem and inserting the chemical. Axe cuts for stem injection can also be used. Cuts can be made at regular intervals around the stem and should leave a "pocket" into which the chemical must be immediately injected. Axe cuts should penetrate the cambium layer, but not the hardwood.
- **Spray Method** - There are two (2) types of spraying methods that will be employed where appropriate:
 - Selective blanket spraying: The area must initially be checked for the presence of any native species. Any weeds within 2 m of the drip zone of existing native species will be removed by hand. Alternatively, native species will be covered with impermeable material (e.g. a tarpaulin) for protection during spraying;
 - Spot spraying: The spray nozzle will be kept close to ground to avoid any overspray. Individual weeds will be spot-sprayed at the site. This method of spraying will be employed as native species are interspersed throughout the exotic grasses; and
 - Herbicides specific to each target species, where appropriate, will be identified prior to the implementation of any works. Herbicides will be applied in accordance with the manufacturer's specifications and when environmental conditions are most preferred (e.g. wind and rainfall).
- **Cutting and Chipping** - Manual weeding may involve cutting and chipping, pulling, digging or slashing and is preferred, depending on the growth stage and situation as detailed:
 - Where native plants are growing within a weed infestation and the use of selective herbicide is not possible;
 - Where inadequate foliage is present to allow for successful uptake of herbicide e.g. Mile-a-minute runners typically exhibit this trait; and
 - When hand weeding, the stem must be grasped firmly at the base of the plant and pulled. A trowel, mattock or sharp knife may be needed

to loosen the soil. Care must be taken not to leave behind stems or other plant pieces that may re-shoot. Hand weeding should also be undertaken at times when weeds are not seeding to reduce dispersal and spread. Hand pulling is not recommended for some weed species as they readily sucker if their roots are disturbed e.g. *Lantana camara*. This method will be employed when removing exotic grass species within retained vegetation.

- **Ring Barking** - This method involves removing the lower bark from the stem using a sharp implement to expose the phloem and xylem tissue to the outer environment thereby destroying it.
- **Basal Bark Method** - This method involves applying an herbicide to the lower 35-45 cm bark around the entire stem using a hand-pump backpack sprayer fitted with a shut-off at the wand tip and an adjustable cone nozzle or a small, ATV (All-Terrain Vehicle)-mounted sprayer with a shut-off at the wand tip and an adjustable cone nozzle.

Annexure 7 - Maintenance

1 Introduction

Maintenance or follow up works are vital for the continuing regeneration and revegetation of the precincts. Regular maintenance will be completed by the rehabilitation team. Once canopy closure has been achieved the period of time between maintenance visits will increase.

2 Timing of Maintenance

After primary weeding and revegetation works, regular follow up maintenance will be required within each precinct. The Revegetation Team will be required to complete:

- Regular maintenance of the regeneration and revegetation zone, once every three (3) months until canopy closure has been achieved. This is expected to take between two (2) - three (3) years.
- After canopy closure has been achieved, the removal of weed re-growth and other general maintenance tasks will only be completed every six (6) months until completion criteria are achieved.

3 Maintenance Requirements

The maintenance is to be completed by the rehabilitation team and will include:

- Control of invasive weeds and grasses;
- Ensuring adequate soil nutrient levels within revegetation zones by periodic fertilising;
- Ensuring adequate soil moisture levels within revegetation zones by using irrigation during times of prolong drought;
- Repairing exclusion fencing when required;
- Pruning and thinning to allow for optimal growth and form;
- Staking or propping-up of trees which have fallen or developed a permanent lean;
- Replacing large areas of dead trees; and
- Re-mulching and re-fertilising of the revegetation plantings is recommended after the first year.

Continued maintenance after canopy closure will be required only once every six (6) months, and will include:

- Pruning and thinning to allow for optimal growth and form;
- Control of invasive weeds and grasses; and
- Repairing or removing fencing when required.

Annexure 8 - Monitoring and Reporting

1 Introduction

The Horticulturist and qualified ecologist will inspect the revegetation zones before revegetation commences to ensure suitable preparation. A qualified ecologist will also regularly monitor the condition of each management precinct until completion criteria are achieved, to ensure that the proposed planting and revegetation works satisfy the aims and methods of this Plan.

Within regeneration and revegetation areas a qualified ecologist will monitor the abundance of native species, weed abundance, any significant problems and the status of protective fences.

During the monitoring visits an assessment will be made of the health of the seedlings (growth rates, foliage status and survival rates) within revegetation areas to ensure that maintenance of planted individuals has occurred.

At the end of the final stage of the project, a qualified ecologist will determine if the stated objectives of this management plan have been achieved. If not, a report will need to be prepared identifying the works and the time frames required to ensure that the Regeneration and Revegetation Plan meets the stated objectives and that, most importantly, a self-sustaining community is established within all the regeneration precincts.

