



KINGS FOREST

PRECINCTS 6 - 11

VEGETATION & WEED MANAGEMENT PLAN

A Report Prepared for
Project 28 Pty Ltd

DECEMBER 2020

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1 INTRODUCTION

1.1 Background

JWA Pty Ltd have been engaged by Project 28 Pty Ltd (Project 28) to prepare a Vegetation and Weed Management Plan (VWMP) for Precincts 6 - 11 of the Kings Forest project site. The Kings Forest site is 846 hectares in area and is located in the coastal zone of the Tweed Shire Local Government Area (LGA). The site was zoned for residential and commercial development in the early 1990's and has been subject to a lengthy Commonwealth, State and Council approval process. Numerous ecological studies have been completed on the site over the last 30 years including detailed flora, fauna and hydrological surveys.

This VWMP provides specific measures for mitigating and/or minimising the potential impacts on vegetation within Precincts 6 - 11 and associated Environmental Management Areas (EMAs) as a result of development activities. Specific management actions discussed in this VWMP will be triggered and completed on a pre-construction, construction and operational phase basis. Due to the uncertainty of the timing of commencement of construction works within Precincts 6 - 11, it is also proposed to undertake pre-commencement monitoring and maintenance works within the Precinct 6 - 11 EMAs to ensure that relevant ecological values of these areas are not compromised.

Weed control strategies and the regeneration/revegetation of heath and wetland communities are the focus of this VWMP. Strategies for the management of native vegetation (including retained habitat) and fauna pre and post construction are also included. The Koala Plan of Management (KPoM) (JWA 2019) and Wallum Sedge Frog Management Plan (WSFMP) (JWA 2020a) provide specific management strategies for the koala and wallum sedge frog respectively including details of compensatory habitat creation.

It should be noted that within Precincts 6 - 11, the weed control strategies outlined in this VWMP will only apply to land zoned as Environmental Protection and associated ecological buffers. For other parts of the site, the control of weeds is the responsibility of landowners, or where they occur on public land, the responsibility of Tweed Shire Council (TSC).

It is also noted that Concept Plan (06_0318) Approval Condition C2 requires management plan updates (where necessary) to accompany future development applications. As a consequence, there may be changes arising from these updates to specific management provisions contained in this plan.

1.2 Aim and Objectives

This VWMP is intended to assist Project 28 in managing existing native vegetation and other environmentally sensitive areas within development precincts 6 - 11 and associated EMAs before, during and after development.

The aim of this VWMP is to develop a comprehensive and integrated approach to guide the immediate and long-term management of retained and rehabilitated native vegetation and to ensure its protection and enhancement. Implementation of this VWMP will ensure ongoing sustainable management of native vegetation within areas associated with Precincts 6 - 11 on

the Kings Forest site, and that land clearing and land modification activities associated with the development are effectively remediated.

Specific objectives of this VWMP are to:

- Protect the environmentally significant site values of areas associated with Precincts 6 - 11 from bulk earthworks and construction activities;
- Remove vegetation from the development footprint in a controlled and an environmentally sustainable way;
- Provide permanent protection for the environmentally significant values within EMAs associated with Precincts 6 - 11 (i.e. threatened flora and fauna species, endangered ecological communities, and wetlands);
- Manage noxious and environmental weeds in an environmentally sustainable manner and prevent the further spread of weeds resulting from the development of Precincts 6 - 11;
- Utilise assisted natural regeneration where appropriate;
- Restore, enhance and manage the retained and protected vegetation including providing guidelines for the revegetation of EMAs where required; and
- Monitor the condition of retained and rehabilitated vegetation to assess if the project completion criteria have been met and report where appropriate.

1.3 Compliance with Relevant Approval Conditions

On the 19th January 2007, the NSW Minister for Planning authorised a Concept Plan (06_0318) for a proposed residential community at Kings Forest. The Minister for Planning granted part 3A approval (with conditions) for the Concept Plan for Kings Forest in August 2010. Separate Precincts 6 - 11 Vegetation Management Plan and Precincts 6 - 11 Weed Management Plan were prepared in accordance with the Concept Plan approval conditions.

The Kings Forest Stage 1 Project Application (MP 08_0194) was lodged in November 2011. The Project Application was approved (with conditions) on the 11th August 2013. Conditions of this approval required that all environmental management plans be revised.

On the 21st May 2015 the Commonwealth Department of Environment approved (with conditions) the Kings forest residential development (EPBC 2012/6328). The Commonwealth approval is confined to the mitigation of impacts of the proposed development on the koala and wallum sedge frog, both of which are listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). There are no EPBC Act approval conditions specifically relating to vegetation or weed management on the Kings Forest development site, however it is noted that the Precinct 6 - 11 EMAs are used extensively for the retention, management and offsetting of koala and wallum sedge frog habitat.

Since the Commonwealth approval decision Project 28 have been liaising with TSC and the NSW Department of Planning, Industry and Environment (DPI&E) to reconcile all approval conditions.

The Precincts 6 - 11 VWMP has been prepared to comply with all relevant Commonwealth, State and Local Government approval conditions. **APPENDIX 1** contains the details of the following relevant Consolidated Approval Conditions and also notes where they are addressed in this VWMP:

- Concept Plan 06_0318 Consolidated Approval Conditions incorporating the following:
 - Modification No. 1, approved on 22 December 2010;
 - Modification No. 2, approved on 11 August 2013;
 - Modification No. 3, approved on 16 May 2014;
 - Modification No. 4, approved on 20 November 2014;
 - Modification No. 5, approved on 10 November 2015;
 - Modification No. 8, approved on 24 May 2018;
- Project Approval 08_0194 Consolidated Approval Conditions incorporating the following:
 - Modification No. 1, approved on 16 May 2014;
 - Modification No. 2, approved on 20 November 2014;
 - Modification No. 3, approved on 20 February 2017;
 - Modification No. 6, approved on 21 December 2017; and
 - Modification No. 7, approved 24 May 2018.

JWA hereby certify that this VWMP has been prepared in accordance with the requirements of Condition C2 of Concept Plan Approval No. CP06_0318 (as modified) and generally in accordance with the requirements of Conditions 39, 40 and 42 of Major Project Approval No. MP08_0194 (as modified) for Kings Forest Stage 1.

1.4 Related Management Plans Prepared for the Kings Forest Site

Various management plans were completed for the Kings Forest Stage 1 Project Application and approved under Project Approval 08_0194. Subsequent to their approval, significant work has been completed on the site. Several of these management plans have therefore been amended (and others will need to be amended) as required by Condition 39 of MP 08_0194.

This VWMP should be read in conjunction with the following documents prepared for the Kings Forest development:

- Kings Forest Koala Plan of Management (KPoM) (JWA 2019);
- Kings Forest Wallum Sedge Frog Management Plan (WSFMP) (JWA 2020a);
- Kings Forest Precincts 6 - 14 Buffer Management Plan (BMP) (JWA 2020b);
- Kings Forest Precincts 6 - 11 Threatened Species Management Plan (TSMP) (JWA 2020c);
- Kings Forest Flora and Fauna Monitoring Report (FFMR) (JWA 2020d);
- Kings Forest Feral Animal Management Plan (FAMP) (JWA 2020e);
- Kings Forest Stage 1 Bushfire Risk Management Plan (BushfireSafe 2020);

- Kings Forest Koala Fire Management Plan (Wildsite 2020);
- Construction Environmental Management Plan (CEMP) (MUS 2020);
- Kings Forest Summary of Management Plans (SOMP) (G&S 2020a);
- Kings Forest Overall Water Management Plan (OWMP) (G&S 2020b); and
- Kings Forest Drainage Maintenance Management Plan (DMMP) (G&S 2020c).

APPENDIX 2 provides further details of these management plans and details of their relationship to the VWMP.

2 SITE DESCRIPTION

2.1 Location

Kings Forest is located on the far north coast of NSW in the Tweed local government area (LGA) approximately 20 km south of the Queensland/NSW border, 5 km north-west of the village of Bogangar and 4 km south-west of Kingscliff (**FIGURE 1**).

2.2 Subject Site

The Kings Forest site is comprised of fourteen (14) land parcels with a total area of 846 hectares:

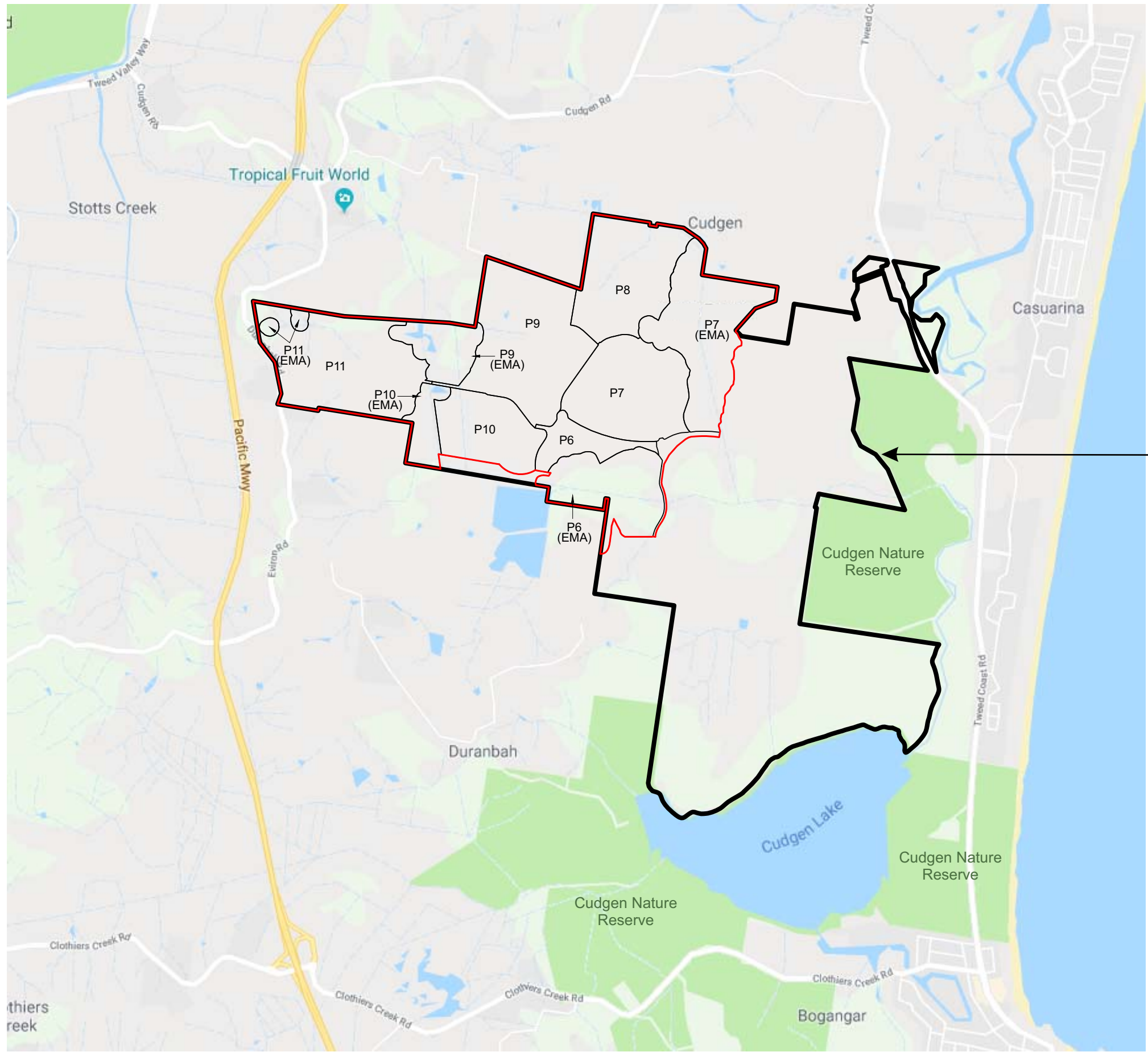
- Lot 76, 272, 323 and 326 in DP 755701;
- Lot 6 in DP 875446;
- Lot 2 in DP 819015;
- Lot 1 in DP 706497;
- Lot 40 in DP 7482;
- Lot 37A in DP 13727;
- Lot 38A in DP 13727;
- Lot 38B in DP 13727;
- Lot 1 in DP 129737;
- Lot 1 in DP 781633; and
- Lot 7 in DP 875447.

