

Vegetation Management Plan for a Staged Residential Subdivision at Lots 33 and 34 DP 803801, Ocean Drive and Forest Parkway, Lake Cathie

Prepared for:

RTS Super Pty Ltd, Stacks Super Pty Ltd &
TJS Super Pty Ltd

Prepared by:

King & Campbell Pty Ltd
1st Floor, Colonial Arcade
25-27 Hay Street
Port Macquarie
PO Box 243
Port Macquarie 2444
Ph: (02) 6586 2555
Fax: (02) 6583 4064
info@kingcampbell.com.au

In consultation with:

*Wild Things Native
Gardens*
Kelly Benson
395 Pappinbarra Left Arm
Road
UPPER PAPPINBARRA 2446
Ph: (02) 6587 6194
Mo: 0409 846 952
kellyjim@westnet.com.au

*Peter Parker Environmental
Consultants Pty Ltd*
Broken Head Road
BROKEN HEAD 2481
Ph: (02) 6685 3148
Fax: (02) 6685 3148
Mo: 0419 984 954
peterp@mullum.com.au

Date: May, 2016

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URBAN DESIGN

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Section 1

Introduction

This Vegetation Management Plan (VMP) has been prepared to accompany a Development Application for the staged residential subdivision at Lots 33 and 34 DP 803801, Ocean Drive and Forest Parkway, Lake Cathie.

This VMP provides detail on the work to be undertaken within four (4) Management Units, as street tree plantings and within designated areas of the E4 zoned lands.

The required works include regeneration, weed eradication, plant establishment and ongoing maintenance, management and monitoring, as set out in the existing Planning Agreement between Port Macquarie-Hastings Council (PMHC) and the landowner.

This VMP has been prepared in consultation with Wild Things Native Gardens (WTNG) and Peter Parker Environmental Consultants Pty Ltd (PPEC).

1.1 VMP - Objectives

The objectives of this VMP are to clearly set out the environmental obligations for the land, as established by the VPA, by specifying the following control measures:

- Site preparation works to provide a vegetated habitat link to facilitate koala movement within Management Unit no.1, being Habitat Linkage C (south);
- Site management works to assist in the natural regeneration of Management Unit no.2 (south);
- Site management/preparation works and revegetation works to assist in the natural regeneration of Management Unit no.3, being Habitat Linkage E (Area 14 KPoM), including specifications for supplementary planting if required (north);
- The monitoring of Management Unit 4 and works to maximise its regeneration potential, including specifications for supplementary planting if required;
- Providing a stormwater quality bio-retention network, utilising native sedges and trees; and
- Maintenance and monitoring works post establishment.

The implementation of this VMP will be the responsibility of the property owners. All works are to be carried out and monitored by a qualified Certificate II bush regenerator and all certification is to be submitted to PMHC as required by the VPA.

In preparation of this VMP, the following resources have been utilised:

- Flora and Fauna Survey (January, 2016), Peter Parker Environmental Consultants, Pty Ltd;
- The VPA between PMHC and the landowner;
- The Area 14 Koala Plan of Management;
- The PMH DCP 2013, Part 2; and
- The informational guide 'Vegetation Management Plan Requirements' prepared by Port Macquarie Hastings Council (as at 14 December 2011).

1.2 Identification of management Units

Four (4) Management Units have been identified in the VMP, as set out below:

Management Unit 1 (south – proposed road reserve)

This Unit comprises an area of approximately 3,981m² and represents the 20m wide habitat link within existing Lot 34, known as *Habitat Linkage C*. Unit 1 will include site preparation works and the planting of koala food trees (canopy trees) and native grasses. No mid storey is proposed.

KFT planting will include:

- 18 Tallowwood and 2 Swamp Mahogany at 8 – 10m centres along the central spine; and
- 38 Swamp Mahogany / Narrow-leaved Peppermint at approximately 8m centres on the unit edge, 5m from the kerb.

Unit 1 is within a future public road (road 8).

Management Unit 2 (south – proposed Lot 152)

This Unit comprises an area of approximately 3.96ha and represents the E2 and E3 environmental zoned lands and part of the R1 zoned lands (stormwater swale) on the northern edge of proposed road no.4. Planting is limited to 75 Swamp Mahogany at 8m centres, to be located adjacent the existing fence line and within the central area following weed treatment. Ground planting to be provided within the stormwater swale.

The environmental lands that are outside the future public road reserve will be dedicated to Council as a public reserve, pursuant to the existing Planning Agreement.

Management Unit 3 (north – proposed Lot 69)

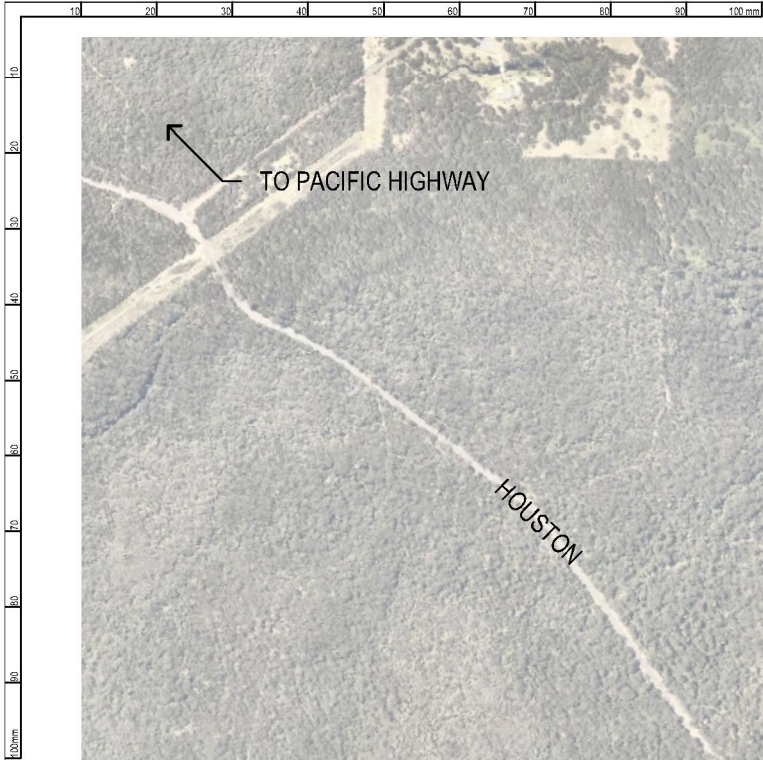
This Unit comprises an area of approximately 9.64ha and represents the E2 and E3 environmental zoned lands and part of the R1 zoned lands (stormwater swale) on the northern edge of proposed road no.1. Planting is limited to 128 Swamp Mahogany at 8m centres, to be located within the environmental zone adjacent road no.1 and within the central area following weed treatment. Ground planting to be provided within the stormwater swale.

The environmental lands that are outside the future public road reserve will be dedicated to Council as a public reserve, pursuant to the existing Planning Agreement.

Management Unit 4 (north – proposed rural residue, part Lot 70)

This Unit comprises an area of approximately 9 ha, where 4.5 ha is available for natural regeneration. Unit 4 represents the existing rural zoned lands on the western edge of Lake Cathie Nature Reserve.

Unit 4 will be retained in private ownership.



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KING + CAMPBELL

King & Campbell Pty Ltd
www.kingcampbell.com.au
A: PO Box 243 Port Macquarie NSW 2444
T: 02 6586 2555
F: 02 6583 4064
E: info@kingcampbell.com.au

REV.	DATE	DESCRIPTION
A	30.09.2015	ISSUED FOR CLIENT REVIEW
B	02.11.2015	ISSUED FOR DA

DATUM: AHD SCALE: 1:16000 @A3

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PROJECT NO:	4539	DRAWING TITLE:	VMP EXHIBIT 01 - SITE CONTEXT
DA NO.:	N/A	PROJECT:	PROPOSED STAGED RESIDENTIAL SUBDIVISIONS NORTH LOT 33 AND SOUTH LOT 34 DP 803801, FOREST PARKWAY, LAKE CATHIE
DESIGNED BY:	DAT/BC	CLIENT:	RTS SUPER PTY LTD, STACKS SUPER PTY LTD & TJS SUPER PTY LTD
DRAWN BY:	MW/JO/CC	DRAWING NO:	4539P_Exhibits
CHECKED BY:	KM/CC	SHEET:	01
DATE CREATED:	05.2015	REVISION:	B

