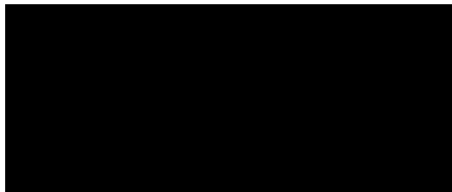


Attachment 7

Revegetation Management Plan (BES, 2018)

EPBC 2012/6274
LOTS 6 & 317 MINNINUP RD, DALYELLUP
REVEGETATION MANAGEMENT PLAN

Prepared for



Draft Report No. J07013i
18 December 2018

BAYLEY ENVIRONMENTAL SERVICES
30 Thomas Street
SOUTH FREMANTLE WA 6162

DECLARATION OF ACCURACY

I declare that:

1. To the best of my knowledge, all the information contained in, or accompanying this Revegetation Management Plan dated 18 October 2018 is complete, current and correct.

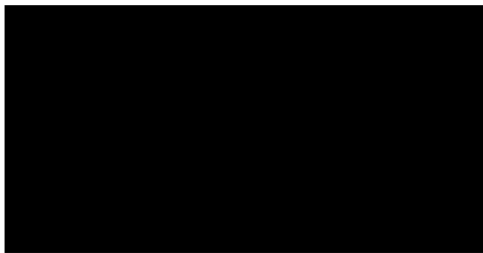
2. I am aware that:

a. Section 490 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading.

b. Section 491 of the EPBC Act makes it an offence for a person to provide information or documents to specified persons who are known by the person to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) where the person knows the information or document is false or misleading.

c. The above offences are punishable on conviction by imprisonment, a fine or both.

Signed



Revision History

Version	Date	Description	Author
1	19 July 2018	Draft for internal review	POB
2	2 August 2018	Draft for DEE review	POB
3	21 August 2018	Revised draft for DEE review	POB
4	17 December 2018	Revised draft for DEE review	POB
5	18 December 2018	Revised draft for DEE review	POB
6	18 December 2018	Final for signature	POB

EXECUTIVE SUMMARY

Introduction

On 17 December 2017 a delegate of the Minister for the Environment and Energy approved a proposal by Mr Colin Piacentini to clear 39ha of native vegetation on Lots 2-5 Maidment Parade (formerly Pt Lots 313-316 Minninup Road), Dalyellup. The approval is subject to EPBC Act conditions including a requirement to prepare a Revegetation Management Plan dealing with the planting of at least 28ha of black cockatoo and Western Ringtail Possum habitat on land adjacent to the development site (Condition 4, Appendix A).

The planting site is owned by the Western Australian Planning Commission (WAPC), is zoned Regional Open Space (Parks & Recreation) under the Greater Bunbury Region Scheme (GBRS) and is expected to be vested in the Department of Biodiversity, Conservation & Attractions (DBCA) as a Regional Park for conservation.

The objective of the planting is to increase the habitat value of the planting area for black cockatoos and Western Ringtail Possums by increasing the density of food resources and nesting trees and by creating a continuous interconnected tree canopy between areas of existing bushland to the west and east of the project area.

Site Description

The planting site has been used for grazing for a number of decades, with the result that the remaining vegetation consists largely of widely-spaced mature trees (mostly Tuart) over pasture grasses and weeds.

One hundred and four native plant species were recorded in the planting site and surrounds, as well as 51 introduced weed species. The species list for planting will be drawn from the native plant species list. Weed control before and after planting will be essential to ensuring the success of the plantings. Methods of pre-planting weed control will be tested in trial plots before the major planting program is undertaken.

Planting Programme

The planting will be undertaken by a professional rehabilitation specialist engaged by Mr Piacentini. The planting will begin with a series of trials to test different weed control and ground preparation techniques (herbicides, scalping, burning, ripping, mulching), planting methods (tube stock vs direct seeding) and seedling protection measures (fencing vs tree guards).

Tuart, Jarrah, Banksias, Peppermint, Flooded Gum and Paperbarks will be the primary tree species used in the planting, with a particular emphasis on Peppermint (the main

food source for possums) and Banksias (the main food source for black cockatoos). Understorey species will also be planted to maximise the sustainability and habitat value of the vegetation.