Project 28 Pty Ltd owns and manages the site which is currently used for cattle grazing and silviculture. The site consists of a mosaic of natural, partially natural, modified and regenerating plant communities including Heathland, Swamp sclerophyll (Paperbark) forest, Woodland, Pine plantation, Freshwater wetland and Pasture. The majority of the site is maintained as pasture for cattle grazing.

The Kings Forest site abuts agricultural and rural lands to the north, west and south west. Cudgen Nature Reserve (including Cudgen Lake and Cudgen Creek) abuts the site boundaries to the south and east. There are a small number of residential properties along Tweed Coast Road to the north of the site.

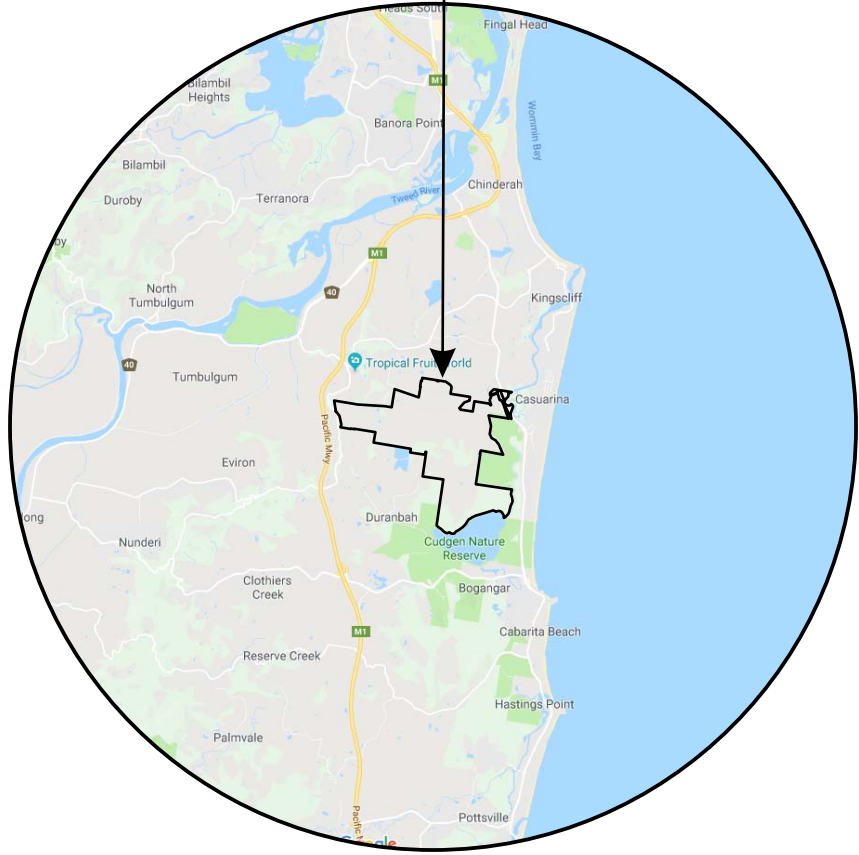
2.3 Conservation Reserves/Ecologically Significant Areas in the Locality

The Cudgen Nature Reserve adjoins the southern and (in part) eastern boundaries of the subject site (**FIGURE 2**). Stotts Island Nature Reserve is situated approximately 2 km to the north-west of the site.



LEGEND
[Red outline] Area Subject to this Management Plan
[Black outline] Kings Forest Boundary

SUBJECT SITE



0 750m
1 : 30 000

SOURCE: Google Maps
SCALE: 1 : 30 000 @ A3
JWA PTY LTD
Ecological Consultants

CLIENT
Project 28 Pty Ltd
PROJECT
Vegetation & Weed Management Plan
Precincts 6 - 11 Kings Forest
Melaleuca Drive, Duranbah, NSW
Shire of Tweed

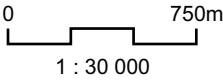
FIGURE 1
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DATE: 16 November 2020
FILE: N97017_Locality.cdr

TITLE
LOCALITY PLAN



LEGEND

- Cudgen Nature Reserve
- Area Subject to this Management Plan
- Kings Forest Boundary



SOURCE: NSW DPI Cadastre
Google Earth Apr 2017 Aerial
SCALE: 1 : 30 000 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Project 28 Pty Ltd
PROJECT
Vegetation & Weed Management Plan
Precincts 6 - 11 Kings Forest
Melaleuca Drive, Duranbah, NSW
Shire of Tweed

FIGURE 2

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FILE: N97017_Cudgen NR.cdr

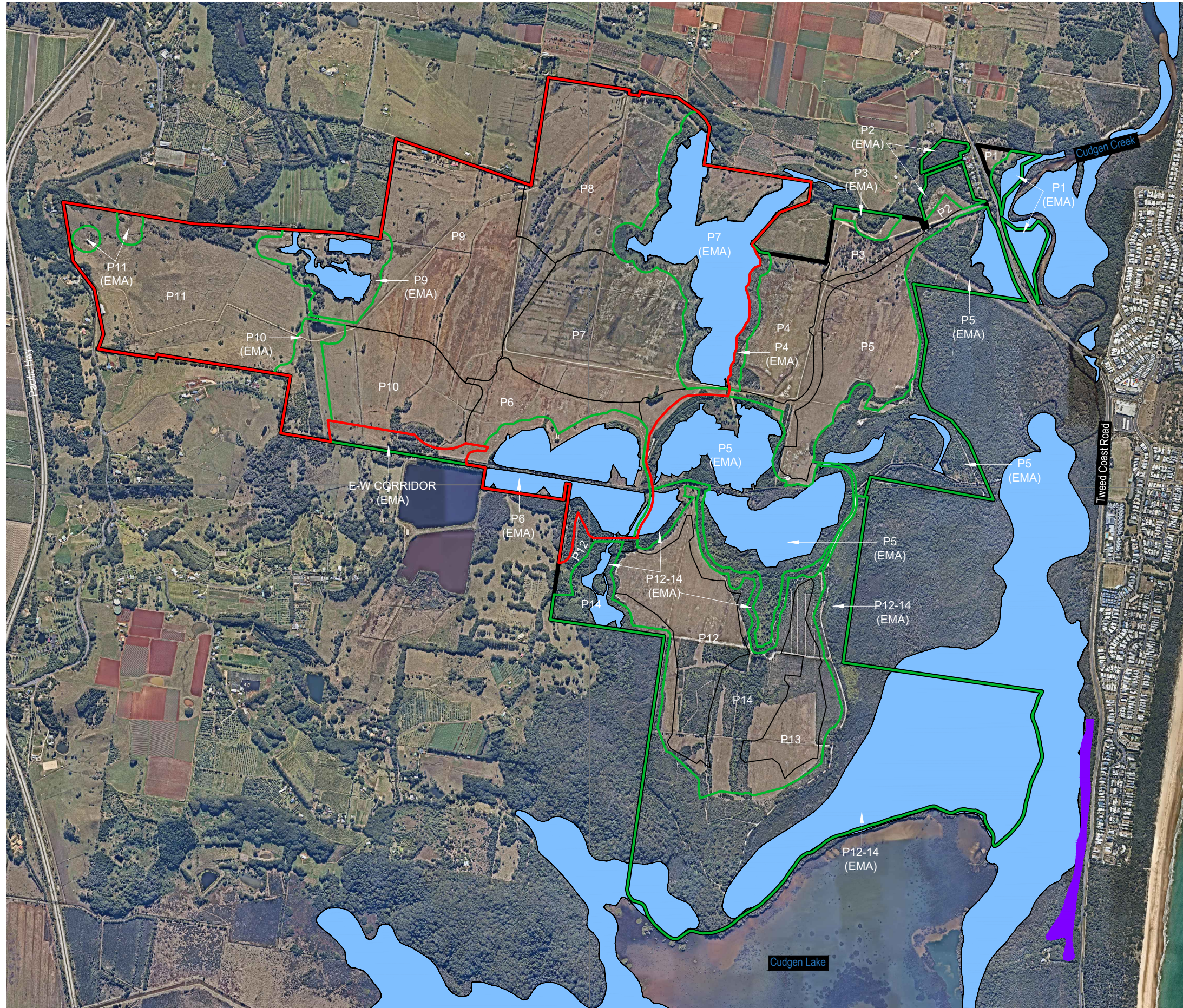
TITLE

**CUDGEN
NATURE
RESERVE**

Several Freshwater wetland and Littoral Rainforest areas protected under the (superseded) State Environmental Planning Policy (SEPP) 14 (Coastal Wetlands) and SEPP 26 (Littoral Rainforests) exist within and near the site (**FIGURE 3**). These SEPPs have been superseded by State Environmental Planning Policy (SEPP) Coastal Management (2018). Whilst there are areas of discrepancy between the superseded and current SEPP wetland mapping on site, the wetlands generally occur in areas zoned for Environmental Protection on the NSW Planning SEPP Major Development 2005 - Kings Forest land zoning map (**FIGURE 4**). As all relevant approvals were granted prior to the gazettal of the Coastal Management SEPP reference to this mapping has not been shown to avoid confusion.

2.4 Land Use Zones

Land use zones over the Kings Forest development site are identified on the NSW Planning SEPP Major Development 2005 - Kings Forest land zoning map (**FIGURE 4**). SEPP 14 wetland areas, as well as a number of smaller wetland and Littoral rainforest parcels have been designated Environmental Protection (Wetlands and Littoral Rainforests) (7a) zones. Substantial buffer zones occur wherever the 2(c) lands abut neighbouring agricultural land (150 metres) and Environmental Protection zones (50 metre). Lands in the far south of the property are subject to clause 50b of the Tweed LEP, committing them to conservation. Apart from other smaller areas of Environmental Protection (Habitat) (7I), the remainder of the property is zoned Urban Expansion (2c).

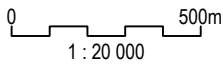


LEGEND

- SEPP 14 Coastal Wetlands (#1)
- SEPP 26 Littoral Rainforest (#1)
- Area Subject to this Management Plan
- Environmental Management Area (EMA) Boundary (#2)
- Precinct Boundary
- Kings Forest Boundary

Note 1:
These SEPP's have been superseded by State Environmental Planning Policy (SEPP) Coastal Management (2018). As all relevant approvals were granted prior to the gazettal of the Coastal Management SEPP, reference to the revised mapping has not been shown to avoid confusion.

Note 2:
To assist in identifying the staging of rehabilitation and management actions, EPZs and buffer areas have been associated with a relevant development precinct and are collectively titled as Environmental Management Areas (EMAs).