A3

Section 2

Existing Site Conditions

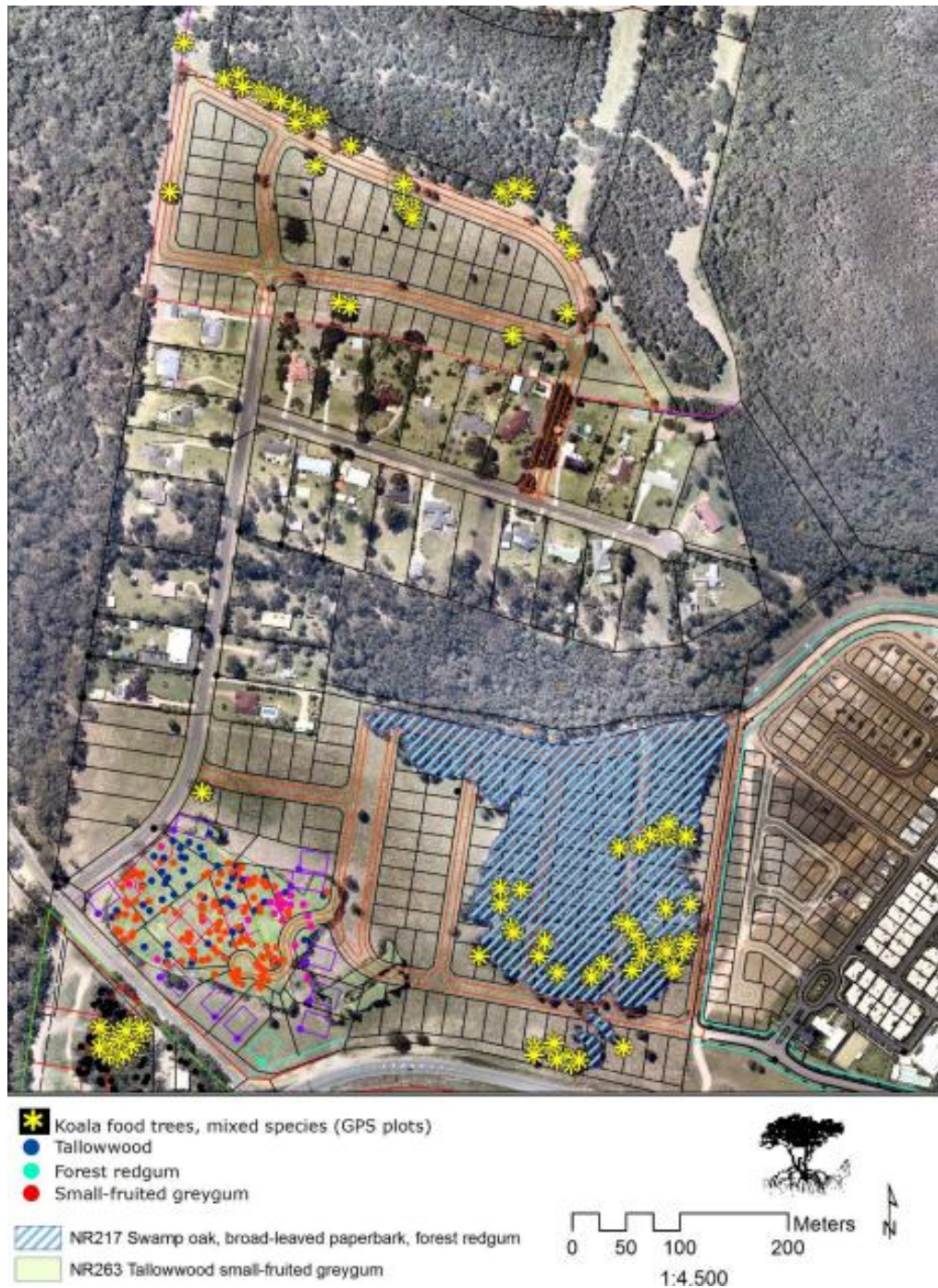
2.1 Vegetation

Peter Parker Environmental Consultants Pty Ltd (PPEC) undertook a vegetation survey during March 2012 and a supplementary vegetation survey was undertaken in March, 2015.

A copy of the Flora and Fauna Survey (January, 2016) is included at Appendix D to the Statement of Environmental Effects.

Table 1 below describes the vegetation formations and should be read in association with Figure 7 from PPEC 2016 (reproduced following the table below).

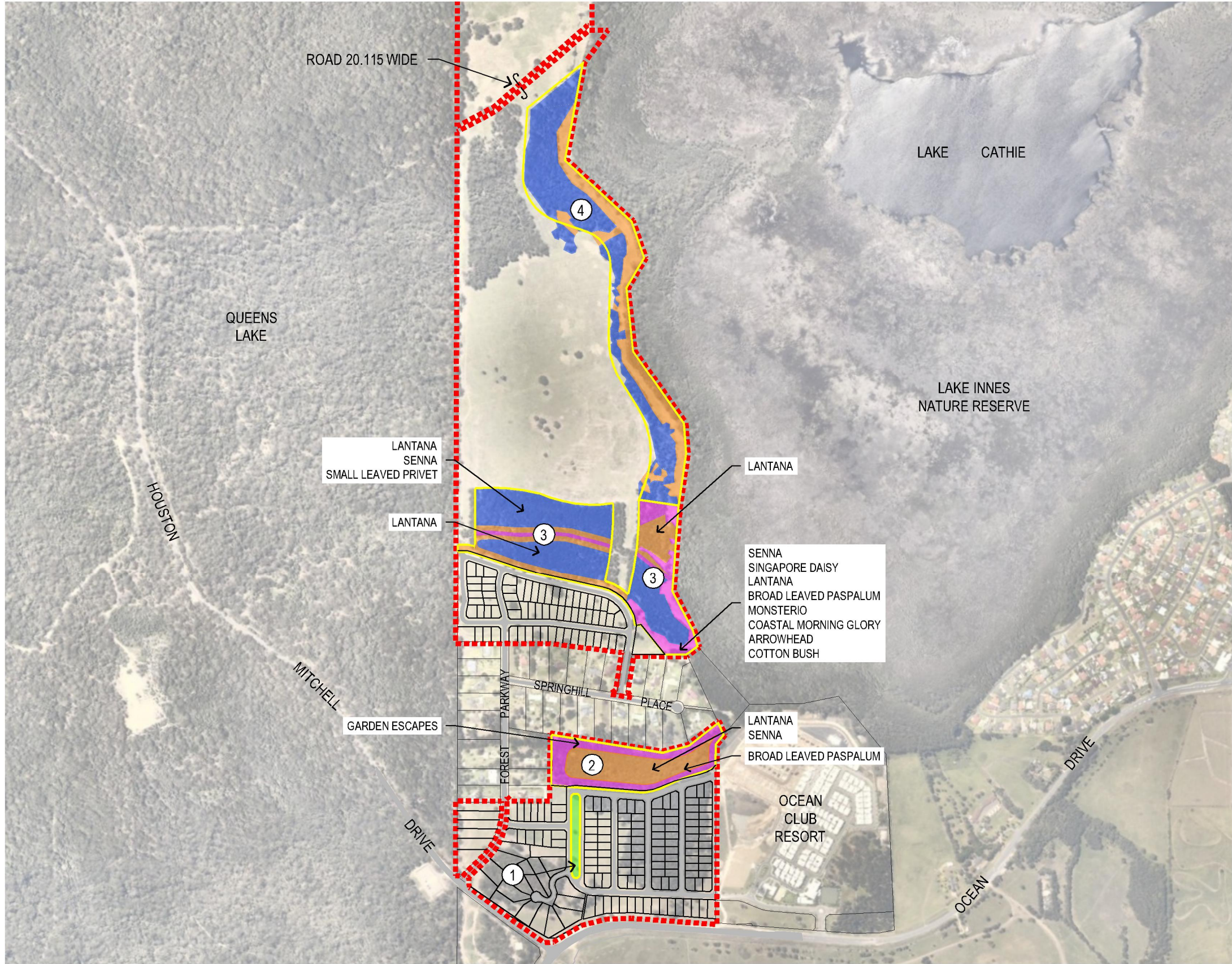
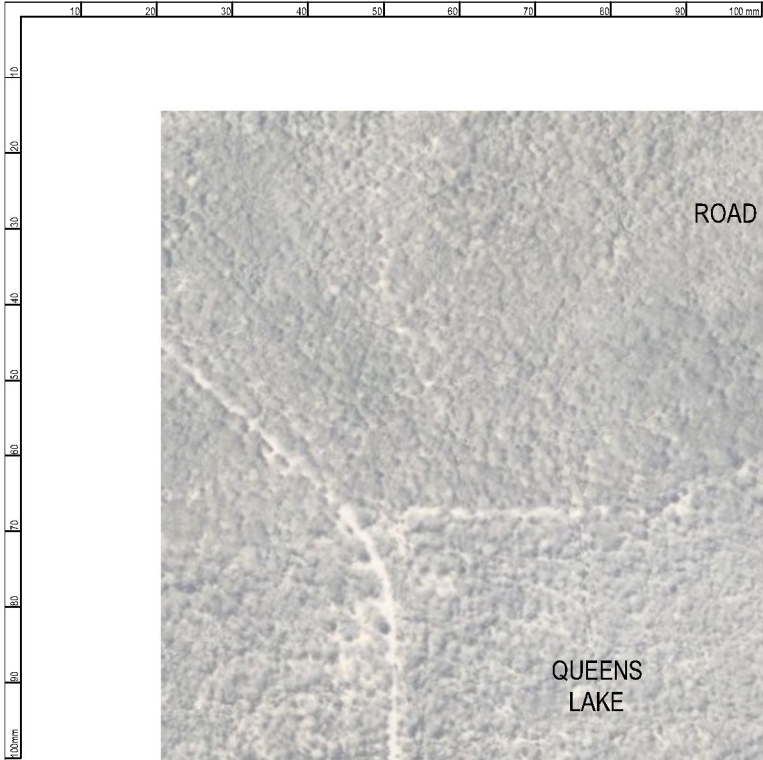
Table 1 – Vegetation formations	
1. Forested wetland (NR 217)	
Class	Coastal swamp forest
Type	Mid-high to tall swamp she-oak open woodland to forest
Community	Swamp she-oak, broad-leaved paperbark, flax-leaved paperbark, prickly-leaved tea-tree with emergent forest redgum open woodland to forest
Comments	This community has regenerated since around 1990 and contains limited species richness (Appendix 1). Its main conservation attributes are isolated forest redgum and forest redgum x swamp mahogany hybrids. Compensation for the removal of koala food trees is contained in the SEE. Approximately 5 ha of this swamp she-oak community will require clearing.
2. Wet sclerophyll forest (NR 263)	
Class	Northern Hinterland Wet Sclerophyll Forest
Type	Tall to extremely tall woodland to open forest
Community	Tallowwood, small-fruited grey gum, pink and red bloodwood, grey ironbark, forest redgum open woodland to forest
Comments	This community supports a mixed aged forest with some older hollow-bearing trees. Koala food trees have been surveyed and the residential precinct designed to incorporate their retention as far as was practicable. This community is 2.5 ha in area and tree removal will be compensated for in accordance with the provisions of Council's koala plan of management and in substantial offset areas
3. Grassland	
Comments	Grassland dominated by whiskey grass (Plate 2), <i>Andropogon virginicus</i> , and Parramatta grass, <i>Sporobolus indicus</i> var. <i>capensis</i> , was recorded in the exposed (un-vegetated) part of the site, whereas broad-leaved paspalum, <i>Paspalum mandiocanum</i> , dominated cleared shaded areas (Plate 7). This community is of little conservation value and is grazed by livestock and slashed.



(Source: Flora and Fauna Survey, Peter Parker Environmental Consultants Pty Ltd, January, 2016)

2.2 Weed Mapping

Weed species on the site have been identified at Appendix 1 to the Flora and Fauna Survey (PPEC 2016). A Baseline Weed Map is provided at Exhibit VMP_02.



LEGEND

SITE BOUNDARY

PROPOSED LAYOUT

EXISTING CADASTRE

VEGETATION MANAGEMENT UNIT BOUNDARY

①

VEGETATION MANAGEMENT UNIT

PROPOSED BIORETENTION BASIN

WEED DENSITY LEGEND

1 - 20%

↑ GOOD

20 - 50%

50 - 80%

80 - 100%

↓ BAD



CAUTION

THIS PLAN HAS BEEN PREPARED FOR THE PURPOSE OF A DEVELOPMENT APPLICATION. THE INFORMATION SHOWN HEREIN IS ONLY RELIABLE FOR THE ABOVE PURPOSE. IT SHOULD NOT THEREFORE BE USED FOR ANY OTHER PURPOSE WITHOUT VERIFICATION.