2 Monitoring Basic Indicators

Revegetated rainforest sites typically progress through two main stages: an initial 'establishment' phase and a longer-term 'building' phase. The 'establishment' phase is the period from when seeds or seedlings are planted until they have 'captured' the site, forming a relatively closed canopy and suppressing grasses and weeds. The establishment phase may last three to five years, depending on site conditions, planting design, maintenance, and so on.

In the 'building' phase, the planted trees mature, reproduce and eventually die, and other species of plants and animals are recruited to the site. In a restoration project, the aim of this phase is typically the development of a floristically and structurally diverse forest that provides habitat for native wildlife (Catterall *et al.* 2006). It may take decades or even centuries for a revegetated site to come to resemble mature rainforest.

The monitoring of basic indicators involves the survey of various aspects of vegetation structure on defined transects and plots, using a standard design. Kanowski and Catterall (Eds 2006) list the following basic indicators (TABLE 1) which have been identified from research conducted by the Rainforest CRC on the biodiversity values of reforested sites in tropical and subtropical Australia, and from other relevant work.

TABLE 1
LIST OF ATTRIBUTES TO BE SURVEYED

Attributes	Definition
Canopy Cover	Projective cover (%) of vegetation >2 m above ground (= shade cast by vegetation >2 m above ground, if sun was directly overhead).
Canopy Height	Height attained by the crown of the tallest tree in the canopy. The canopy is the layer of foliage forming the 'roof' of the forest; it may be broken by gaps or incomplete. In some sites, it may be necessary to distinguish canopy trees from emergents (i.e. trees projecting above canopy with crowns exposed on all sides).
Ground Cover	Proportion of ground (%) covered by (a) vegetation <1 m high (score for each of: grass, herbs, ferns, vines and scramblers, trees and shrubs, moss), (b) leaf litter and fine woody debris, (c) coarse woody debris, (d) rock, (e) soil, (f) other.
Trees	Live freestanding woody-stemmed plants >2 m high. Trees are assessed by dbh class (= stem diameter at 1.3 m above ground): <2.5 cm, 2.5-10 cm, 10-20 cm, 20-50 cm, 50-100 cm, >100 cm.
Structural damage to trees	Any significant structural damage to live trees from storms or cyclones is recorded as: 1 = defoliation and smaller branches broken; 2 = larger branches broken, 3 = trunk broken; 4 = tree pushed over at >45° angle or uprooted.
Standing dead trees (stags)	Dead freestanding woody-stemmed plants >2 m high, assessed by dbh class: <2.5 cm, 2.5-10 cm, 10-20 cm, 20-50 cm, 50-100 cm, >100 cm.
Shrubs	Live freestanding woody stemmed plants 1-2 m high.
Special life forms	Plant life forms characteristic of rainforest and/ or particular forest types. Includes: strangler figs, hemi-epiphytes, vines ('slender' <5 cm diameter, 'robust' >5 cm diameter), vine towers, vine tangles, thorny scramblers, clumping epiphytic ferns, other epiphytes, tree ferns, ground ferns, palm trees, understorey palms, cordylines, herbs with long, wide leaves, herbs with strap leaves, cycads (with stems or on ground), other life forms characteristic of a site.
Coarse woody debris	Fallen logs and branches, lying on or within 2 m of the ground and >10 cm diameter. Where present, coarse woody debris usually comprises most of the volume of woody debris. Provides stable habitat for organisms dependent on rotting wood, as the core tends to remain moist.

3 Timing of Monitoring Visits

The monitoring is to be completed by a qualified ecologist. Site visits should occur for each precinct as follows:

- Six (6) weeks after primary weeding;
- Six (6) weeks after initial plant-out;
- Every three (3) months thereafter until plants are sufficiently established; and

- Every six (6) months for the full maintenance timeframe (refer **ANNEXURE 7**).

4 Reporting of Monitoring Results

Following each inspection by the qualified ecologist, a brief report will be prepared and provided to Council. At the end of each year a detailed report will be prepared and will discuss the following:

- Works undertaken;
- Progress of regeneration/revegetation areas;
- Significant problems encountered (death of seedlings, broken fences, vandalism etc.) and the effect of these on the plantings and aims of the revegetation strategy;
- Success or failures of measures implemented to rectify previously identified problems; and
- Measures to be taken to rectify new problems.

5 Completion of Reporting

At the end of the final stage of the project, a qualified ecologist will determine if the stated objectives of the revegetation strategy have been achieved (or close to being achieved). If not, a report will be prepared and provided to Council identifying the works and the time frames required to ensure that the stated objectives are fulfilled.