SOURCE: Landpartners - SEPP14 Wetlands (Amendment 15) & SEPP26 Littoral Rainforest; Near Map 08/08/18 Aerial

SCALE: 1 : 20 000 @ A3

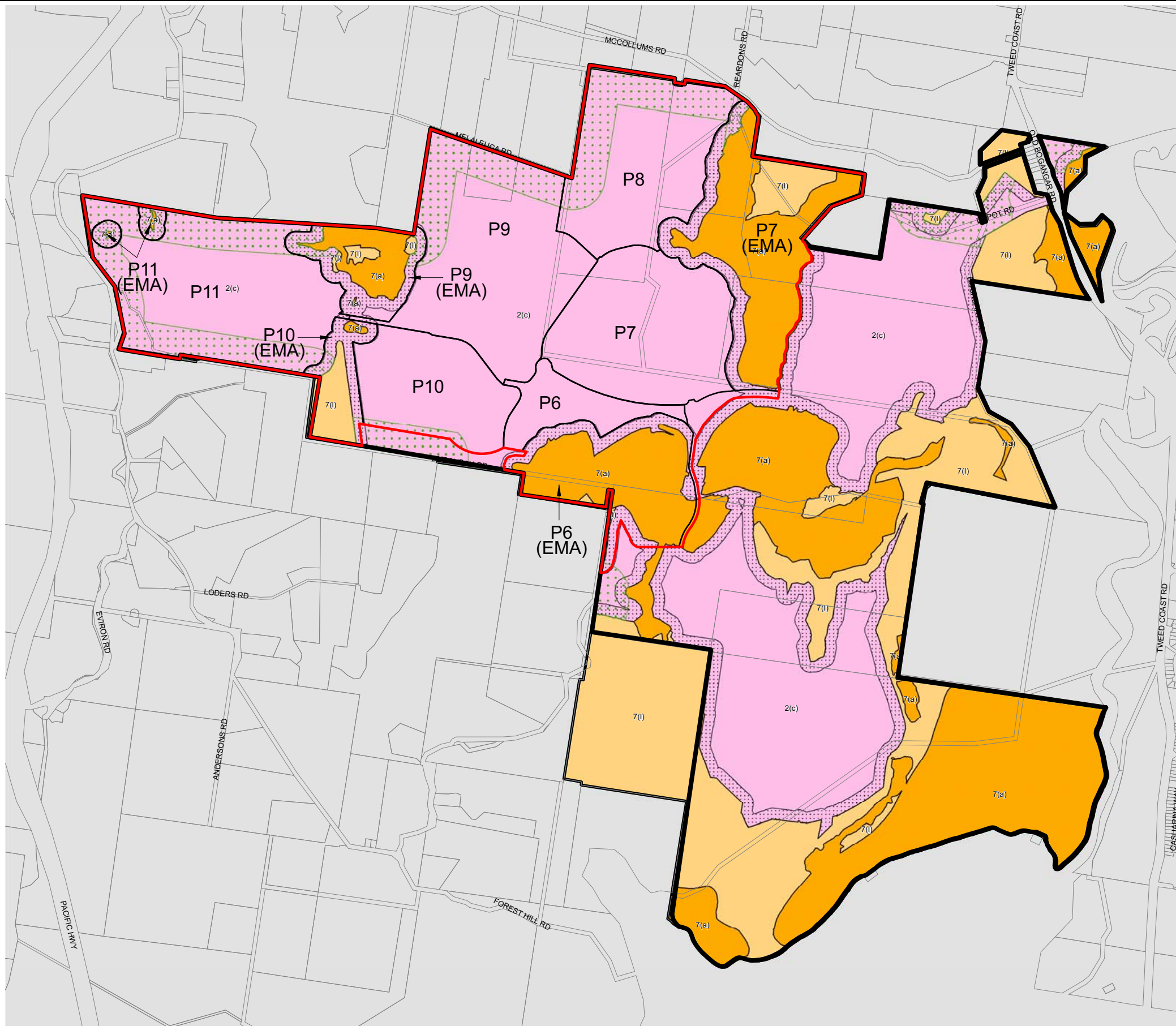
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Shire of Tweed

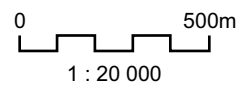
FIGURE 3

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TITLE
SEPP No. 14
COASTAL WETLANDS
& SEPP No. 26
LITTORAL RAINFOREST



- LEGEND**
- Area Subject to this Management Plan
 - Kings Forest Boundary
- ZONING**
- 2(c) Urban Expansion
 - 7(a) Environmental Protection (Wetlands & Littoral Rainforests)
 - 7(l) Environmental Protection (Habitat)
 - Agricultural Buffer (150m)
 - Ecological Buffer (50m)



SOURCE: NSW Planning SEPP (Major Development) 2005 - Kings Forest Land Zoning Map (Ref: SEPP_MD_KIF_LZN_001_20100201) SCALE: 1 : 20 000 @ A3 JWA PTY LTD Ecological Consultants	CLIENT Project 28 Pty Ltd PROJECT Vegetation & Weed Management Plan Precincts 6 - 11 Kings Forest Melaleuca Drive, Duranbah, NSW Shire of Tweed	FIGURE 4	TITLE ZONING PLAN
		PREPARED: BW DATE: 16 November 2020 FILE: N97017_Zoning.cdr	

3 PROPOSED DEVELOPMENT

3.1 Background

The Kings Forest project is a master planned residential community. The total area of the proposed development is 422.32 ha and will include the following in accordance with the Concept Plan Approval (as modified Mods 1 to 5):

- Residential development for approximately 4500 dwellings;
- Town centre and neighbourhood centre for future retail and commercial uses;
- Community and education facilities;
- Employment land;
- 18 hole Golf Course;
- Open space;
- Wildlife corridors;
- Protection and rehabilitation of environmentally sensitive land;
- Utility services infrastructure;
- Water management areas and lake; and
- Roads and pedestrian and bicycle paths.

The proposed development comprises a total of fourteen (14) separate precincts (**FIGURE 5**) and development of the site will be completed on a precinct-by-precinct basis.

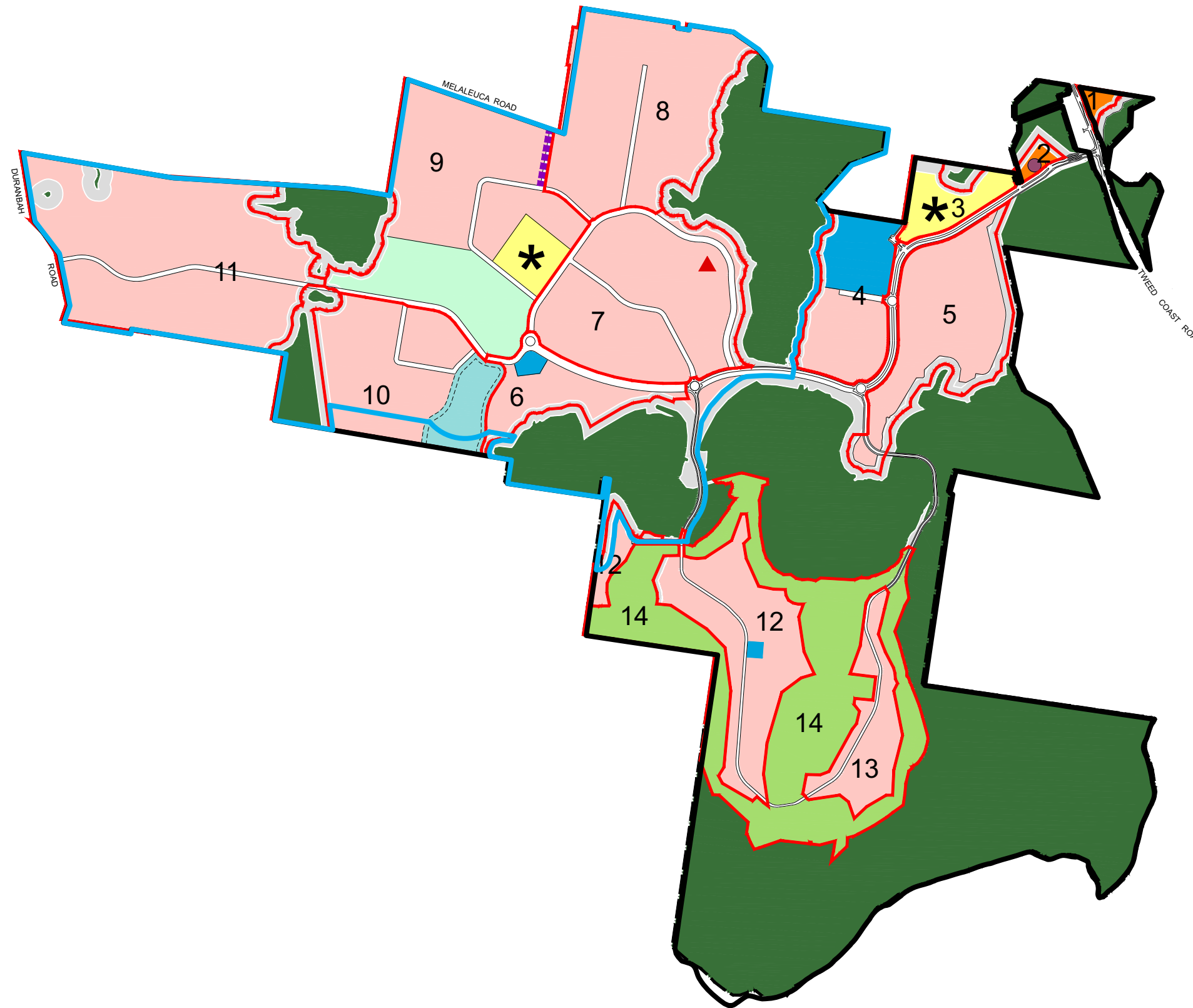
Retained vegetation and habitat areas across the site generally occur within Environmental Protection Zones (EPZs) and associated buffers. To assist in identifying the staging of rehabilitation and management actions, these EPZ and buffer areas have been associated with a relevant development precinct and are collectively titled as Environmental Management Areas (EMAs). Works within EMAs will be completed in accordance with the staging of the associated Precinct.

EMAs associated with Precincts 6 - 11 are the subject of this VWMP. Precincts 6 - 11 occur in the central and western portions of the Kings Forest development site.

3.2 Precinct Descriptions

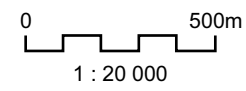
3.2.1 *Precinct 6*

Precinct 6 occurs in the central portion of the Kings Forest site at the western end of the proposed Kings Forest Parkway. A small area in the north of Precinct 6 is proposed to be developed as a Town/Neighbourhood Centre whilst the remainder of the precinct is proposed to be developed as a residential precinct. An EPZ and associated 50 m buffer zone occur to the south of Precinct 6 (collectively referred to as the Precinct 6 EMA) in which no development works are proposed. Works within the Precinct 6 EMA will include:



- LEGEND**
- Area Subject to this Management Plan
 - Precinct Boundary
 - Kings Forest Boundary
- PRECINCT PLAN**
- Town Centre / Neighbourhood Centre
 - Residential
 - Community Facilities / Education
 - Employment Land
 - Structured Open Space (Active)
(Passive open space to council standards, location subject to urban design)
 - Environmental Protection Area
 - 50m Ecological Buffer
(Includes APZs & roads where approved)
 - * State School Site
 - Proposed Zone Substation
(Subject to Country Energy final approval)
 - ▲ Potential Affordable Housing Location
 - Potential Road Connection to Melaleuca Road
 - Private Open Space
 - Golf Course Area
(Encompassing ecological buffers where indicated)
 - Private Open Space including lake

IMPORTANT NOTE
 This plan was prepared as a preliminary concept plan for planning purposes only. As such all particulars, including lot design, areas and densities, are subject to detailed survey, site investigations and to the requirements of council and any other authority which may have requirements under any relevant legislation.
 This note is an integral part of this plan.



SOURCE: RPS Precinct Plan Rev B dated 05/12/13 (Ref: 113691-PSP-4b(PRECINCT PLAN).dwg) SCALE: 1 : 20 000 @ A3 JWA PTY LTD Ecological Consultants	CLIENT Project 28 Pty Ltd PROJECT Vegetation & Weed Management Plan Precincts 6 - 11 Kings Forest Melaleuca Drive, Duranbah, NSW Shire of Tweed	FIGURE 5 PREPARED: BW DATE: 16 November 2020 FILE: N97017_Precinct Plan.cdr	TITLE PRECINCT PLAN
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- Protection and maintenance of retained vegetation in accordance with this VWMP and the following documents where applicable:
 - Kings Forest KPoM (JWA 2019) - Section 7.5; and
 - Kings Forest WSFMP (JWA 2020a) - Section 7.7.
- Regeneration/revegetation works (including compensatory koala and WSF habitat creation and regeneration/revegetation of heath and wetland communities) in accordance with this VWMP and the following documents where appropriate:
 - Kings Forest KPoM (JWA 2019) - Section 7.6; and
 - Kings Forest WSFMP (JWA 2020a) - Section 7.8.