REV.	DATE	DESCRIPTION
A	30.09.2015	ISSUED FOR CLIENT REVIEW
B	02.11.2015	ISSUED FOR DA
C	09.03.2016	VMU 4 BOUNDARY ADJUSTMENT

PROJECT NO:	4539	DRAWING TITLE:	VMP EXHIBIT 02 - BASELINE WEED MAP			
DA NO.:	N/A					
DESIGNED BY:	DAT/BC	PROJECT:	PROPOSED STAGED RESIDENTIAL SUBDIVISIONS NORTH LOT 33 AND SOUTH LOT 34 DP 803801, FOREST PARKWAY, LAKE CATHIE			
DRAWN BY:	MW/JO/CC					
CHECKED BY:	KM/CC	CLIENT:	RTS SUPER PTY LTD, STACKS SUPER PTY LTD & TJS SUPER PTY LTD			
DATE CREATED:	05.2015					
		DRAWING NO:	4539P_Exhibits	SHEET:	02	REVISION: C

Section 3

Proposed Environmental Works

3.1 Summary of Works

3.1.1 Pre-establishment Works

The installations of 18 nest boxes within the adjacent E2 zone (see Section 3.5 for nest box strategy) prior to on-site works commencing.

Upon installation, the GPS location of each nest box is to be provided to Council.

3.1.2 Management Units 1 to 4 - Establishment / Management Works and Timing

The Management Units are shown on Exhibit VMP_02 and the proposed works and timing are detailed in the following table:

Table 2 - Management Unit Works		
Description of works	Timing (see Table 5 for detail)	Performance criteria
Management Unit 1 (south) – 3,980m ² <i>This unit comprises the R1 zoned land within road no.8, known as Habitat Linkage C</i>		
Establishment works 1. Planting works, including <ul style="list-style-type: none"> a. Upper canopy: - 18 Tallowood and 2 Swamp Mahogany at 8 – 10m centres along the central spine; and - 38 Swamp Mahogany / Narrow-leaved Peppermint at approximately 8m centres on the unit edge, 5m setback from the kerb. All trees to be Natspec 100L at time of planting and protected with 3 x 2m high star pickets and protective mesh, with 100mm thick mulch bed. b. Groundcover: Groundcover planting at a rate of 1/m². Management works 1. Maintenance including watering and spot spraying grasses and annual weeds around plantings.	Establishment Upon commencement of development associated with Stage 4 subdivision works (construction of road no.8) within existing Lot 34. Dedication Dedicated to Council as part of Stage 4 subdivision certificate. Management Period Maintain for 1 year as defects liability period post dedication of the road	<ul style="list-style-type: none"> • 100% survival of Schedule 2 Koala feed trees, where all failed plantings are replaced within 3 months of failure.

Table 2 - Management Unit Works		
Description of works	Timing (see Table 5 for detail)	Performance criteria
Management Unit 2 (south) This Unit comprises an area of approximately 3.96ha and represents the E2 and E3 environmental zoned lands and part of the R1 zoned lands (stormwater swale) on the northern edge of proposed road no.4. Planting is limited to 75 Swamp Mahogany at 8m centres, to be located adjacent the existing fence line and within the central area following weed treatment. Ground planting to be provided within the stormwater swale. The environmental lands that are outside the future public road reserve will be dedicated to Council as a public reserve, pursuant to the existing Planning Agreement.		
Establishment works 1. Weed control to include treatment of woody weeds and spraying of weedy grasses using 200 litre vehicle mounted sprayer; and 2. Planting of 75 Swamp Mahogany. All trees to be 600mm at time of planting and protected with 3 x 2m high star pickets and protective mesh, with 100mm thick mulch bed. Management works 1. Spray to suppress Broad Leaved Paspalum, including 3 sprays in first year between October and May growing period, then twice yearly on the second and third year. 2. Maintenance of tree plantings including watering and spot spraying grasses and annual weeds around plantings. 3. Maintenance of stormwater swale	Establishment Upon commencement of development associated with Stage 1 subdivision works within existing Lot 34. Dedication Dedicated to Council upon completion of the Establishment Obligation (being the establishment works identified in this VMP). Management Period A period of 20 years commencing at the end of the Establishment Period (or as agreed to with Council).	<ul style="list-style-type: none"> 90% reduction in the extent of all transforming weeds per annum; and No mature weed set or propagule set after the first weed pass.
Management Unit 3 (north) This Unit comprises an area of approximately 9.64ha and represents the E2 and E3 environmental zoned lands and part of the R1 zoned lands (stormwater swale) on the northern edge of proposed road no.1. Planting is limited to 128 Swamp Mahogany at 8m centres, to be located within the environmental zone adjacent road no.1 and within the central area following weed treatment. Ground planting to be provided within the stormwater swale. The environmental lands that are outside the future public road reserve will be dedicated to Council as a public reserve, pursuant to the existing Planning Agreement.		
Establishment works 1. Weed control to include treatment of woody weeds and spraying of weedy grasses using 200 litre vehicle mounted sprayer. 2. Compensatory planting of 128 Swamp Mahogany. All trees to be 600mm high at time of planting and protected with 3 x 1.8m high star pickets and shade cloth (1m diameter), with 100mm thick mulch bed.	Establishment Upon commencement of development associated with Stage 1 subdivision works within existing Lot 33. Dedication Dedicated to Council upon completion of the Establishment Obligation (being the establishment works identified in this VMP).	<ul style="list-style-type: none"> 90% reduction in the extent of all transforming weeds per annum; No mature weed set or propagule set after the first weed pass; and

Table 2 - Management Unit Works		
Description of works	Timing (see Table 5 for detail)	Performance criteria
<p>Management works</p> <p>1. Follow up spraying of weedy grasses and woody weeds.</p> <p>2. Hand weeding and spraying of woody weeds and grass weeds inaccessible to vehicle mounted sprayer.</p> <p>3. Maintenance of tree plantings including watering and spot spraying grasses and annual weeds around plantings.</p> <p>4. Maintenance of stormwater swale</p>	<p>Management Period</p> <p>A period of 20 years commencing at the end of the Establishment Period (or as agreed to with Council).</p>	<ul style="list-style-type: none"> 100% survival of Schedule 2 Koala feed trees, where all failed plantings are replaced within 3 months of failure.
<p>Management Unit 4</p> <p>This unit has an area of 9ha, where approximately 4.5ha available for natural regeneration¹</p>		
<p>Establishment works</p> <p>1. Fencing of unit to prevent grazing.</p> <p>2. Weed control to include spraying of weedy grasses using 200 litre vehicle mounted sprayer.</p> <p>Management works</p> <p>1. Monitoring of regeneration, including 100m transect with 3 photo locations. Monitored twice yearly for the first 5 years and then yearly for years 6 to 20.</p> <p>2. Monitoring to include an assessment of the need for supplementary koala food tree planting to occur in year 2, include the contingency for planting of koala food trees to be undertaken in year 3.</p>	<p>Establishment</p> <p>Upon commencement of development associated with Stage 1 subdivision works within existing Lot 34.</p> <p>Dedication</p> <p>To be retained in private ownership.</p> <p>Management Period</p> <p>To be managed in perpetuity if retained in private ownership or 20 years if dedicated into public ownership.</p>	<ul style="list-style-type: none"> Natural regeneration to achieve a density of 90% after 5 years¹. Greater than 50% of regenerated canopy trees species are Koala food tree species by year 2

¹ Supplementary planting contingency provided for Management Unit 4 – see Appendix VMP_A.

3.1.3 Compensatory planting within E4 Environmental Living zone (existing Lot 34)

The KFT planting program within the E4 zone is set out in the following table. The planting program will be undertaken as part of Stage 6 subdivision works.

All street trees to be **Natspec 100L** at time of planting and protected with 3 x 1.8m high star pickets and shade cloth (1m diameter), with 100mm thick mulch bed.

This table should be read in conjunction with South Exhibit 04B which details the location of the plantings to be provided.

Table 3 – E4 zone planting					
Lot number	No. of existing KFT's	KFT's to be removed	Location for compensatory plantings		Tree species
			4.5m/3m front setback	Rear reserve	
135	3	0	6	2	Tallowwood
136	1	0	1	6	Tallowwood
137	0	0	0	12	Tallowwood
138	0	0	0	10	Tallowwood
139	3	0	0	8	Tallowwood
140	4	0	0	8	Tallowwood
141	6	0	0	15	Tallowwood
142	16	7	1	4	Tallowwood
143	20	2	0	4	Tallowwood
144	24	5	1	1	Tallowwood
145	33	2	1	1	Tallowwood
146	14	0	1	0	Tallowwood
147	0	0	1	6	Tallowwood
148	4	0	1	6	Tallowwood
149	17	5	1	3	Tallowwood
150	21	14	2	2	Tallowwood
151	17	0	3	5	Tallowwood
Road no. 9	10	10	Nil		
Totals	193	16 (45) ¹	19	93	

¹An inspection of the 45 KFT's to be removed within the building envelopes of the proposed residential lots within the E4 Environmental Living zone confirmed that 29 of the existing trees are either;

- undersized (i.e. less than 150mm dbh), or
- have minimal or no existing tree canopy habitat with little chance of developing into better quality habitat; or
- are either dead or in poor health.

Therefore based on prior consultation with PMHC and the lack of existing koala habitat provided by these 29 KFTs, the 20:1 compensatory planting requirement of the Area 14 KPOM will only apply to 16 KFT's within the E4 zone.

3.1.4 Street tree planting program

The KFT street tree planting program is set out in the following table. The planting program will be undertaken in association with the corresponding subdivision works within which the road is to be constructed.

All trees to be **minimum 75 litre stock conforming to AS2 302:2015 – Tree stock of landscape use** and protected with 3 x 1.8m high star pickets and shade cloth (1m diameter), with 100mm thick mulch bed.

Excavated street tree planting pits are to be inspected by Council Senior Arborist prior to planting.

Table 4 – Street tree planting program			
Road	Planting location	Tree no's	Tree species
South – existing Lot 34:			
Road 1	1 / lots 117 to 123	7	Narrow-leaved Peppermint
Road 2	1 / lot on northern road edge	12	Narrow-leaved Peppermint
Road 3	Nil	0	-
Road 4	Nil	0	-
Road 5	1 / lot on eastern road edge	13	Narrow-leaved Peppermint
Road 6	1 / lot on eastern road edge	11	Narrow-leaved Peppermint
Road 7	1 / lot on eastern road edge	10	Narrow-leaved Peppermint
Road 8	Nil (see Management Unit 1)	0	n/a
Road 9	Nil – see E4 zone planting	0	n/a
Forest Parkway	1 / 20m on western road edge	9	Tallowood
North – existing Lot 33:			
Road 1	1 / lots 31 to 35	6	Narrow-leaved Peppermint
Road 2	1 / lot on southern road edge + 1 / 20m on western road edge	19 + 5	Narrow-leaved Peppermint
Road 3	1 / 20m on access handle	8	Narrow-leaved Peppermint
Total		100	

3.1.5 Summary - staging, tree removal, subdivision works, Unit works and dedication

Table 5 – Staging and dedication					
Indicative stage	KFT's to be removed	Subdivision works	Management Unit establishment works	Compensatory KFT numbers	Dedication
1 south	26	<ul style="list-style-type: none"> Road 3; Road 5; Part roads 2, 4; Lots 1 to 32. 	Units 2 and 4	<ul style="list-style-type: none"> 16 street trees 75 within Unit 2 continued monitoring of natural regeneration within Unit 4 	<ul style="list-style-type: none"> Subdivision works and Unit 2 with Subdivision Certificate for stage 1. Unit 4 to remain in private ownership
2 south	15	<ul style="list-style-type: none"> Road 6; Part roads 2, 4; Lots 33 to 61. 	nil	<ul style="list-style-type: none"> 14 street trees 	<ul style="list-style-type: none"> Subdivision works with Subdivision Certificate for stage 2.
3 south	nil	<ul style="list-style-type: none"> Road 7; Part roads 2, 4; and Lots 62 to 87. 	nil	<ul style="list-style-type: none"> 13 street trees 	<ul style="list-style-type: none"> Subdivision works with Subdivision Certificate for stage 3.
4 south	nil	<ul style="list-style-type: none"> Road 1; Road 8; Complete road 2, 4; and Lots 88 to 128. 	Unit 1	<ul style="list-style-type: none"> 10 street trees 58 Unit 1 trees 	<ul style="list-style-type: none"> Subdivision works and Unit 1 with Subdivision Certificate for stage 4.
5 south	nil	<ul style="list-style-type: none"> Lots 129 to 134. 	nil	<ul style="list-style-type: none"> 9 Forest Parkway trees 	<ul style="list-style-type: none"> Subdivision works with Subdivision Certificate for stage 5
6 south	16 (45)	<ul style="list-style-type: none"> Road 9; Lots 135 to 151. 	nil	<ul style="list-style-type: none"> 105 allotment trees 12 street trees 	-
			Total	312	
1 north	13	<ul style="list-style-type: none"> Part roads 1, 2, 3 	Unit 3	<ul style="list-style-type: none"> 23 street trees 	<ul style="list-style-type: none"> Subdivision works and

Table 5 – Staging and dedication					
Indicative stage	KFT's to be removed	Subdivision works	Management Unit establishment works	Compensatory KFT numbers	Dedication
		• Lots 1 to 30.		• 128 Unit 3 trees	Unit 3 with Subdivision Certificate for stage 1.
2 north	nil	• Part road 3 • Complete road 1 • Lots 31 to 49.	nil	• 6 street trees	• Subdivision works with Subdivision Certificate for stage 2.
3 north	nil	• Part roads 1, 2, 3 • Lots 50 to 68.	nil	• 9 street trees	• Subdivision works with Subdivision Certificate for stage 3.
Totals	11			166	

3.2 Weed Control

Management Units 2, 3 and 4

As a result of previous grazing practices the understory of the remnant bushland has been moderately to heavily infested with *Lantana camara* and *Senna pendula*.

A combination of hand weeding and splatter gun spraying during the establishment phase will provide initial knockdown for most of the woody weeds in these areas, with only limited follow up required in future years.

Paspalum mandiocanum (broad leaved paspalum) has also become a problem under the canopy, particularly in Unit 2. *Paspalum mandiocanum* is considered to be a transforming weed due to its shade tolerance and ability to turn the understory into a monoculture. To interrupt the seeding cycle it is recommended that three spray runs during the growing period (October – May) in the first year will break this cycle. Six (6) monthly spray maintenance in the following years will ensure continued success and increase potential for natural regeneration.

Primary weed removal and priority weed

- Weeding will occur in the Management Units by an experienced bush regeneration contractor with membership to AABR (Australian Association of Bush Regeneration).
- Weeds Declared Noxious under the Noxious Weeds Act (1993) include *Ageratina adenophora* (Crofton Weed) and *Lantana camara* (Lantana). Both are declared noxious weeds in the Port Macquarie-Hastings LGA, while lantana is considered a Weed of National Significance (WoNS).
- The Mid North Coast weeds advisory committee and Hastings Council Control Management Plan states that landholders must

reduce the spread of *Ageratina adenophora* (Crofton Weed) to adjoining properties to within a 10 m buffer of property boundary.

Weed Control Methods

Successful management of the weeds present on site will involve a variety of weed control methods. Recommendations of weed control methods per species recorded on site are listed in Table 6 below.

Table 6 – Weed control measures			
Scientific name	Common name	Recommended control methods	Comments and treatment timing
Noxious & priority weeds			
<i>Ageratina adenophora</i>	Crofton weed	<ul style="list-style-type: none">Remove seedsHand pull ensuring removal of rhizomeMay need to use mattock or knife	<ul style="list-style-type: none">Woody perennialTreat early in project due to intractable nature and likely need for retreatmentTreat prior to seeding in September
<i>Lantana camara</i>	Lantana	<ul style="list-style-type: none">Cut and paint¹ stem bases with glyphosate mix³	<ul style="list-style-type: none">Stack weed refuse in neat piles to maximise potential regeneration between piles and facilitate maintenance access
<i>Ochna serrulata</i>		<ul style="list-style-type: none">All mature Ochnas to be basal barked using Biosafe oil® and Starane advanced® at a rate of 20mL/ltr.Ochna seedlings will be sprayed using Glyphosate® and a non-ionic surfactant at a rate of 10mL/Ltr.	
<i>Senna pendula</i> var. <i>Glabra</i>	Winter senna	<ul style="list-style-type: none">Cut stems at ground level and paint¹ with glyphosate and metsulfuron mix²Hand pull immature plants as practicalSpray seedlings with 1:100 glyphosate mix⁴ as appropriate	<ul style="list-style-type: none">ShrubsThin vascular tissue can render success of glyphosate only cut and paint treatments variableTreatment during April/May flowering can assist in location of individual plantsTreat before May/June pod productionIn densely infested areas mass germination of seedlings may occur following treatment
Other woody weeds			
<i>Cinnamomum camphora</i>	Camphor laurel	<ul style="list-style-type: none">Inject base of stems with glyphosate mix³	<ul style="list-style-type: none">Use cordless drill or chainsaw auger with 10mm or larger drill bit to create herbicide injection pointsControl as high priority
Perennials			
<i>Senecio madagascariensis</i>	Fireweed	<ul style="list-style-type: none">Hand pull or spray with 1:100 glyphosate mix⁴ as appropriate	<ul style="list-style-type: none">Treatment is a low priority
<i>Verbena bonariensis</i>	Purpletop		
Tall pasture grasses			
<i>Andropogon virginicus</i>	Whisky grass	<ul style="list-style-type: none">Spray with 1:100 glyphosate mix⁴ as appropriate	<ul style="list-style-type: none">Occurrence will naturally reduce as revegetation and
<i>Paspalum urvillei</i>	Paspalum		

Table 6 – Weed control measures			
Scientific name	Common name	Recommended control methods	Comments and treatment timing
<i>Paspalum wettsteinii</i>	Broad leaved paspalum	<ul style="list-style-type: none">Where practical reduce seed head formation and dispersal by removing with whipper snipper or slashing	regeneration produces shrub canopy and associated soil shading
<i>Sporobolus indicus</i> var. <i>Capensis</i>	Paramatta grass		<ul style="list-style-type: none">Control required only when inhibiting natural regeneration or impeding growth of plantings
Rhizomatus pasture grasses			
<i>Axonopus affinis</i>	Broad-leaved carpet grass	<ul style="list-style-type: none">Spray with 1:100 glyphosate mix⁴ as appropriate	<ul style="list-style-type: none">Occurrence will naturally reduce as revegetation and regeneration produces shrub canopy and associated soil shadingControl required only when inhibiting natural regeneration or impeding growth of plantings

(Notes on herbicide mixes:

¹ Cut stems as close to ground as practical using sharp loppers or secateurs and apply herbicide mix as soon as possible.

² Undiluted 360 g/L glyphosate (such as Roundup Biactive®) and 835g/L glyphosate 10g/kg metsulfuron-methyl (such as Trounce®) mixed at ratio of 10:1. Herbicide marker dye (such as Bigfoot®) added to colour. Apply via 100mm container with small nozzle.

³ Undiluted 360 g/L glyphosate (such as Roundup Biactive®) and herbicide marker dye (such as Bigfoot®) to colour. Apply via 100mm container with small nozzle.

⁴ 1:100 360 g/L glyphosate (such as Roundup Biactive®) and clean water. Herbicide marker dye (such as Bigfoot®) to be added to mix to colour.

⁵ Scrape stems of vine weeds exposing vascular tissue along approximately 30cm stem length and 1/3 of stem in cross section)

3.3 General Planting Guidelines

Unless otherwise specified the following applies to all planting activities.

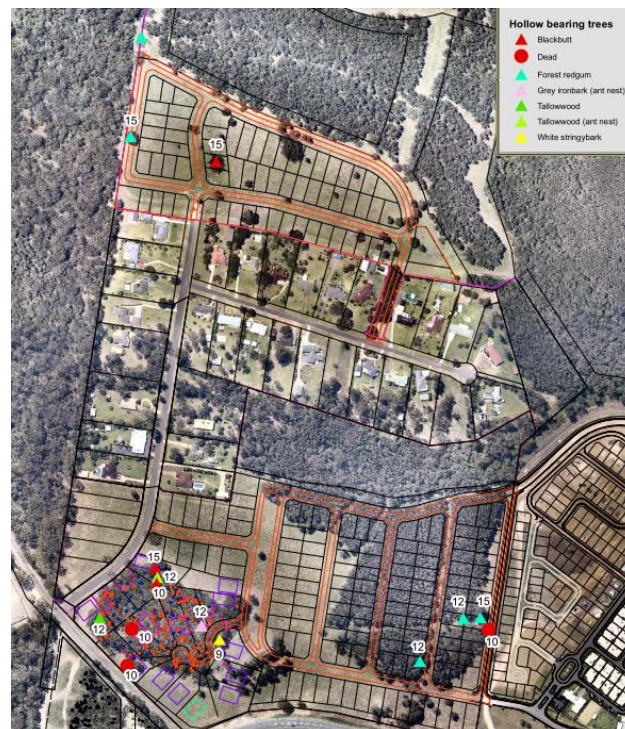
- All plants are to be supplied in a weed free state as tube stock (with the exception of the Schedule 2 Koala food trees). Roots should extend to base of tube without circling. When removed from the tube, the root ball and growing medium should remain in-tact;
- Placement of plants on site is to be undertaken by a suitably qualified bush regenerator who is able to identify all species to be planted and has an understanding of their mature size and ecological requirements;
- All Schedule 2 feed tree species to be protected with 3 x 1.8m high star pickets and shade cloth (1m diameter), with 100mm thick mulch

bed;

- All planting will be planted using Terraform and watered in on the day of planting with at least 2 litres of water per tube; and
- Follow up watering should occur weekly for up to 3 weeks in the instance where rainfall does not exceed 10ml in any one event.