3.2.2 Precinct 7

Precinct 7 is located in the central portion of the Kings Forest site, to the west of the northern SEPP wetland. Precinct 7 is proposed to be developed as a residential precinct. An EPZ and associated 50 m buffer zone occur to the east of Precinct 7 (containing the northern SEPP wetland and collectively referred to as the Precinct 7 EMA) within in which no development works are proposed. Works within the Precinct 7 EMA will include:

- Protection and maintenance of retained vegetation in accordance with this VWMP and the following documents where applicable:
 - Kings Forest KPoM (JWA 2019) - Section 7.5; and
 - Kings Forest WSFMP (JWA 2020a) - Section 7.7.
- Regeneration/revegetation works (including compensatory koala and WSF habitat creation and regeneration/revegetation of heath and wetland communities) in accordance with this VWMP and the following documents where appropriate:
 - Kings Forest KPoM (JWA 2019) - Section 7.6; and
 - Kings Forest WSFMP (JWA 2020a) - Section 7.8.

3.2.3 Precinct 8

Precinct 8 is located in the central northern portion of the Kings Forest site, to the west of the northern SEPP wetlands. Precinct 8 is proposed to be developed as a residential precinct. A large EPZ and associated 50 m buffer occurs to the east of Precinct 8 in which no development works are proposed. It is noted that the EPZ and associated 50 m ecological buffer to the east of Precinct 8 are included in the EMA associated with Precinct 7 (discussed above).

3.2.4 Precinct 9

Precinct 9 occurs in the north-western portion of the Kings Forest site. The northern portion of Precinct 9 is proposed to be developed as a residential precinct while the southern portion is proposed to be developed as a Community Facility/Education precinct and Structure Open Space (Active) area. An EPZ and associated 50 m buffer zone occur to the west of Precinct 9 (collectively referred to as the Precinct 9 EMA) in which no development works are proposed. Works within the Precinct 9 EMA will include:

- Protection and maintenance of retained vegetation in accordance with this VWMP and Section 7.5 of the Kings Forest KPoM (JWA 2019).
- Regeneration/revegetation works (including compensatory koala habitat creation and regeneration/revegetation of heath communities) in accordance with this VWMP and Section 7.6 of the Kings Forest KPoM (JWA 2019).

3.2.5 Precinct 10

Precinct 10 is located in the western portion of the Kings Forest site. The western portion of Precinct 10 is proposed to be developed as a residential precinct whilst the eastern portion will contain a Private Open Space area including a lake. An EPZ and associated 50 m buffer zone occur to the west of Precinct 10 (collectively referred to as the Precinct 10 EMA) in which no development works are proposed. Works within the Precinct 10 EMA will include:

- Protection and maintenance of retained vegetation in accordance with this VWMP and the Section 7.5 of the Kings Forest KPoM (JWA 2019).
- Regeneration/revegetation works (including compensatory koala habitat creation and regeneration/revegetation of heath communities) in accordance with this VWMP and Section 7.6 of the Kings Forest KPoM (JWA 2019).

It should be noted that an area to the immediate south of Precinct 10 has been allocated to the proposed East-West Corridor which will link the Precincts 6 and 10 EPZs and bolster movement/dispersal corridors in this portion of the Kings Forest site. The proposed East-West Corridor is designated as a koala compensatory habitat area. This area is outside the scope of this VWMP and is covered separately as part of the Precincts 1 - 5 VWMP (JWA 2020g).

3.2.6 Precinct 11

Precinct 11 occurs in the far west of the Kings Forest site and is proposed to be developed as a residential precinct. Two (2) small EPZs and associated 50 m buffer zones occur in the north west of the precinct (collectively referred to as the Precinct 11 EMAs) in which no development works are proposed. Works within the Precinct 11 EMA will include wetland regeneration/revegetation works in accordance with this VWMP.

3.3 Development Staging

The Kings Forest project will likely proceed over many years. The length of time will be dependent, to a certain degree, on the demand for land over time. The development of the site will be completed on a precinct-by-precinct basis in accordance with approved Precinct Plan (**FIGURE 5**), however this may be subject change. In relation to Precincts 6 - 11 (i.e. the subject of this VWMP), indicative staging is shown in **TABLE 1**.

TABLE 1
INDICATIVE DEVELOPMENT STAGING

Development Stage	Precinct
Stage 3	Precinct 6
Stage 4	Precinct 7
Stage 5	Precinct 8
Stage 6	Precinct 9
Stage 7	Precinct 10
Stage 8	Precinct 11

4 EXISTING SITE VALUES

4.1 Introduction

The following sections detail the existing ecological values contained within Precincts 6 - 11 and associated EMAs. An aerial photograph of these areas is shown in **FIGURE 6**.

4.2 Vegetation

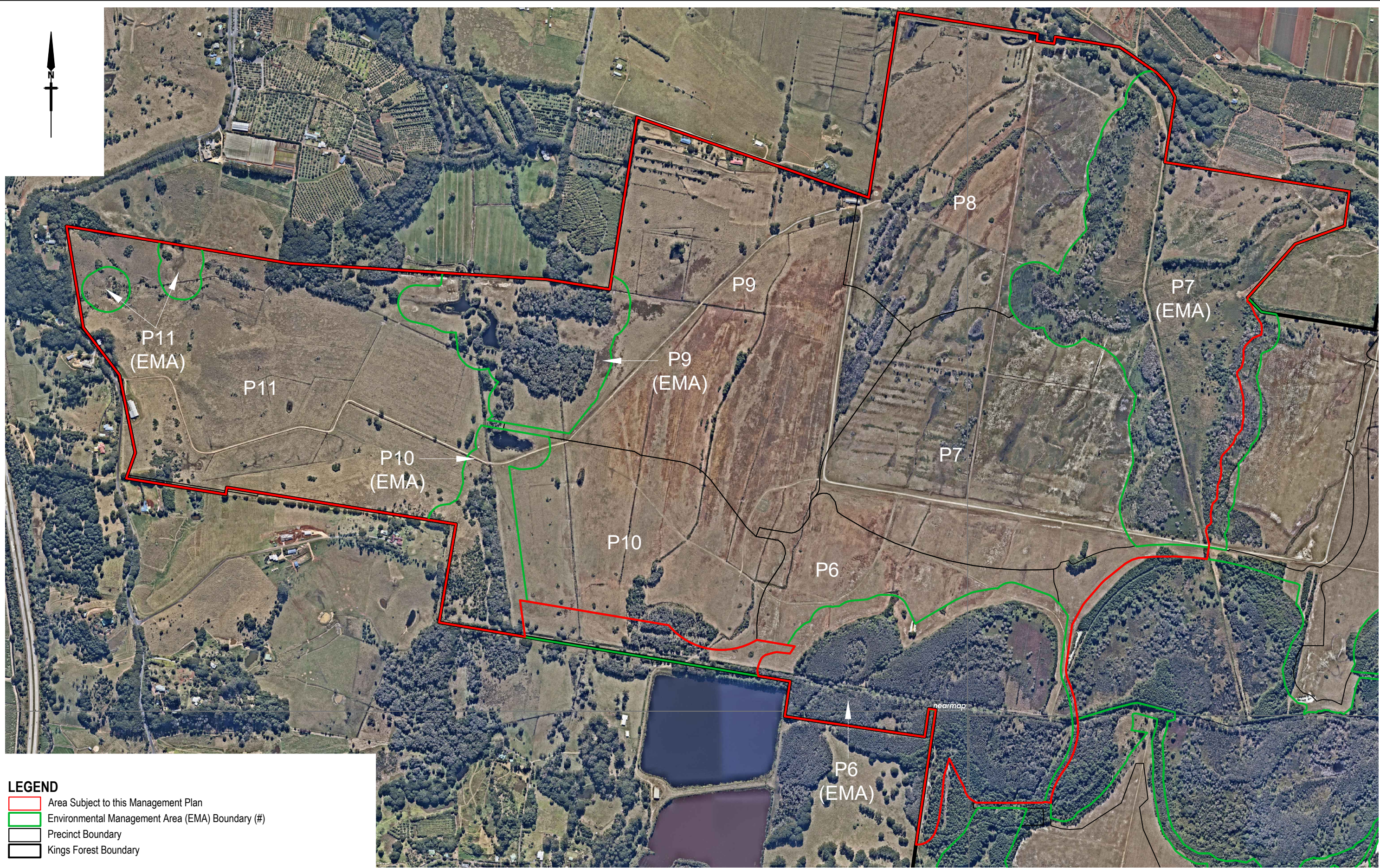
The Kings Forest site has a decades-long history of various land uses and land management practices, including pine plantation, sand mining, pasture improvement and turf production, dairy farming, small cropping and sugar cane production. It is presently used generally for cattle grazing. Over many years the land has been extensively cleared for these activities. There remain, however, large areas of undisturbed vegetation in the eastern and south-eastern portions of the property and within wetland areas throughout. These areas of the site are generally zoned for Environment Protection.

Vegetation on the site has been described in varying degrees of detail (Warren 2000, Kingston *et al.* 2004, Callaghan *et al.* 2005). The most comprehensive vegetation mapping over the Kings Forest site was completed by the Australian Koala Foundation (Callaghan *et al.* 2005). However, harvesting of areas of pine plantation, continued infestation of native vegetation with Slash pine (*Pinus elliottii*) wildings and areas of natural heath regeneration has occurred since the preparation of this map.

FIGURE 7 shows the vegetation communities occurring over Precincts 6 - 11 and associated EMAs (as at July 2019) and has been adapted from the Callaghan *et al.* (2005) mapping combined with detailed re-mapping/ground-truthing surveys completed by JWA between 2010 - 2019. In total, five (5) broad vegetation types have been mapped within Precincts 6 - 11 and associated EMAs:

- Highly modified vegetation communities;
- Freshwater wetlands;
- Heathland and shrublands;
- Swamp sclerophyll floodplain forests; and
- Rainforest.

Vegetation community descriptions in this VWMP, including proposed offset/compensatory habitat areas, are discussed in relation to their closest Plant Community Type (PCT) descriptions which were accessed via the Biodiversity and Conservation Division (BCD) (formerly OEH) of the Environment, Energy and Science Group in the NSW DPI&E database (i.e. the BioNet Vegetation Classification System). PCTs are classified based on vegetation types occurring within the Interim Biogeographic Regionalisation for Australia (IBRA) subregions, as developed by the Commonwealth government. The IBRA framework divides Australia landscapes into bioregions and subsequently subregions based on common features such as climate, geology, landform, and vegetation.



LEGEND

- Area Subject to this Management Plan
- Environmental Management Area (EMA) Boundary (#)
- Precinct Boundary
- Kings Forest Boundary

Note:
To assist in identifying the staging of rehabilitation and management actions, EPZs and buffer areas have been associated with a relevant development precinct and are collectively titled as Environmental Management Areas (EMAs).

SOURCE: Near Map 08/08/18 Aerial	CLIENT Project 28 Pty Ltd	FIGURE 6	TITLE AERIAL PHOTOGRAPH
SCALE: 1 : 10 000 @ A3	PROJECT Vegetation & Weed Management Plan Precincts 6- 11 Kings Forest Melaleuca Drive, Duranbah, NSW Shire of Tweed		
JWA PTY LTD Ecological Consultants		PREPARED: BW DATE: 16 November 2020 FILE: N97017_MP6-11_20201116.dwg	



#1 Note: To assist in identifying the staging of rehabilitation and management actions, EPZs and buffer areas have been associated with a relevant development precinct and are collectively titled as Environmental Management Areas (EMAs).

#2 Note: Vegetation mapping has been adapted from the Australian Koala Foundation (Callaghan *et al.* 2005) mapping combined with detailed re-mapping/ground-truthing surveys completed by JWA between 2010 - 2018.