3.4 Hollow-Bearing Tree Removal Strategy

Fourteen hollow bearing trees have been identified on the site, as shown on the image below:



(Source: Flora and Fauna Survey, Peter Parker Environmental Consultants Pty Ltd, January, 2014, Figure 4, p.26)

The following table sets out the hollow bearing tree removal requirements:

HBT location	Species	Score	Retain / remove
Lot 151 south	Tallowwood (tag 677)	12	Retain
Lot 148 south	Blackbutt (part of a clump)	15	Retain
Lot 148 south	Tallowwood (white ants)	12	Remove
Lot 149 south	Tallowwood	10	Retain
Lot 145 south	Grey ironbark (white ants)	12	Remove
Lot 142 south	Dead	10	Remove
Lot 141 south	Dead	10	Remove
Lot 135 south	White stringybark	9	Retain
Lot 34 south	Forest red gum	12	Remove
Road 03 south	Dead	10	Remove

Table 7 – Hollow bearing tree score card			
HBT location	Species	Score	Retain / remove
Lot 5 south	Forest red gum	15	Remove
Lot 23 south	Forest red gum	12	Remove
Lot 30 north	Blackbutt	15	Remove
Road 02 north	Forest red gum	15	Retain

Removal of the above listed hollow-bearing trees should be undertaken in accordance with the following strategy:

- An Ecologist shall be present on site during removal of the hollow-bearing trees;
- The hollow-bearing trees shall be left in place until at least 48 hours after all of the non-habitat trees and other vegetation located within 25 metres of the hollow-bearing trees has been removed;
- Once the non-habitat trees and other vegetation have been removed from around the hollow-bearing trees, the hollow-bearing trees are to be bumped on the side at least twice per day, using the on-site clearing equipment or other appropriate means, to encourage any resident fauna to depart the tree;
- The bumping is to be repeated at one minute intervals over a period of at least 5 minutes immediately prior to the felling of each tree;
- During the bumping the contractor is to take precautions to ensure that there is no risk of personal injury or equipment damage from falling limbs.
- The hollow-bearing trees are to be felled on to stockpiles of previously felled timber or other suitable means to soften the impact of felling;
- Immediately following the felling of each hollow-bearing tree the Ecologist is to properly inspect the tree for signs of fauna occupation. If hollows cannot be viewed over their full length, then they are to be sectioned carefully to enable a full inspection of the hollow. When the Ecologist is satisfied the tree is free of fauna, the tree can be removed or mulched;
- Where fauna is found within a hollow of the felled hollow-bearing tree all work within 25 m of the fauna shall cease until it has moved away of its own volition or is captured for later release;
- The Ecologist will need to make a judgement call in some instances as to whether fauna found within a hollow of a felled hollow-bearing tree should be left to move away of its own volition or should be captured for later release or placed into care with a member of a licenced wildlife carers group such as FAWNA NSW Inc.

3.5 Nest Box Strategy

The nest box strategy shall incorporate the following measures:

- Nest boxes shall be provided at a ratio of 2 nest boxes for each tree hollow to be removed (i.e. 18 nest boxes);
- Nest boxes shall be installed within the adjacent E2 Environmental Conservation zone;
- Nest boxes will be manufactured to reduce the likelihood of occupation by feral animals such as the Common Myna and Honey Bee according to industry standards;
- If additional hollows are found during the removal of the hollow-bearing trees additional nest boxes shall be provided at a ratio of 2:1;
- Nest boxes are to be installed in trees (both rough-barked and smooth-barked eucalypts) that do not already have hollows;
- A 40 mm to 50 mm thick layer of wood shavings is to be placed in the base of nest boxes to simulate decaying hollows and provide extra insulation;
- All nest boxes will be attached to the tree using the Habisure system, which involves:
 - A length of 3.15 mm plastic-coated soft fencing wire passed through the nest box and around the tree trunk;
 - The wire must be folded into at least four folds about 60 mm tall and 15 mm apart at the sides of the box to allow for tree growth;
 - Where the wire is in contact with the tree trunk or branch it must be threaded through a length of garden hose to protect the tree;
 - Where possible the wire around the tree should pass over a branch behind the trunk, although nest boxes can be installed directly on a straight-stemmed tree; and
 - Nest boxes will be positioned on the north-west to east sector of tree trunks to avoid hot afternoon sun and the predominant aspects of severe storm.

- Nest box type and number to be in accordance with the following table, noting that the existing hollows to be removed are suitable for bird species:

Table 8 – Nest box sizing				
Fauna	Dimensions H x W x D (mm)	Entrance Diameter (mm)	Height range	Number
Micro Bats	500 x 360 x 150	20 hole/15 slit	2-5	4
Lorikeet	400 x 135 x 135	60	5-15	4
Cockatoo	1200 x 400 x 300	200	20-30	3
Owl	250 x 250 x 400	150	10-15	3
Small Glider	300 x 200 x 200	45	4-8	4
Total				18

3.6 Monitoring and Audit Proforma for Each Management Unit

The following monitoring program will apply to each of the Management Units identified in Table 4:

- Twice yearly photo monitoring of each Management Unit for years 1 to 5;
- Yearly photo monitoring of each Management Unit for years 6 to 20; and
- Yearly VMP audit report for each Management Unit. A copy of the Council's 'VMP Audit and Monitoring Proforma' is included in Appendix VMP_D.

Section 4

Dedication of Land and Planning Agreements

4.1 Planning Agreement

A Planning Agreement has been executed between the land owner and Council that provides for the following outcomes in relation to the site:

- Provisions relating to the payment of monetary development contributions for water supply, roads, sewerage, open space and administration;
- The carrying out of work for the purposes of environmental lands, roads, water supply and sewerage services, including:
 - Establish and maintain the environmental management lands;
 - Construct a portion of the water supply trunk main;
 - Construction of the future road links; and
- The preparation of a Vegetation Management Plan as part of the development application documentation and the establishment, dedication and the ongoing management of environmental land zoned E2 and E3.

4.2 Location of the lands to be dedicated

The Environmental Management Lands to be dedicated to Council includes all of the land zoned E2 Environmental Conservation and E3 Environmental Management within Management Units 2 and 3.

Management Unit 1 will be dedicated as part of the subdivision works for stage 4 (road no.8). **Management Unit 4 will be maintained in perpetuity if retained in private ownership, or dedicated with a 20 year maintenance period.**

4.3 Timing of the Dedication

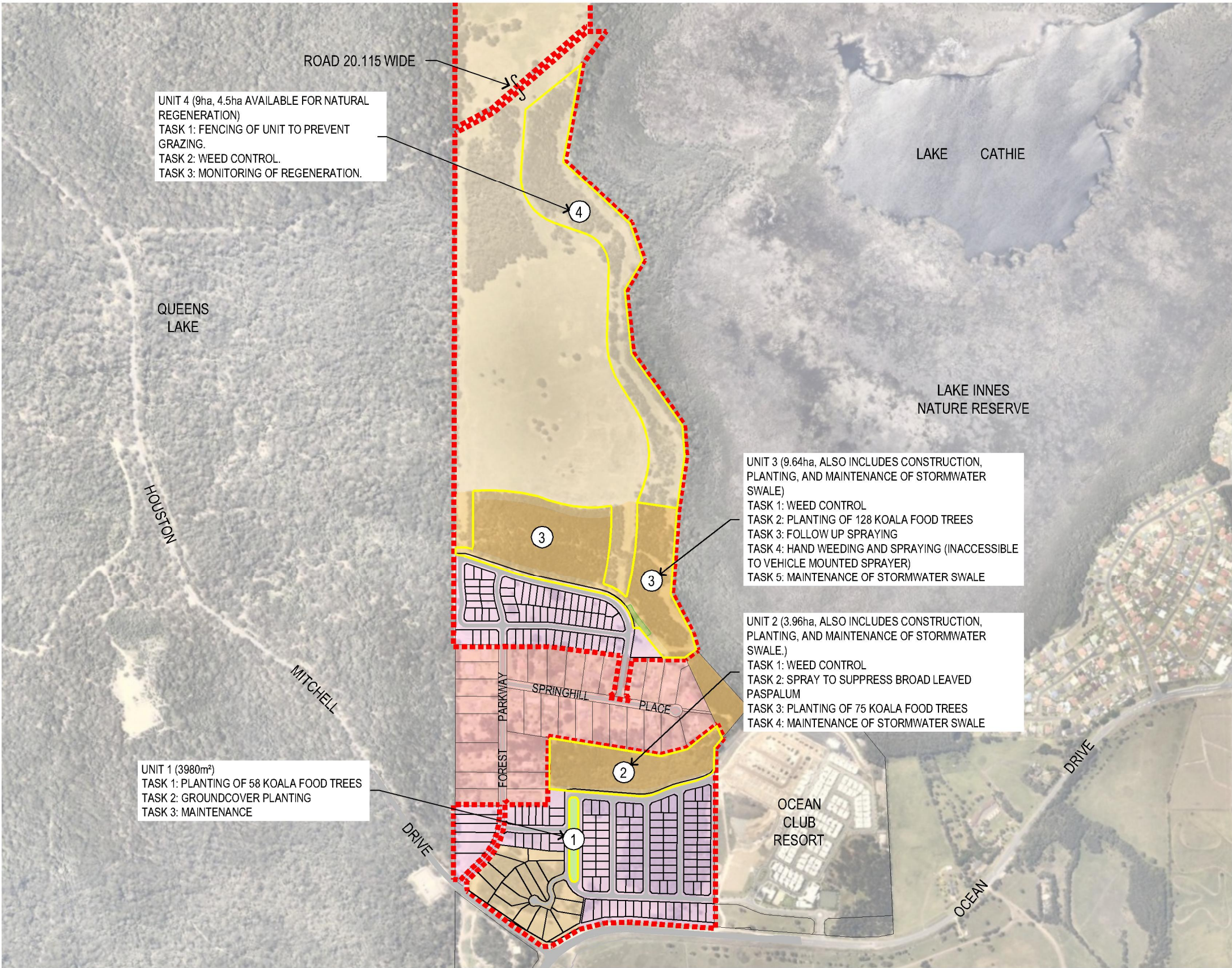
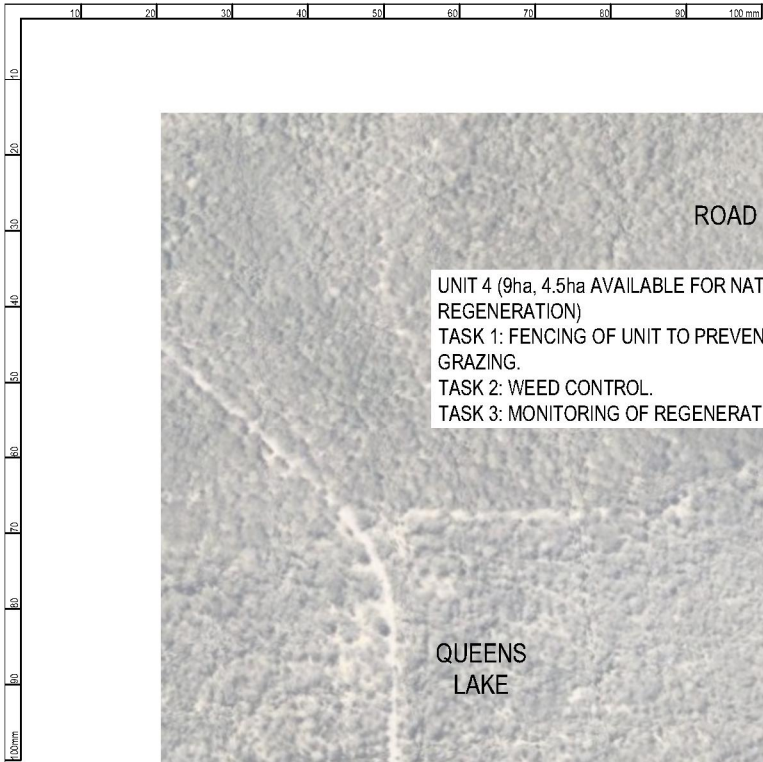
The works in accordance with this VMP will generally be carried out in association with the adjacent staged subdivision works

Dedication of the Management Units to Council will be undertaken in accordance with the timing periods set out in the VPA:

- Establishment Period – the period commencing when the development is commenced and ending when the Establishment Obligation is completed to Councils satisfaction (or as agreed to with

Council);

- Establishment Obligation – the establishment of the Environmental Management Lands in accordance with any Development Consent and the Vegetation Management Plan;
- Management Period –the period commencing immediately at the end of the Establishment Period and ending twenty (20) years after the Environmental Management Land is dedicated to Council (or as agreed to with Council); and
- Management Obligation – the management of the Environmental Management Land in accordance with a Development Consent and the Vegetation Management Plan.



LEGEND	
<div></div>	SITE BOUNDARY
<div></div>	PROPOSED LAYOUT
<div></div>	EXISTING CADASTRE
<div></div>	VEGETATION MANAGEMENT UNIT BOUNDARY
<div>①</div>	VEGETATION MANAGEMENT UNIT
<div></div>	PROPOSED BIORETENTION BASIN
<div></div>	E2 ZONE - ENVIRONMENTAL CONSERVATION
<div></div>	E3 ZONE - ENVIRONMENTAL MANAGEMENT
<div></div>	E4 ZONE - ENVIRONMENTAL LIVING
<div></div>	R1 ZONE - GENERAL RESIDENTIAL
<div></div>	R2 ZONE - LOW DENSITY RESIDENTIAL
<div></div>	HABITAT LINKAGE C (AREA 14 KPOM)



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K-C REF: OV-539_Sydney21-Planning-4539P_Exhibits.dwg - A3(L)-VMP_03 VMP_16-May-2016_craigc

REV.	DATE	DESCRIPTION
A	24.09.2015	ISSUED TO CLIENT
B	30.09.2015	MINOR AMENDMENTS - ISSUED FOR CLIENT REVIEW
C	02.11.2015	ISSUED FOR DA
D	06.04.2016	VMU AMENDMENTS
E	16.05.2016	MINOR AMENDMENTS

PROJECT NO:	4539	DRAWING TITLE:	VMP EXHIBIT 03 - VEGETATION MANAGEMENT PLAN				A3	
D.A NO.:	N/A							
DESIGNED BY:	DAT/BC	PROJECT:	PROPOSED STAGED RESIDENTIAL SUBDIVISIONS NORTH LOT 33 AND SOUTH LOT 34 DP 803801, FOREST PARKWAY, LAKE CATHIE					
DRAWN BY:	MW/JO/CC							
CHECKED BY:	KM/CC	CLIENT:	RTS SUPER PTY LTD, STACKS SUPER PTY LTD & TJS SUPER PTY LTD			DRAWING NO:	SHEET:	REVISION:
DATE CREATED:	05.2015					4539P_Exhibits	03	E

DRAFT Costing for Bush Regeneration Works for Lot 33 and 34 Forest Parkway .

Lake Cathie, NSW

TASK	12 Month Establishment Period		Year 2 (Follow up/secondary)		Year 3 (Maintenance)		Year 4 (Maintenance)		Year 5 (Maintenance)		Comments
	COSTING	Costing Comments	COSTING	Costing Comments	COSTING	Costing Comments	COSTING	Costing Comments	COSTING	Costing Comments	
MU 1											
Advanced Koala food tree planting	\$6,670.00	58 KFTS at \$115/tree									Supply and installation of advanced 200ml Koala food tree, 3 x 2m starpickets and protective mesh.
Maintenance of KFT's			\$1,680.00	40hrs at \$42/hr	\$1,680.00	40hrs at \$42/hr	\$840.00	20hrs at \$42/hr	\$840.00	20hrs at \$42/hr	Including watering and spot spraying grasses and annuals weeds around plantings
Groundcover plantings supply and install	\$11,940.00	3980 v-cells at \$3 each									3980m2 planted with groundcovers at a density of 1/m2
MU 2											
Weed Control using 200ltr vehicle mounted sprayer	\$2,975.00	35hrs @ \$85/hr.	\$2,380.00	14hrs @ \$85/hr. twice yearly	\$1,190.00	7hrs @ \$85/hr. twice yearly	\$1,190.00	7hrs @ \$85/hr. twice yearly	\$850.00	5hrs @ \$85/hr. twice yearly	Paspalum (<i>Paspalum mandiocanum</i>).3 Sprays in first year between October and May growing period then twice yearly in second and third year.
Woody weed control	\$29,400.00	700 Hrs @ \$42/Hr	\$12,600.00	300 hrs @ \$42/hr	\$6,300.00	150 hrs @ \$42/hr	\$4,200.00	100 hrs @ \$42/hr	\$3,360.00	80 hrs @ \$42/hr	
Koala food tree planting	\$8,625.00	75 KFTS at \$115/tree									Supply and installation of advanced 200ml Koala food tree, 3 x 2m starpickets and protective mesh.
Maintenance of KFT's			\$2,100.00	50hrs at \$42/hr	\$2,100.00	50hrs at \$42/hr	\$2,100.00	50hrs at \$42/hr	\$2,100.00	50hrs at \$42/hr	Including watering and spot spraying grasses and annuals weeds around plantings
EMU 3											
Weed Control using 200ltr vehicle mounted sprayer	\$1,190.00	14 hrs @ \$85/hr	\$595.00	7 hrs @ \$85/hr	\$595.00	7 hrs @ \$85/hr	\$595.00	7 hrs @ \$85/hr	\$595.00	7 hrs @ \$85/hr	200 Ltr Vehicle mounted sprayer for primary knockdown of weeds accessible by car.
Advanced Koala food tree planting	\$14,720.00	128 KFTS at \$115/tree									advanced 200ml Koala food tree, 3 x 2m starpickets and protective mesh.
Maintenance of KFT's			\$2,100.00	50hrs at \$42/hr	\$2,100.00	50hrs at \$42/hr	\$2,100.00	50hrs at \$42/hr	\$2,100.00	50hrs at \$42/hr	Including watering and spot spraying grasses and annuals weeds around plantings
Weed control	\$21,000.00	500hrs @ \$41/hr	\$10,250.00	250hrs @ \$42/hr	\$4,200.00	100hrs @ \$42/hr	\$2,940.00	70hrs @ \$42/hr	\$2,100.00	50hrs @ \$42/hr	Hand weeding and spraying of woody weeds and grass weeds inaccessible to vehicle mounted sprayer
EMU 4											
Weed Control using 200ltr vehicle mounted sprayer	\$1,190.00	14 hrs @ \$85/hr	\$595.00	7 hrs @ \$85/hr	\$595.00	7 hrs @ \$85/hr	\$595.00	7 hrs @ \$85/hr	\$595.00	7 hrs @ \$85/hr	200 Ltr Vehicle mounted sprayer for primary knockdown of weeds accessible by car.
Monitoring of regeneration	\$588.00	14 hrs @ \$42/hr	\$588.00	14 hrs @ \$42/hr	\$588.00	14 hrs @ \$42/hr	\$588.00	14 hrs @ \$42/hr	\$588.00	14 hrs @ \$42/hr	100m transect with 3 Photo points monitored twice yearly.
Nestbox supply and install	\$1,100.00	11 nestboxes at \$100 each									
Terraform water crystals and fertiliser mix	\$215.00	Supply of Terraform									Terraform is a native plant fertiliser and water crystal mix designed to encourage root establishment of tubestock and encourage water retention during the establishment of plantings.
Photo Monitoring and Audit report	\$294.00	7hrs @ \$42/hr	\$294.00	7hrs @ \$42/hr	\$294.00	7hrs @ \$42/hr	\$294.00	7hrs @ \$42/hr	\$294.00	7hrs @ \$42/hr	Twice yearly monitoring.
COSTING TOTALS (GST excl.)	\$99,907.00		\$33,182.00		\$19,642.00		\$15,442.00		\$13,422.00		

N.B Costings are indicative only and should be reviewed prior to onground works commencing.

Unit 4 supplementary planting contingency											
Tubestock supply	\$11,450.00	5725 tubes @\$2.00									Planting density at 1 tube per m2 Planting rates based on verages from similar sites across the hastings.
Planting	\$12,022.50	Planting at \$42/hr 35 bundles x 500 Bamboo stakes 2									
Plant protection	\$3,773.00	\$107.80/bundle 23 packs x 250 Tree									3 x 120mm stakes per tube
	\$5,842.00	Guards @\$254/pack									1 x 800mm high protective guard per tube
Installation of plant protection	\$11,760.00	280hrs @ \$42/hr									
Maintenance of plantings			\$12,600.00	300 hrs @ \$42/hr	\$12,600.00	300 hrs @ \$42/hr	\$6,300.00	150 hrs @ \$42/hr	\$6,300.00	150 hrs @ \$42/hr	Maintenance to include watering and spraying of grasses and annual weeds around plantings during their establishment.