LEGEND

- Area Subject to this Management Plan
- Environmental Management Area (EMA) Boundary (#1)
- Precinct Boundary
- Kings Forest Boundary
- VEGETATION COMMUNITIES (#2)**
- Community 1 - Highly Modified**
- 1(a) Substantially cleared of native vegetation
 - 1(b) Camphor laurel dominant closed forest (with rainforest species)
 - 1(e1) Exotic pine plantation
 - 1(e2) Exotic pine plantation (with heathland species)
 - 1(f) Exotic grassland dominated (with heathland species)
 - 1(g) Exotic grassland dominated (with regrowth Acacia & other native species)
 - 1(h) Exotic pines with sedgeland/rushland/fernland
 - 1(i) Exotic pines with swamp sclerophyll floodplain forest
- Community 2 - Freshwater Wetland**
- 2(a) Hillside seepage swamp (with *Eleocharis tetraquetra*) [PCT 1911, TVMS 701]
 - 2(b) Ponds & fringing wetland [PCT 1911, TVMS 701]
 - 2(c1) Sedgeland/rushland/fernland [PCT 1911, TVMS 701/702]
 - 2(c2) Sedgeland/rushland/fernland (with exotic pines) [PCT 1911, TVMS 701/702]
- Community 3 - Heathland & Shrubland**
- 3(d) Regenerating wet/dry coastal heathland to shrubland [PCT 1297, TVMS 501/5022]
 - 3(e) Regenerating wet/dry coastal heathland to shrubland (with exotic pines) [PCT 1297, TVMS 501/502]
- Community 4 - Swamp Sclerophyll Floodplain Forest**
- 4(b) Swamp mahogany open forest to woodland & heathland species [PCT 1230, TVMS 305]

- 4(e) Broad-leaved paperbark closed forest to woodland [PCT 1064, TVMS 401]
 - 4(f) Broad-leaved paperbark closed forest to woodland (with Scribbly gum) [PCT 1064, TVMS 401]
 - 4(g2) Broad-leaved paperbark closed forest to woodland (with rainforest species & camphor laurel) [PCT 1064, TVMS 401]
 - 4(h) Broad-leaved paperbark closed forest to woodland/Swamp mahogany open forest to woodland [PCT 1064, TVMS 403]
 - 4(j1) Regenerating Broad-leaved paperbark closed forest to woodland & heathland species [PCT 1064, TVMS 403]
- Community 6 - Rainforest**
- 6(b) Regenerating sub-tropical rainforest [PCT 1302, TVMS 102]
 - Open water

0 1 : 10 000 300m

SOURCE: JWA Site Investigations 2018;
Near Map 08/08/18 Aerial

SCALE: 1 : 10 000 @ A3

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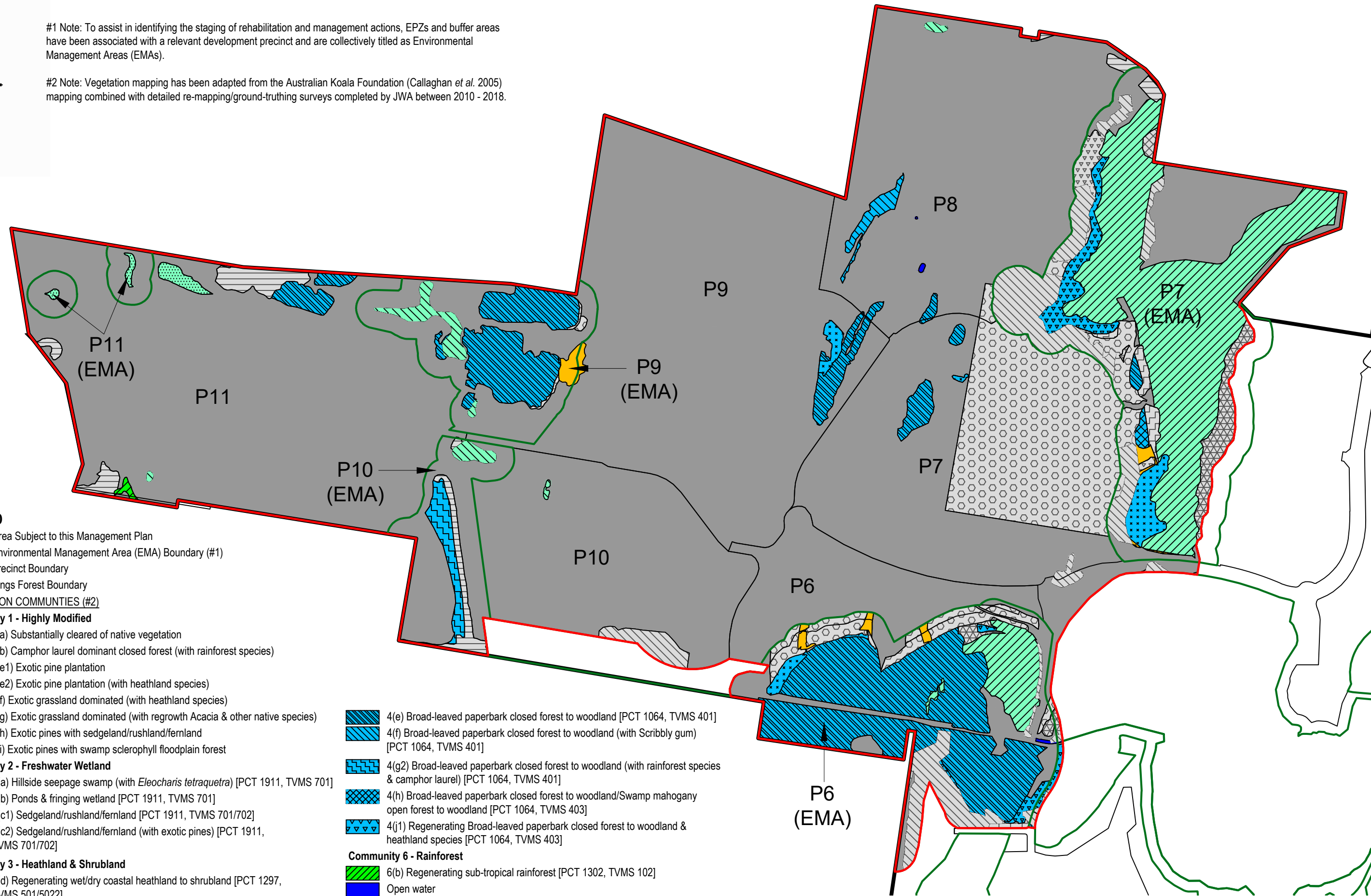
PROJECT
Vegetation & Weed Management Plan
Precincts 6- 11 Kings Forest
Melaleuca Drive, Duranbah, NSW
Shire of Tweed

FIGURE 7

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TITLE

VEGETATION
COMMUNITIES



It is noted however that PCT descriptions are still undergoing revision, and many remain undescribed for the SEQ03 - Burringbar-Conondale Ranges IBRA subregion. Therefore, corresponding Tweed Vegetation Management Strategy 2004 (TVMS) codes have also been provided.

4.3 Endangered Ecological Communities

Two (2) Endangered Ecological Communities (EECs) as defined by the NSW *Biodiversity Conservation Act 2016* (BC Act) have been mapped within Precincts 6 - 11 and associated EMAs (**FIGURE 8**):

- Freshwater wetlands on coastal floodplains of the NSW North Coast; and
- Swamp sclerophyll forest on coastal floodplains of the NSW North Coast.

4.4 Threatened Flora and Fauna

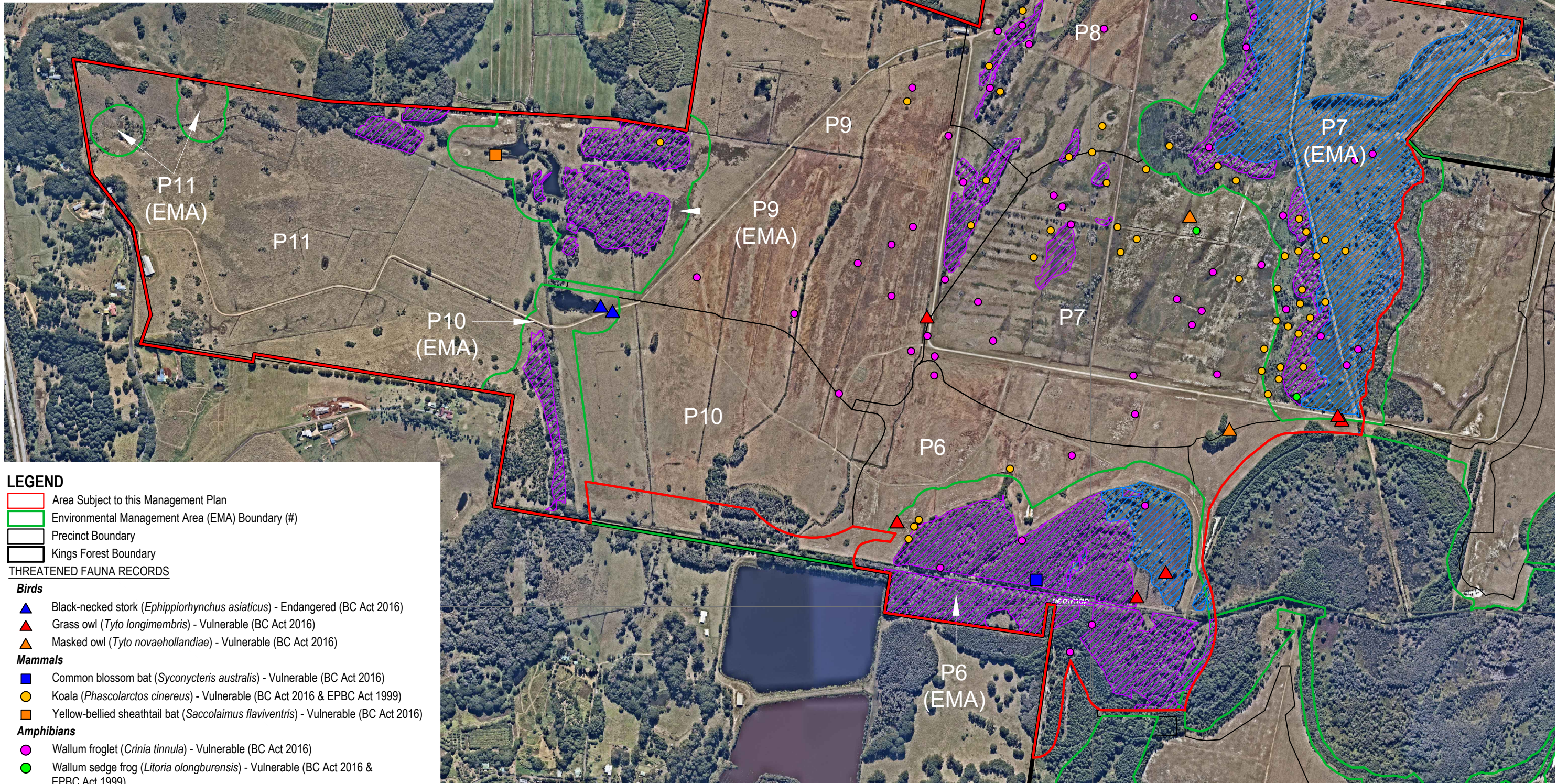
A number of threatened flora and fauna species have been recorded within Precincts 6 - 11 and associated EMAs over the last 30 years. These threatened species are listed in **TABLE 2** and their locations shown in **FIGURE 8**. The conservation status of each species listed in **TABLE 2** is shown in accordance with the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the NSW BC Act.

TABLE 2
THREATENED SPECIES RECORDED WITHIN PRECINCTS 6-11 AND ASSOCIATED EMAS

Scientific Name	Common Name	BC Act*	EPBC Act#
Threatened fauna species			
<i>Ephippiorhynchus asiaticus</i>	Black-necked stork	E	-
<i>Syconycteris australis</i>	Common blossom bat	V	-
<i>Falsistrellus tasmaniensis</i>	Eastern false pipistrelle**	V	-
<i>Calyptorhynchus lathami</i>	Glossy-black cockatoo	V	-
<i>Tyto longimembris</i>	Grass owl	V	-
<i>Pteropus poliocephalus</i>	Grey-headed flying fox**	V	V
<i>Phascolarctos cinereus</i> [^]	Koala	V	V
<i>Miniopterus australis</i>	Little bent-wing bat**	V	-
<i>Tyto novaehollandiae</i>	Masked owl	V	-
<i>Ptilinopus regina</i>	Rose-crowned fruit-dove**	V	-
<i>Myotis macropus</i>	Southern myotis**	V	-
<i>Crinia tinnula</i>	Wallum froglet	V	-
<i>Litoria olongburensis</i>	Wallum sedge frog	V	V
<i>Saccolaimus flaviventris</i>	Yellow-bellied sheath-tail bat	V	-
* E - Endangered and V - Vulnerable as listed within schedules of the NSW BC Act (2016).			
# E - Endangered and V - Vulnerable as listed within schedules of the Commonwealth EPBC Act (1999).			