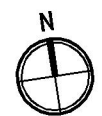
PRELIMINARY
12.05.2016

LEGEND

- EXTENT OF SUBJECT DA (LOT 34 DP 803801)
- PROPOSED RESIDENTIAL SUBDIVISION
- EXISTING CADASTRE
- PMHC CONTOURS (0.5m INTERVALS)
- EXISTING WIRE FENCE
- PROPOSED 1.2m FOOTPATH LOCATION
- FOOTPATH SHAREWAY
- 5.5m BUILDING SETBACK LINE
- STORMWATER SWALE WITH LOW FLOW PIPE
- PROPOSED TALLOWWOOD (*Eucalyptus Microcorys*)
- PROPOSED MIX OF:
 - BOTTLEBRUSH (*Callistemon Viminalis*)
 - BRUSH CHERRY (*Syzygium Australe*)
 - PAPERBARK (*Melaleuca Quinquenervia*)
 - PRICKLY PAPERBARK (*Melaleuca Styphelioides*)DETAILS TO BE PROVIDED AT CC STAGE
- PROPOSED NARROW-LEAVED PEPPERMINT (*Eucalyptus Nicholii*)
- SURVEYED KFT WITH TREE PROTECTION ZONE TO BE RETAINED
- SURVEYED KFT/HBT TO BE REMOVED
- E2 ZONE - ENVIRONMENTAL CONSERVATION
- E3 ZONE - ENVIRONMENTAL MANAGEMENT
- E4 ZONE - ENVIRONMENTAL LIVING
- HABITAT LINKAGE C (AREA 14 KPOM)
- PROPOSED BUILDING ENVELOPE

BUSHFIRE MANAGEMENT REGIME

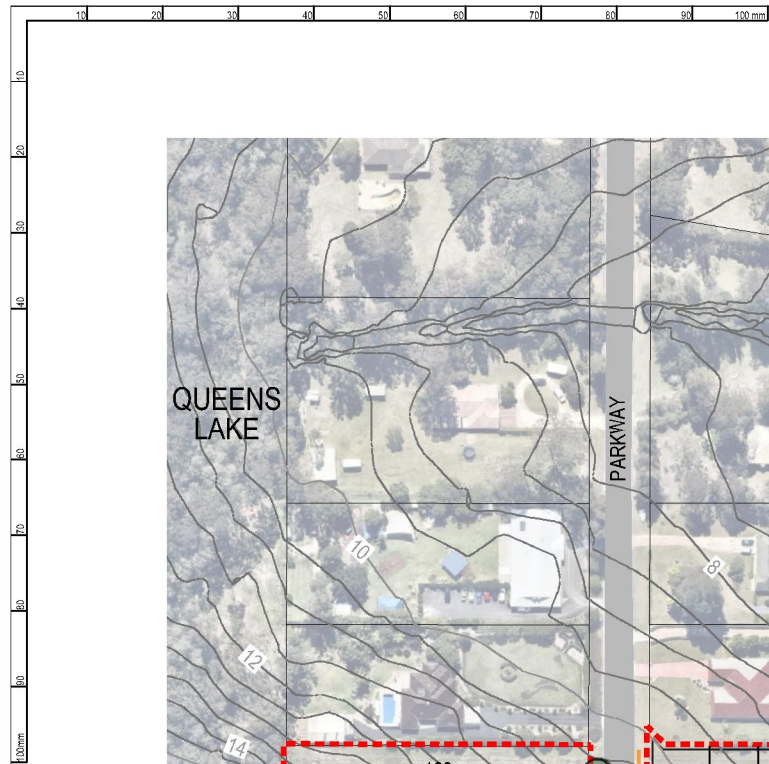
- LOTS 1 - 134 TO BE MANAGED AS INNER PROTECTION AREA (IPA).
- POSITIVE COVENANTS TO BE PLACED ON TITLES AT EACH LOT TO ESTABLISH ABOVE BUSHFIRE MANAGEMENT REGIME.
- REFER TO SOUTH EXHIBIT 04B FOR DETAILS OF BUSHFIRE MANAGEMENT REGIME ON LOTS 135-151.



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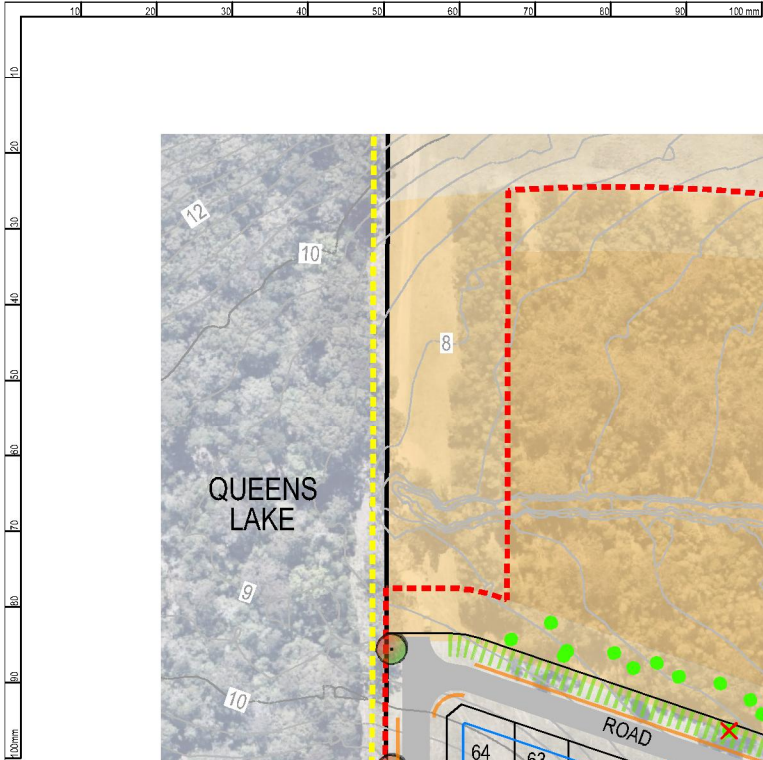
KING + CAMPBELL

King & Campbell Pty Ltd
www.kingcampbell.com.au
A: PO Box 243 Port Macquarie NSW 2444
T: 02 6586 2555
F: 02 6583 4064
E: info@kingcampbell.com.au

REV.	DATE	DESCRIPTION
A	30.09.2015	ISSUED FOR CLIENT REVIEW
B	02.11.2015	ISSUED FOR DA
C	16.11.2015	MINOR AMENDMENTS
D	15.02.2016	MINOR AMENDMENTS
E	08.04.2016	KFT AMENDMENTS
F	22.04.2016	BUSHFIRE MANAGEMENT REGIME ADDED
G	12.05.2016	MINOR AMENDMENTS

DATUM: AHD SCALE: 1:2500 @ A3
0 62.5
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PROJECT NO:	4539	DRAWING TITLE:	SOUTH EXHIBIT 07A - LANDSCAPE CONCEPT WITH FOOTPATH NETWORK			
DA NO.:	N/A	PROJECT:	PROPOSED STAGED RESIDENTIAL SUBDIVISIONS NORTH LOT 33 AND SOUTH LOT 34 DP 803801, FOREST PARKWAY, LAKE CATHIE			
DESIGNED BY:	DAT/BC	CLIENT:	RTS SUPER PTY LTD, STACKS SUPER PTY LTD & TJS SUPER PTY LTD			
DRAWN BY:	MW/JO/CC	DRAWING NO:	4539P_Exhibits	SHEET:	10	REVISION: G
CHECKED BY:	KM/CC					
DATE CREATED:	05.2015					



PRELIMINARY
12.05.2016

LEGEND

- EXTENT OF SUBJECT DA
- EXTENT OF LOT 33 DP 803801
- PROPOSED RESIDENTIAL SUBDIVISION
- EXISTING CADASTRE
- PMHC CONTOURS (0.5m INTERVALS)
- PROPOSED 1.2m FOOTPATH LOCATION
- 5.5m BUILDING SETBACK LINE
- STORMWATER SWALE WITH LOW FLOW PIPE
- PROPOSED BIORETENTION BASIN
- PROPOSED NARROW-LEAVED PEPPERMINT (Eucalyptus Nicholii)
- SURVEYED KFT/HBT WITH TREE PROTECTION ZONE TO BE RETAINED
- SURVEYED KFT TO BE RETAINED
- SURVEYED KFT TO BE REMOVED
- E2 ZONE - ENVIRONMENTAL CONSERVATION
- E3 ZONE - ENVIRONMENTAL MANAGEMENT



CAUTION

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KING + CAMPBELL

King & Campbell Pty Ltd
www.kingcampbell.com.au
A: PO Box 243 Port Macquarie NSW 2444
T: 02 6586 2555
F: 02 6583 4064
E: info@kingcampbell.com.au

REV.	DATE	DESCRIPTION
A	30.09.2015	ISSUED FOR CLIENT REVIEW
B	02.11.2015	ISSUED FOR DA
C	16.11.2015	MINOR AMENDMENTS
D	12.05.2016	MINOR AMENDMENTS

DATUM: AHD SCALE: 1:2500 @ A3
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PROJECT NO:	4539	DRAWING TITLE:	NORTH EXHIBIT 07 - RES LANDSCAPE CONCEPT WITH FOOTPATH NETWORK			
DA NO.:	N/A	PROJECT:	PROPOSED STAGED RESIDENTIAL SUBDIVISIONS NORTH LOT 33 AND SOUTH LOT 34 DP 803801, FOREST PARKWAY, LAKE CATHIE			
DESIGNED BY:	DAT/BC	CLIENT:	RTS SUPER PTY LTD, STACKS SUPER PTY LTD & TJS SUPER PTY LTD			
DRAWN BY:	MW/JO/CC	DRAWING NO:	4539P_Exhibits	SHEET:	08	REVISION
CHECKED BY:	KM/CC					D
DATE CREATED:	05.2015					

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A3

Nest Boxes – Technical Information



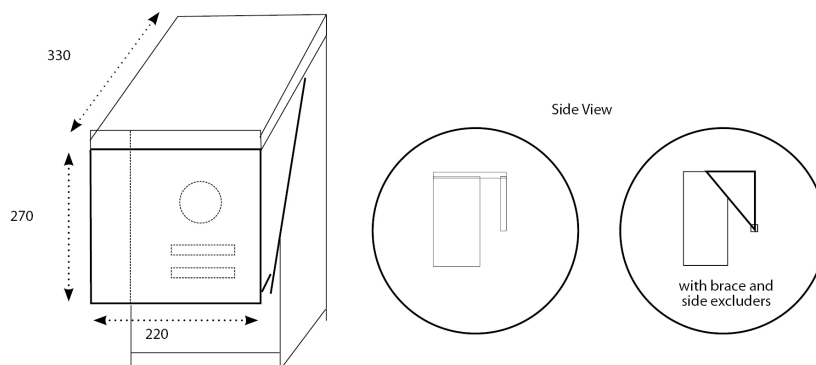
Purple-crowned Lorikeet © BirdLife Australia

Nest boxes are an important aspect to wildlife conservation in any areas where natural nesting hollows are not available. This information sheet provides a little extra technical assistance for anyone who wants to go the next step, and make or install a nest box. For a general introduction to the importance of nest boxes, please read BirdLife Australia Information Sheet entitled 'Nest Boxes for Native Birds'.