Note:
To assist in identifying the staging of rehabilitation and management actions,
EPZs and buffer areas have been associated with a relevant development
precinct and are collectively titled as Environmental Management Areas (EMAs).



LEGEND

- Area Subject to this Management Plan
- Environmental Management Area (EMA) Boundary (#)
- Precinct Boundary
- Kings Forest Boundary

THREATENED FAUNA RECORDS

Birds

- Black-necked stork (*Ephippiorhynchus asiaticus*) - Endangered (BC Act 2016)
- Grass owl (*Tyto longimembris*) - Vulnerable (BC Act 2016)
- Masked owl (*Tyto novaehollandiae*) - Vulnerable (BC Act 2016)

Mammals

- Common blossom bat (*Syconycteris australis*) - Vulnerable (BC Act 2016)
- Koala (*Phascolarctos cinereus*) - Vulnerable (BC Act 2016 & EPBC Act 1999)
- Yellow-bellied sheath-tail bat (*Saccolaimus flaviventris*) - Vulnerable (BC Act 2016)

Amphibians

- Wallum froglet (*Crinia tinnula*) - Vulnerable (BC Act 2016)
- Wallum sedge frog (*Litoria olongburensis*) - Vulnerable (BC Act 2016 & EPBC Act 1999)

ENDANGERED ECOLOGICAL COMMUNITIES

- Freshwater wetlands on coastal floodplains of the NSW North Coast
- Swamp sclerophyll forest on coastal floodplains of the NSW North Coast

0 300m
1 : 10 000

SOURCE: JWA Site Investigations;
Landpartners Revised TSMP & VMP (July
2009); Near Map 08/08/18 Aerial

SCALE: 1 : 10 000 @ A3

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FIGURE 8

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TITLE
THREATENED
FLORA & FAUNA RECORDS
& ENDANGERED
ECOLOGICAL
COMMUNITIES

Scientific Name	Common Name	BC Act*	EPBC Act#
** These species are highly mobile and were generally recorded foraging opportunistically over the site and are not included in FIGURE 8. ^ The koala (combined population in Queensland, New South Wales and the Australian Capital Territory) is listed as a vulnerable species within schedules of the Commonwealth <i>EPBC Act</i> (1999). The koala, between the Tweed and Brunswick Rivers east of the Pacific Highway, is listed as an endangered population within schedules of the <i>NSW BC Act</i> (2016).			

4.5 Weed Assessment

4.5.1 Introduction

Kings Forest has a long history of varied land uses. Disturbance to the natural ecosystems and vegetation communities has resulted in the introduction of a variety of exotic species.

Site surveys indicate that the primary weed species on the Kings Forest site is Slash pine (*Pinus elliottii*), with large areas of recruitment originating from historical pine plantations. Other environmental weeds of note include Camphor laurel (*Cinnamomum camphora*), Lantana (*Lantana camara*), Pampas grass (*Cortaderia selloana*), Blackberry nightshade (*Solanum nigrum*) and Bitou bush (*Chrysanthemoides monilifera*).

4.5.2 Weed Mapping

Areas of weed invasion on the Kings Forest site were originally mapped by LandPartners (2009) in the Revised Weed Management Plan which accompanied the Concept Plan Application. Mapping was limited to species considered particularly invasive and therefore a priority for control (e.g. Madeira Vine, Pampas grass, Para grass), or where species occurred over a sufficient area to enable broad scale mapping (notably Slash pine and areas of exotic grass).

Mapped weed infestations within Precincts 6 - 11 and associated EMAs were ground-truthed during the preparation of this VWMP. Due to the large vegetated areas within the EMAs not all areas of vegetation were investigated, however particular attention was paid to ecological buffers (i.e. edges of vegetation to be retained).

The results of weed mapping within Precincts 6 - 11 and associated EMAs are shown in **FIGURE 9**. The locations of threatened flora have also been included in the figure to provide an indication of threats to these species.

4.5.3 Weed Species

Various weed species occur on the Kings Forest site however Slash pine is the most common. Slash pine was originally grown as a forestry species but has become naturalised in some areas of the site. Characteristics such as wind pollination and seed dispersal have enabled the species to invade native vegetation communities. Wildlings range in height from 30 cm to 20 m.

The highly invasive vine species Madeira vine (*Anredera cordifolia*) was recorded in one area of degraded land in the north of the Kings Forest site (Precinct 8). Although this is within the development footprint and relatively contained, the presence of this species is of concern due



LEGEND

- Area Subject to this Management Plan
- Environmental Management Area (EMA) Boundary (#)
- Precinct Boundary
- Kings Forest Boundary

WEED INFESTATIONS

- Coral tree
- Madeira vine
- Pampas grass
- Para grass
- Exotic grasses (Whisky grass, Setaria)
- Slash pine

Note:
To assist in identifying the staging of rehabilitation and management actions, EPZs and buffer areas have been associated with a relevant development precinct and are collectively titled as Environmental Management Areas (EMAs).

0 1 : 10 000 300m

SOURCE: JWA Site Investigations 2018-2020;
Landpartners Revised WMP (July 2009);
Near Map 08/08/18 Aerial
SCALE: 1 : 10 000 @ A3

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Shire of Tweed

FIGURE 9

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TITLE

WEED
INFESTATIONS

to the possibility of spread to areas of good quality vegetation on the site by mechanical means (earthworks, slashing etc).

Para grass (*Brachiaria mutica*) is known to occur along the central (east-west) drain and the northern edges of SEPP 14 wetland within the Precinct 6 EMA. Pampas grass also occurs sparingly in this area. Lantana (*Lantana camara*) occurs sporadically within native vegetation communities, particularly on the edges and along tracks.

A complete list of the environmental weeds present on the site has been compiled and is provided in **TABLE 3. APPENDIX 3** lists control methods for each identified weed species.

TABLE 3
IDENTIFIED ENVIRONMENTAL WEEDS AT KINGS FOREST

Common Name	Botanical Name
Balloon Cotton Bush	<i>Gomphocarpus physocarpus</i>
Barner Grass	<i>Pennisetum purpureum</i>
Billygoat Weed	<i>Ageratina houstonianum</i>
Bird of Paradise	<i>Strelitzia</i> sp.
Bitou Bush	<i>Chrysanthemoides monilifera</i>
Blackberry Nightshade	<i>Solanum nigrum</i>
Broad-leaved Paspalum	<i>Paspalum dilatatum</i>
Camphor Laurel	<i>Cinnamomum camphora</i>
Canna Lily	<i>Canna indica</i>
Castor Oil Plant	<i>Ricinus communis</i>
Cherry Guava	<i>Psidium cattleianum</i>
Chinese Burr	<i>Triumfetta rhomboidea</i>
Chinese Elm	<i>Celtis sinensis</i>
Coastal Morning Glory	<i>Ipomoea cairica</i>
Cocos Palm	<i>Syagrus romanzoffianum</i>
Common Carpet Grass	<i>Axonopus affinis</i>
Coral Tree	<i>Erythrina sykesii</i>
Corky Passionfruit	<i>Passiflora suberosa</i>
Crofton Weed	<i>Ageratina adenophora</i>
Cuphea	<i>Cuphea carthagenensis</i>
Duranta	<i>Duranta repens</i>
Edible Passionfruit	<i>Passiflora edulis</i>
Exotic Clerodendron	<i>Clerodendron</i> sp.
Fireweed	<i>Senecio madagascariensis</i>
Fishbone Fern	<i>Nephrolepis cordifolia</i>
Fleabane	<i>Conyza</i> sp.
Giant Devil's Thorn	<i>Solanum chrysotrichum</i>
Glory Lily	<i>Gloriosa superba</i>
Happy Plant	<i>Dracaena</i> sp.
Inkweed	<i>Phytolacca octandra</i>
Lantana	<i>Lantana camara</i>
Lemon-scented Teatree	<i>Leptospermum petersonii</i>

Common Name	Botanical Name
Madeira Vine	<i>Anredera cordifolia</i>
Molasses Grass	<i>Melinis minutiflora</i>
Monstera	<i>Monstera deliciosa</i>
Morning Glory	<i>Ipomoea purpurea</i>
Moth Vine	<i>Araujia sericiflora</i>
Mother-in-law's Tongue	<i>Sansevieria trifasciata</i>
Ochna	<i>Ochna serrulata</i>
Paddy's Lucerne	<i>Sida rhombifolia</i>
Pampas Grass	<i>Cortaderia jubata</i>
Para Grass	<i>Brachiaria mutica</i>
Paspalum	<i>Paspalum</i> sp.
Perennial Soybean	<i>Neonotonia wightii</i>
Pigeon Grass	<i>Setaria sphacelata</i>
Poor Man's Orchid	<i>Epidendrum</i> sp.
Redhead Cotton Bush	<i>Asclepias curassavica</i>
Red Natal Grass	<i>Melinis repens</i>
Rhodes Grass	<i>Chloris gayana</i>
Scotch Thistle	<i>Onopordum acanthium</i>
Scrobic	<i>Paspalum scrobiculatum</i>
Slash Pine	<i>Pinus elliottii</i>
Siratro	<i>Macroptilium atropurpureum</i>
Small-leaved Privet	<i>Ligustrum sinense</i>
Thickhead	<i>Crassocephalum crepidioides</i>
Umbrella Tree	<i>Schefflera actinophylla</i>
Whiskey Grass	<i>Andropogon virginicus</i>
White Passionfruit	<i>Passiflora subpeltata</i>
Wild Tobacco	<i>Solanum mauritianum</i>
Winter Senna	<i>Senna pendula</i> var. <i>glabrata</i>

5 MANAGEMENT ZONES

5.1 Identification of Management Zones

The Kings Forest site has been divided into nine (9) zones based on the management intent for each area. These management zones are:

- Zone 1 - Construction zone;
- Zone 2 - Retained koala habitat;
- Zone 3 - Retained wallum sedge frog (WSF) habitat;
- Zone 4 - Koala compensatory habitat;
- Zone 5 - WSF compensatory habitat;
- Zone 6 - Heath regeneration/revegetation;
- Zone 7 - Littoral rainforest regeneration/revegetation (Precinct 1);
- Zone 8 - Wetland regeneration; and
- Zone 9 - Residual lands e.g. tracks and easements.

FIGURE 10 shows the location of management zones applicable to this VWMP. A brief description of each management zone and details of the proposed management intent is provided in the sections below. Specific management actions for each zone are addressed in **SECTION 6**. Monitoring and reporting requirements are detailed in **SECTION 8**.

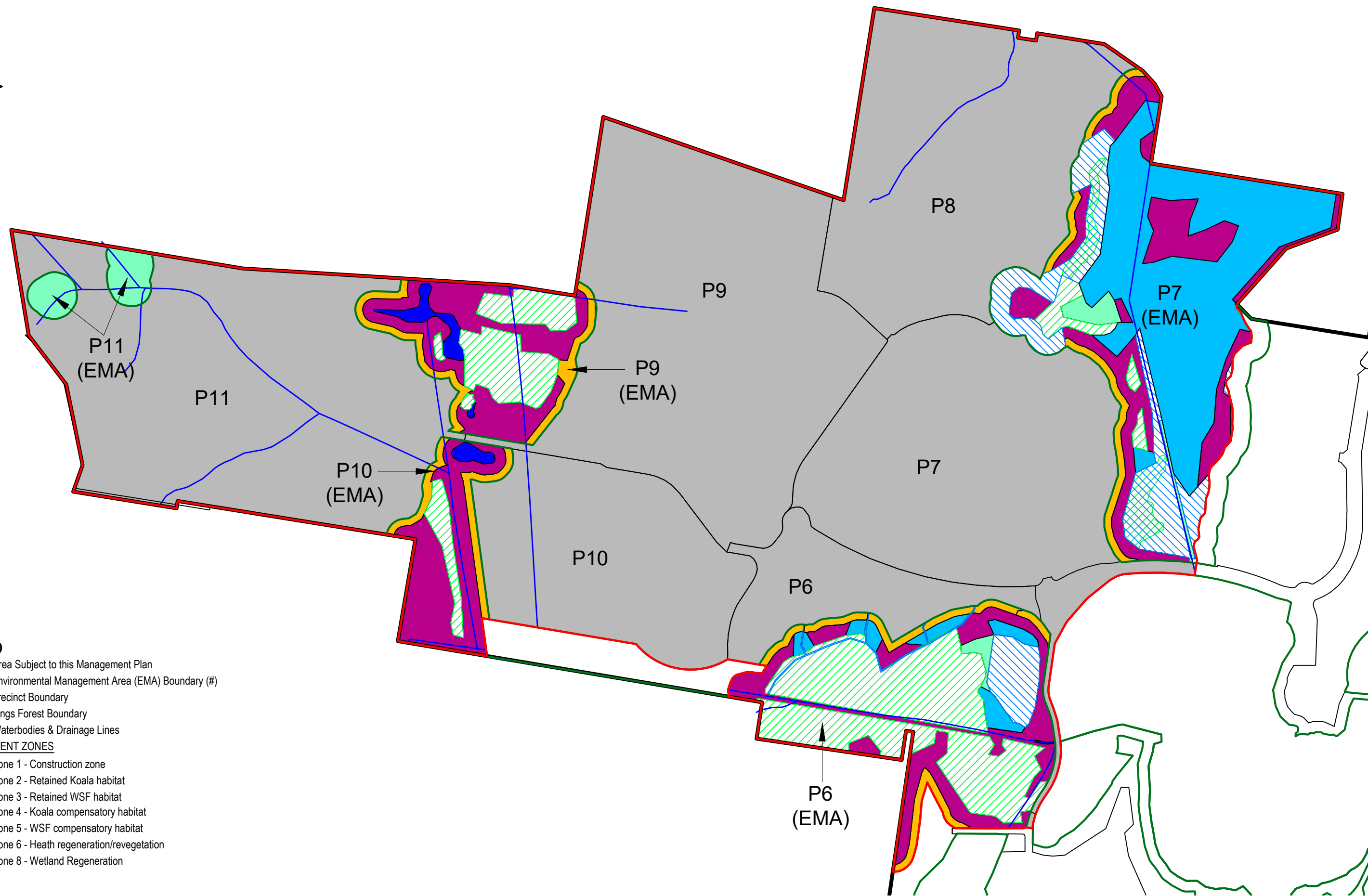
5.2 Zone 1 - Construction Zone

The construction zone consists of the development footprint of Precincts 6 - 11 (**FIGURE 10**). The management intent of this zone is:

- To remove all existing vegetation within the Construction Zone (consistent with the conditions of approval) prior to bulk earthworks and disposal of cleared vegetation in an environmentally responsible manner;
- To undertake vegetation removal operations in a manner that provides maximum protection of the health and livelihood of native fauna;
- To limit human impacts on retained and compensatory habitat, threatened flora and fauna species or ecological communities; and
- To remove all noxious and environmental weeds in a manner that is environmentally sustainable.

5.3 Zone 2 - Retained Koala Habitat

Management Zone 2 consists of existing koala habitat to be retained within the Precincts 6 - 11 EMAs in accordance with the KPOM (JWA 2019) (**FIGURE 10**). The management intent of this zone is:



LEGEND

- Area Subject to this Management Plan
- Environmental Management Area (EMA) Boundary (#)
- Precinct Boundary
- Kings Forest Boundary
- Waterbodies & Drainage Lines

MANAGEMENT ZONES

- Zone 1 - Construction zone
- Zone 2 - Retained Koala habitat
- Zone 3 - Retained WSF habitat
- Zone 4 - Koala compensatory habitat
- Zone 5 - WSF compensatory habitat
- Zone 6 - Heath regeneration/revegetation
- Zone 8 - Wetland Regeneration

Note:
To assist in identifying the staging of rehabilitation and management actions,
EPZs and buffer areas have been associated with a relevant development
precinct and are collectively titled as Environmental Management Areas (EMAs).

0 300m
1 : 10 000

SOURCE: JWA Site Investigations 2018,
Near Map 08/08/18 Aerial

SCALE: 1 : 10 000 @ A3

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FIGURE 10

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TITLE

MANAGEMENT
ZONES

- To protect, restore (through assisted natural regeneration) and provide for the ongoing maintenance of retained koala habitat;
- To limit human impacts on retained koala habitat; and
- To remove all noxious and environmental weeds in a manner that is environmentally sustainable.

5.4 Zone 3 - Retained WSF Habitat

Management Zone 3 consists of existing WSF habitat to be retained within the Precincts 6 - 11 EMAs in accordance with the WSFMP (JWA 2020a) (**FIGURE 10**). The management intent of this zone is:

- To protect, restore (through assisted natural regeneration) and provide for ongoing maintenance of retained WSF habitat;
- To limit human impacts on retained WSF habitat;
- To remove all noxious and environmental weeds in a manner that is environmentally sustainable; and
- To ensure the ongoing protection of water quality within retained WSF habitat.

5.5 Zone 4 - Koala Compensatory Habitat

Management Zone 4 consists of koala compensatory habitat areas within Precincts 6 - 11 EMAs in accordance with the KPoM (JWA 2019) (**FIGURE 10**). The management intent of this zone is:

- To create additional koala habitat through assisted regeneration and revegetation works;
- To limit human impacts on future koala habitat; and
- To remove all noxious and environmental weeds in a manner that is environmentally sustainable.

5.6 Zone 5 - WSF Compensatory Habitat

Management Zone 5 consists of WSF compensatory habitat areas within Precincts 6 - 11 EMAs in accordance with the WSFMP (JWA 2020a) (**FIGURE 10**). The management intent of this zone is:

- To create additional WSF habitat through assisted regeneration and revegetation works;
- To limit human impacts on future WSF habitat; and
- To remove all noxious and environmental weeds in a manner that is environmentally sustainable.

5.7 Zone 6 - Heath Regeneration/Revegetation

Management Zone 6 consists of heath regeneration areas within the Precincts 6 - 11 EMAs in accordance with this VWMP (**FIGURE 10**). The management intent of this zone is:

- To protect and provide for ongoing maintenance of retained heath;
- To restore existing heath areas through assisted natural regeneration works;
- Revegetation utilising heath species and including re-use of topsoil (where appropriate) likely to contain a suitable seedbank;
- To limit human impacts on retained and restored heath areas; and
- To remove all noxious and environmental weeds in a manner that is environmentally sustainable.

5.8 Zone 7 - Littoral Rainforest Regeneration/Revegetation

Management Zone 7 consists of a littoral rainforest regeneration and revegetation area within the Precinct 1 EMA. The management intent of this zone is:

- To protect, restore (through assisted natural regeneration) and provide for ongoing maintenance of retained littoral rainforest;
- To create additional littoral rainforest areas through assisted regeneration and revegetation works;
- To limit human impacts on retained and future littoral rainforest areas; and
- To remove all noxious and environmental weeds in a manner that is environmentally sustainable.

There are no areas designated as Management Zone 7 within Precincts 6 - 11.

5.9 Zone 8 - Wetland Regeneration

Management Zone 8 consists of areas of wetland vegetation to be retained and restored within Precincts 6 - 11 EMAs in accordance with this VWMP (**FIGURE 10**). The management intent of this zone is:

- To protect, restore (through assisted natural regeneration) and provide for ongoing maintenance of retained wetlands;
- To limit human impacts on retained wetlands;
- To remove all noxious and environmental weeds in a manner that is environmentally sustainable; and
- To ensure the ongoing protection of water quality within retained wetlands.

5.10 Zone 9 - Residual Lands

Management Zone 9 consists of residual lands including fire trails and power line easements. The management intent of this zone is:

- To maintain the areas in a serviceable condition for their intended purpose; and
- To remove all noxious and environmental weeds in a manner that is environmentally sustainable.

There are no areas designated as Management Zone 9 within Precincts 6 - 11.

6 MANAGEMENT STRATEGIES

6.1 Introduction

The following sections detail the management strategies to be implemented as part of this VWMP and include:

- Education of site personnel;
- Construction phase management measures;
- Pre-clearing fauna trapping and fauna spotter catcher;
- Exclusion fencing and other infrastructure;
- Re-use of topsoil;
- Management of retained vegetation;
- Weed management;
- Regeneration and revegetation;
- Transfer of land to public ownership;
- Fire management;
- Bond for environmental restoration and maintenance works;
- Environmental and Community Liaison Officer(s); and
- Adaptive management.

These management strategies are apportioned to pre-construction, construction and operational phases of the development in the Implementation Schedules (**SECTION 9**). The applicable management zones for each specific management strategy are outlined in **TABLE 4**.

TABLE 4
MANAGEMENT STRATEGIES

Section	Management Strategy	Applicable Management Zone
6.2	Education of site personnel	1
6.3	Construction phase management measures	All
6.4	Pre-clearing fauna trapping and fauna spotter catcher	1
6.5	Exclusion fencing and other infrastructure	All
6.6	Re-use of topsoil	1 and 6
6.7	Management of retained vegetation	2 - 8
6.8	Weed management	All
6.9	Regeneration and revegetation	2 - 8
6.10	Transfer of land to public ownership	2 - 8
6.11	Fire management	All
6.12	Bond for environmental restoration and maintenance works	2 - 8

Section	Management Strategy	Applicable Management Zone
6.13	Environmental and Community Liaison Officer(s)	All
6.14	Adaptive management	All

The Kings Forest KPOM (JWA 2019) and WSFMP (JWA 2020a) have been prepared outlining specific and detailed management procedures for the protection of koalas and wallum sedge frogs, respectively.

In addition a Precincts 6 - 11 TSMP (JWA 2020c) has been prepared outlining specific and detailed management procedures for the protection of EEC and all other Threatened flora and fauna species which have been known or predicted to occur within Precincts 6 - 11 and associated EMAs.

6.2 Education of Site Personnel

A key action to be implemented in accordance with the approved Kings Forest KPOM (JWA 2019, Section 7.2.1) is the development of a construction personnel induction program. The program shall be developed by the Proponent and in addition to koala related issues, should highlight the significance of threatened species and EEC's on the site and include a discussion of the management requirements for native vegetation and fauna, threatened species, feral animals and weeds.

The induction program is to be approved by a suitably qualified person prior to construction commencing and all construction personnel, and any other persons/contractors completing works within or adjacent to Precincts 6 - 11 and associated EMAs need to complete the induction prior to starting work on the site.

The general induction of all construction personnel will aim to ensure the awareness of environmental-related issues and of responsibilities and procedures in relation thereto, covering such matters as:

- Areas of the site in which significant threatened species (including koalas and wallum sedge frogs) are most likely to be encountered;
- Areas of the site in which significant vegetation will be encountered;
- Threats to threatened species, vegetation and fauna associated with construction activities;
- Requirement to report any incidents, and actions required;
- Requirement to report *any* koala sightings or incidents on or near the site, and actions required;
- Prohibition on construction personnel bringing dogs onto the site;
- Requirement to report any evidence of feral animals, particularly dogs within buffers (sightings, footprints, droppings);

- Requirements of the Precincts 6 - 11 VWMP and TSMP - particularly protocols for vegetation clearing and measures to protect native vegetation and fauna; and
- Requirements of the Kings Forest KPOM and WSFMP.

Specific detail in relation to education protocols will be located in the Kings Forest Construction and Environment Management Plan (CEMP).

6.3 Construction Phase Management Measures

The following vegetation protection strategies will be implemented during the construction phase of the development.