The Anti-Myna Baffle

The Anti-Myna Baffle is a simple device which shields the entrance hole to the nest box, and prevents Common Mynas from entering (they always fly directly to the entrance of the nest hollow), while allowing access to rosellas and other parrots, which usually climb up to the entrance of their nesting hollow, and so are able to climb between the baffle and the nest box. It is important to provide a 'ladder' for the parrot to climb up the entrance — chisel or saw a few horizontal grooves into the front of the nest box, or attach a small piece of wire mesh that they can climb up, but do not attach a stick, which may allow Mynas to land there.

The distance that the baffle is placed in front of the nest box should be the same as the diameter of the entrance hole.



A Few More Useful Tips for Nest Boxes

- Add a few wood shavings to the bottom of your nest box; some parrots will not nest there without them.
- In vertical (or steeply sloping) nest boxes, it is a good idea to install a 'ladder' for birds to climb out of the nest, especially if the inner surface of the nest box is relatively smooth. A few horizontal grooves, either sawn or chiselled into the wood will act as 'steps', as will a strip of wire mesh.

- Drill a few drainage holes in the floor of the nest box.

Recommended Dimensions for Nest Boxes

The different requirements of our wildlife necessitate that nest boxes are specially designed to incorporate essential features that mimic the characteristics of their natural nesting hollows. Here are the vital statistics for nest boxes designed to be used by certain species.

SPECIES	INTERNAL DIAM (mm)	DEPTH/LENGTH (mm)	ENTRANCE DIAM (mm)	VERTICAL/HORIZ.	HEIGHT (m)
Black-Cockatoo, Glossy	300	870–1000	160 x 200	v	
Boobook, Southern			150	h	
Cockatoo, Sulphur-crested			150	v	
Corella, Little			150		
Corella, Long-billed			150		
Duck, Australian Wood	200	500	120	v	
Duck, Pacific Black	450 x 300		120	h	
Galah	200		120–150	v	
Kestrel, Nankeen	400		100	v	
Kingfisher, Sacred	130		75	h	
Kookaburra, Laughing	300–400 x 150–200	500–600	open, >130	h	5–10
Lorikeet sp.	120	600	60	h	5
Lorikeet, Little	400	750	25–30		
Lorikeet, Musk			25–30		
Lorikeet, Purple-crowned			25–30		
Owl, Eastern Barn			open, >150	h	
Owlet-nightjar, Australian	100–150	300–400	30–120	v	5
Pardalote sp.	120	400–500	30–45	h	5
Pardalote, Striated	90–200 x 120–150	200	25–35	v/h	5
Parrot, Red-rumped	100–240	400–600	25–120	v/h	
Rosella sp.	120–200	350–800	70–120	v/h	
Rosella, Crimson	150–200	350–800	75–100	v/h	
Rosella, Eastern	135–240	350–800	60–100	v/h	
Shrike-thrush, Grey	150–200 x 200–300	150–300	open, >150	h	3
Swallow, Welcome	130		open	h	
Teal, Chestnut	200–400 x 300	450–750	80–120	v	
Teal, Grey	200–450 x 300	450–750	80–120	v	
Treecreeper sp.	90–150	100–400	50–80	v	
Treecreeper, White-throated	75–100	300–400	50–70	v	5
Antechinus, Yellow-footed	70–100 x 150–240	200–250	20–25	v	
Bat sp.			15–20 (slit)		
Bat, Chocolate Wattled			10 (slit)		
Bat, Gould's Wattled			10 (slit)		
Bat, Lesser Long-eared			10 (slit)		
Brush-tail-Possum	210 x 240–320	380–400	90–150	v	4–8
Glider, Feather-tailed	200–250	300–450	20–25	v	4–8
Glider, Squirrel			60		
Glider, Sugar			25–50		
Phascogale, Brush-tailed			25–30		
Ringtail-Possum	250	350–400	60–90	v	4–8

Further Reading ~ for specific nest box designs, consult any of these references:

Adams, George Martin. (1980). Birdscaping Your Garden. Rigby, Adelaide.

Bendigo Field Naturalists Club. (n.d.). Cosy Abodes for Fur and Feather. (leaflet).

Elliot, Rodger. (1994). Attracting Wildlife to Your Garden. Lothian, Melbourne.

Grant, Peter. (2003). Habitat Garden. Attracting Wildlife to Your Garden. ABC Books, Sydney.

Melbourne Zoo Education Service. (n.d.). Nest Boxes for Native Birds and Mammals. (leaflet).

Morrison, Rob. (1996). The Nestbox Project. Nature Australia 25(5): 56–63.

Pedler, Lynn. (1996). Artificial nest hollows for black-cockatoos. Eclectus 1: 13.

Pizzey, Graham. (2000). The Australian Bird Garden. Creating Havens for Native Birds. Angus & Robertson, Melbourne.

RSPCA. (n.d.). Learn to Live with Possums. (leaflet).

Trainor, Russell. (1995). Artificial nest-hollows. Bird Observer 759: 5–7

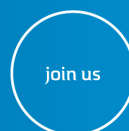
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Port Macquarie – Hastings Council

Vegetation Management Plan Requirements

The following requirements are to be addressed for the development of VMPs.

EXISTING SITE CONDITIONS

- Vegetation map of existing and retained vegetation. Vegetation needs to be mapped at vegetation community level. Structure condition (age and forms) needs to be included.
- Weed map detailing current weed condition (species, extent, density).
- Soils map.
- Topography.

PROPOSED ENVIRONMENTAL WORKS

- Management units mapped, staging and costing table defined for each unit.
- Planting works table (where required) for each unit. Planting table to identify species, area and planting densities (plants/m²).
- Bush regeneration works map and table for each work unit. Detail on type and timing of control works and target weed species.
- Type, number and location of Nesting Boxes (if applicable).
- Mapped APZ and treatment requirements (if applicable).
- Fire History mapped and Ecological Burning requirements identified (for bushland areas >1ha).
- Inclusion of management recommendations from any ecological assessments.
- List of proposed native plants to be planted (if applicable).

MONITORING AND REPORTING

- Detailed monitoring and audit proforma for each management unit.
- Schedule of proposed reporting periods (minimum yearly reporting).

MAINTENANCE AND CONTINGENCY

- Detail on scheduled maintenance of plantings, nesting boxes, APZ, and bush regeneration areas.
- Contingency plans for failed works.

COSTINGS

- Annual costings of each management unit and the overall budget for life of the VMP.

MAPPING OF ENVIRONMENTAL LANDS

- Applicant to submit geo-referenced file (AutoCAD DXF or GIS shapefile) of environmental lands.

DEDICATION AND VOLUNTARY PLANNING AGREEMENTS

- Where the environmental land is to be dedicated to Council. The timing of dedication in relation to rehabilitation stages and development construction is to be stated.



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VMP Audit and Monitoring Proforma

Area No.	
Date of Inspection	
Personnel Recording	
Revegetation Performance Approximate date the area was first rehabilitated	
Sample Size – Area (m ²) of sample site	

Map of Management Unit

Previous Activity since last audit / report:

Regeneration/ Revegetation hours allocated

Regeneration / Revegetation hours spent

Previous audit / report actions undertaken:

General Vegetation Area Performance / Observations

	Major	Minimal	None	N/A
Evidence of any pollution, rubbish, litter, excessive sediment or erosion.				
Evidence of weeds adjacent to the rehabilitation area likely to impact it.				
Evidence of plant pests and diseases or feral animal populations.				
	Good	Fair	Poor	N/A
Evidence of macro fauna colonisation / use (scats, tracks and sitings)				
Evidence of micro fauna colonisation / use (insects, lizards etc)				
Assessment of overall Habitat Value (eg. Animal hiding places, vegetation cover, food etc.)				

Regeneration / Weed Control Performance

Approximate date the area first underwent weed control

Yes

No

Natural Recruitment: Natural recruitment observed

Estimate % coverage (by area projected to ground)

Estimate % age composition

Weeds species identified

Canopy

Ground

Mature

Seedlings

	Canopy	Ground	Mature	Seedlings

Weed Control Comments and Observation Notes:



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Revegetation Performance		Approximate date the area was first rehabilitated			
		Sample Size – Area (m2) of sample site			
Vegetation/ Plant Growth:					
Approximate native plant count within sample area:	Trees	<input type="text"/>	Shrubs	<input type="text"/>	Grasses / Herbs
Species Diversity : (approx no. of different species in each stratum)	Trees	<input type="text"/>	Shrubs	<input type="text"/>	Grasses / Herbs
Species Growth (m): (height of average specimen in each stratum class in metres)	Trees	<input type="text"/>	Shrubs	<input type="text"/>	Grasses / Herbs
		>50%	50-20%	20-5%	<5%
Canopy Cover: Estimate % coverage by area (projected to ground)		<input type="text"/>	<input type="text"/>	<input type="text"/>	Nil
Plant Mortality Rates : Estimate percentage death of new plants		<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Bare Soil : Percentage coverage of area		<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Humus / Leaf Litter Depth : (mm) average in sample area	<input type="text"/>				
		Yes	No		
Fauna: Evidence of plant damage / death caused by feral animals?		<input type="text"/>	<input type="text"/>		
Detail:					
				Yes	No
Number of nest boxes in monitoring area?	<input type="text"/>	Nest boxes inspected?	<input type="text"/>	<input type="text"/>	<input type="text"/>
Detail any nest box issues: nest box damage, takeover by feral animals, damage to tree caused by nest box.					
GENERAL COMMENTS AND OBSERVATION NOTES:					
CORRECTIVE ACTIONS REQUIRED / RECOMMENDED:				Yes	No
Follow up: were previous corrective actions successful and issues addressed?				<input type="text"/>	<input type="text"/>
Detail follow up and new corrective actions proposed.					



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