1. All areas to be cleared and retained will be identified on construction plans and in the field prior to the commencement of clearing. No clearing shall occur outside nominated clearing zones.
2. Within the EMAs the following activities will not be permitted:
 - Storage and mixing of materials;
 - Vehicle parking;
 - Liquid disposal;
 - Machinery repairs and/or refuelling;
 - Construction site office or shed;
 - Combustion of any material;
 - Stockpiling of soil, rubble and debris, cleared vegetation and site mulch;
 - Any filling or excavation including trench line, topsoil skimming and/or surface excavation (with the exception of where necessary for the installation of exclusions fencing); and
 - Unauthorised pesticide, herbicide or chemical applications.
3. All activities in an area adjacent to any retained tree or area are to be carried out in such a manner as to minimise any damage to trees. Trees to be removed will be felled in a direction away from trees to be retained. Where an individual tree to be retained may be impacted by the removal of another tree located at close proximity, the roots of the tree to be disturbed (and the tree to be retained, where required) are to be severed cleanly by a qualified Arborist. All roots are to be exposed first and then cut cleanly with a sharp saw or loppers.
4. Site works shall occur in the following sequence; cutting, shearing of felled vegetation and tub grinding. Where vegetation is cleared or removed, vegetation waste shall be mulched and retained on site for re-use in landscape works. Each area is to be mulched immediately upon completion of clearing and grubbing works. Any vegetation not suitable for mulching (i.e. fertile material from weed species) will not be mulched and will be transported to an appropriate facility.
5. Hollow logs shall not be mulched. If any hollow logs are located on site, they will be relocated to areas proposed for rehabilitation works.

6. Erosion and sedimentation control fencing is to be provided on site in accordance with the Erosion and Sediment Control Plan (G&S 2020d). This will prevent the movement of sediment into ecologically sensitive areas as well prevent the dispersal of weed seeds and vegetative material. All sediment fencing is to be in place prior to the commencement of construction. Prior to any site preparation operations, the Project Manager (or other suitably qualified personnel) shall undertake an inspection of all sediment fencing. The erosion and sediment control measures are to be maintained throughout construction and are not to be dismantled until the works on site have been completed and disturbed areas have been covered by mulch to a minimum depth of 100 mm.
7. The applicant is responsible for the restoration of the site and any adjoining affected lands where sediment deposition has occurred as a consequence of construction activity associated with the development for the duration of works and until the site has been stabilised. Such restoration must be completed in a reasonable timeframe.
8. No soil disturbance is to occur within areas of retained vegetation. Soil disturbance within any areas to be landscaped shall be kept to a minimum to avoid weed recruitment. Areas to be landscaped shall be completed under supervision to avoid unnecessary soil disturbance.
9. Weed or potential weed species shall not be planted during landscaping operations. All nursery stock for landscaping purposes shall be weed, pest and disease free and certified as such by the supplier where feasible. The certificates are to be obtained prior to the commencement of any regeneration/revegetation works on site.
10. Clearing operations are to ensure that propagative material from cleared weeds does not spread across the site. The earthworks machinery must not introduce weed material to the site or spread such material throughout the site.
11. Weeds on the subject site will be managed using suitable control measures (i.e. chemical and/or physical control) in accordance with **SECTION 6.8**.
12. Vehicles shall be restricted to a maximum speed of 50 kph and shall operate only in daylight hours for the duration of the construction phase. Where roads traverse the environmental protection areas vehicles shall be restricted to a maximum speed of 40 kph to minimise the risk of vehicle strike.

6.4 Pre-clearing Fauna Trapping and Fauna Spotter Catcher

6.4.1 Pre-Clearing Fauna Trapping

The following fauna protection strategies will be implemented prior to commencement of any vegetation clearing works.

1. Prior to clearing operations, a suitably qualified ecologist will inspect the site for habitat trees or other habitat features. Habitat trees are defined as those trees that provide suitable refuge and nesting resources for arboreal and avian fauna. These include hollow-bearing trees and trees with fissures, termitaria, etc. Larger, old growth trees are also considered to be habitat trees as they are likely to provide greater amounts of foraging resources, cover, and a high number of potential tree hollows. Dead

(stag) trees are also regarded as important habitat trees as they provide roosting and nesting resources.

2. Any habitat trees or habitat features identified on site will be identified using flagging tape or similar method and shown on appropriately scaled plans. A pre-clearing report shall be prepared prior to clearing which will detail any relevant observations made on site including the presence of habitat trees.

Subsequent to the site inspection, and immediately prior to commencement of site clearing works, a pre-clearing trapping program will be completed within any areas of relatively intact vegetation to be cleared as follows.

1. The trapping program will target Threatened species, in accordance with Section 8.3 of the Precincts 6 - 11 TSMP (JWA 2020c), as well as any other native ground-dwelling and arboreal species. The program will utilise the following trapping methodologies:
 - Pitfall traps/funnel traps;
 - Small (Type A) Elliott traps - installed both on the ground and on platforms on the trunks of trees;
 - Medium (Type B) Elliott traps - installed both on the ground and on platforms on the trunks of trees;
 - Cage traps; and
 - Active searches.
2. All traps will be baited with the universal mixture of peanut butter, honey and rolled oats. Each precinct will be trapped for a minimum of four (4) nights, and any animals captured will be relocated the same day of capture to suitable areas of retained habitat on or adjacent to the site.

6.4.2 Provision of Spotter Catcher and Pre-clearing Site Inspections

The proponent will appoint a suitably qualified fauna spotter catcher to conduct pre-clearing site inspections and to be present during all clearing activities to rescue and relocate any native fauna species as necessary. The spotter catcher is also to direct the civil works contractor in relation to any fauna issues. The contractor will provide access to equipment that may be required by the spotter-catcher (e.g. cherry picker, chainsaw) as well as qualified operators.

The pre-clearance surveys will commence no more than one (1) day prior to commencement of bulk earth moving activities within each precinct. Specific requirements for the appointment of spotter catchers and pre-clearing koala surveys are outlined in Section 7.2.2 of the Kings Forest KPOM (JWA 2019). Specific requirements for pre-clearing WSF surveys are outlined in Section 7.2.3 of the Kings Forest WSFMP (JWA 2020a).

6.4.3 Under Scrubbing

Immediately after each precinct has been trapped, and the extent of the trapped area clearly identified, the groundcover and midstorey will be cleared utilising a slasher with a mulching head attachment or similar. Any hollow-bearing trees and/or other significant habitat features

identified during the initial site inspection will be retained. All under scrubbing works will be completed with a suitably qualified fauna spotter/catcher in attendance.

6.4.4 Clearing Non-habitat Trees

Immediately after under scrubbing of each area is complete, non-habitat trees (i.e. trees other than those identified as habitat trees) will be cleared and stockpiled for mulching. Clearing of non-habitat trees will only occur where their removal will not impact on identified habitat trees (e.g. canopies do not interconnect with habitat trees). All clearing works will be completed with a suitably qualified fauna spotter/catcher in attendance.

6.4.5 Tree Hollow Inspection and Removal

After under scrubbing and clearing of non-habitat trees, the following tree hollow inspection and removal protocols will be implemented.

1. An elevated work platform or cherry-picker will be used in conjunction with a chainsaw operator and suitably qualified fauna spotter/catcher to inspect and remove tree hollows as necessary prior to habitat tree felling. This method involves the fauna spotter/catcher inspecting each of the potential habitat features (usually tree hollows, dreys and arboreal termite nests) to determine the presence of arboreal fauna. This process is detailed following the step by step basis below:
 - a. The fauna spotter/catcher (with arborist unless the fauna spotter/catcher is a qualified chainsaw operator) will inspect each visible tree hollow or potential habitat resource (i.e. ringtail possum drey) identified in each tree using the cherry-picker. This is usually carried out by simply looking into tree hollows with the assistance of a small torch, however, burrow and bore-scopes can also be useful for deep tree hollows.
 - b. If fauna is located within a tree hollow, a piece of towel or rag will be firmly placed in the entrance to prevent the wildlife from escaping as in most cases arboreal fauna become aware of the presence of the fauna spotter/catcher and may attempt to flee the nesting/denning tree hollow due to a perceived threat. If an occupied ringtail possum drey is encountered, the fauna spotter/catcher should quietly approach (i.e. avoid contacting other branches) the drey in the cherry-picker bucket and physically capture the possum by placing the entire drey in a catch bag or only the possum if it emerges from the drey. If arboreal fauna are captured, or able to be easily removed from tree hollows, they will be relocated to a suitable retained habitat area/s on or adjacent to the site the same day of capture.
 - c. Once the tree hollow entrance has been secured the arborist or fauna spotter/catcher will cut the entire hollow tree limb off below the cavity where the branch remains solid. In circumstances where a tree hollow continues into the main stem of the tree, a small window will be carefully cut into the tree hollow, allowing the fauna spotter/catcher to plug the tree hollow above and below the window, then the hollow tree limb removed and lowered to the ground in sections.

- d. When the fauna has been safely secured within its tree hollow, the entire limb can then be placed in the cherry-picker bucket or lowered to the ground using ropes depending on the size of the limb.
 - e. This limb will then be placed in a cool, quiet location until translocation to a suitable donor site the same day of capture, when at dusk the tree hollow entrance is re-opened to allow the fauna to emerge of its own accord.
2. Once all tree hollows within the habitat trees have been inspected and cleared, the tree may be removed. All clearing works will be completed with a suitably qualified fauna spotter/catcher in attendance.
3. Where possible, the actual felling of the habitat trees shall be conducted in a manner that will maximize the chances of survival for any fauna remaining within the tree. This shall involve pushing rather than cutting, and cushioning the tree fall with other felled timber and foliage. Following felling, a second inspection of the relevant trees shall be carried out to relocate fauna disturbed by the clearing process or remaining within the felled timber to a suitable location.
4. Any fauna captured on site during clearing works will be relocated/translocated by the spotter catcher to a suitable habitat area/s on or adjacent to the site the same day of capture. Any injured animals requiring treatment or euthanasia shall be immediately removed and taken to an appropriately qualified veterinary surgeon. Any animals requiring support or rehabilitation other than vet assistance will be taken to a qualified wildlife carer or centre.
5. A post-clearing spotter catcher report will be provided to the clearing contractor and Council Ecologist within two (2) weeks of completion of clearing activities.

6.4.6 Fauna Incident Reporting Protocols

Any threatened species observation or incident during the construction phase will result in an observation/incident report.

Requirements for koala or WSF incident reports are outlined in Section 7.2.6 of the Kings Forest KPoM (JWA 2019) and 7.2.5 of the Kings Forest WSFMP (JWA 2020a) respectively.

For all other threatened species, the report should contain as a minimum, the date, time and location (grid references) and nature of the incident. Where appropriate, cause (or likely cause) of the incident, sex of animal, age (teeth wear or other evidence) and any other information such as presence of ear tags, general condition (evidence of disease, weight, etc.) should be collected. The report should also describe what action has been taken to date, and any proposed measures to address the incident. This information should be forwarded to BCD and TSC. All Fauna Incident reports (excluding those related to koalas and WSF) will be included in the Annual Threatened Species Monitoring Report in accordance with Section 8.7.2 of the Precincts 6 - 11 TSMP (JWA 2020c).

6.5 Exclusion Fencing and Other Infrastructure

6.5.1 Fauna Exclusion Fencing

Exclusion fencing will be utilised where necessary to effectively separate retained vegetation and compensatory habitat from the development and its related threats. Exclusion fencing will be provided in accordance with the requirements of the Kings Forest KPoM (JWA 2019) and WSFMP (JWA 2020a) and will consist of both temporary and/or permanent fencing during construction and permanent fencing during the operational phase.

Detailed specifications for the design of the temporary and permanent exclusion fencing (including associated koala escape mechanism, gates and signage) to be utilised over the entire Kings Forest site is provided Section 7.3.2 of the Kings Forest KPoM (JWA 2019) and Section 7.6.2 of the Kings Forest WSFMP (JWA 2020a).

Temporary fencing will be utilised during the construction phase of the development of Precincts 6 - 11 to exclude construction activities from retained vegetation and compensatory habitat areas. Temporary fencing will be comprised of 1.5 m high wire mesh held upright by star pickets (PLATE 1).



PLATE 1 - EXAMPLE OF TEMPORARY FENCING

Permanent koala exclusion fencing will be constructed at the end of the construction phase of the development of each applicable Precinct. In some areas temporary fencing will not be