The planting will be carried out by a combination of direct seeding and tube stock sourced from local nurseries, grown from seed collected on or within 5km of the planting site.

Tube stock planting will be undertaken at a minimum overall density of 825 seedlings per hectare (average 3.5m spacing), giving a total of about 23,000 seedlings over the 28ha planting site. Overstorey trees (Tuart and Jarrah) will be planted at a spacing of about 20m in upland areas (25/ha, 360 overall). Mid-storey species (Banksias and Peppermint in uplands, paperbarks in wetland) and understorey species will each be planted at 5m spacing.

In order to maximise the habitat value for possums and to minimise the time required for the habitat values to develop, Peppermint will be planted at a higher density of 400/ha (5m spacing) in a mosaic of 1ha patches across the eastern upland area. Within these patches, the Peppermints and Banksias will give a combined mid-storey density of 600/ha (4m spacing). About eight of these denser patches will be created across the planting area. Each patch will be of sufficient size to form a viable ringtail possum habitat, with animals able to move through the lower-density areas between the patches.

If direct seeding is employed, seed will be applied at a rate of approximately 4 kg/ha, depending upon the particular species being seeded. The seed will be prepared by scarifying, soaking and/or smoking before planting, as appropriate to the species.

The planting density is designed to allow for 20% attrition over the first few years of growth, leading to an ultimate density of 320 mid-storey trees per hectare over most of the site and 480/ha in the high-density upland zone.

Tube stock planting will be undertaken nominally in June after the first significant winter rains. The timing may be varied depending on the arrival of significant rainfall. Direct seeding will be undertaken approximately one to two months earlier than tube stock planting, before the onset of winter rains.

Tube stock planting will be undertaken by hand using a "Pottiputki" or similar. Direct seeding will be carried out with equipment designed for native seed, with the seeding depth and configuration set for the particular species being seeded.

The seedlings will be protected from grazing by kangaroos and rabbits by fencing or tree guards, depending on the area and the results of the pre-planting trials.

The tree guards will be kept in place and maintained for at least two years, after which the new growth is expected to be large and robust enough to withstand grazing. After

two years, the tree guards will be inspected and progressively removed once the plants reach a height of 1m for trees and 0.5m for shrubs (based on advice from Tranen Revegetation Systems Pty Ltd). The fences will be left in place for five years. After this time they will be either removed or left in place, depending on the wishes of the WAPC and the DBCA.

Pre-planting Trials

In order to optimise the site preparation, planting and protection techniques for the site, a series of trials will be carried out before the full-scale planting begins. The trials will be conducted in three 2.5ha - 3.75ha plots on upland, wetland and wetland buffer locations and will begin in the autumn immediately following the start of clearing (Year 1), with the commencement of 12-month weed control in the wetland and buffer. The trial plantings will be completed in April - June of the following year.

The trial plots will be monitored for twelve months after planting and the success of the different strategies (including seedling survival, growth rates and need for follow-up weed control) assessed. The most successful and practical methods will be used for the major planting works to be completed in the year following the trial plantings (Year 3).

Post-planting Monitoring and Maintenance

Post-planting monitoring and maintenance will extend for twenty years after planting and will include:

- follow-up weed treatments;
- checking and maintaining tree guards and fences;
- monitoring the success of regrowth; and
- infill plantings as required.

The results of monitoring will be reported to the DEE and published on Mr Piacentini's website.

Completion and Success Criteria

The planting density is designed to allow for 20% attrition of seedlings. Success of the planting will therefore be defined as:

- a density of at least 20 overstorey trees, 320 mid-storey trees (480/ha in the high-density upland zone) and 320 understorey species per hectare in good health after five years; and
- a minimum 80% canopy cover over the planting area after twenty years.

Implementation

Mr Piacentini will commission and fund the revegetation work described in this plan. Following planting, Mr Piacentini will monitor and maintain the revegetation for five years, undertaking infill planting as necessary to achieve the completion criteria.

After five years, assuming the completion criteria as set out in this report have been achieved, Mr Piacentini will continue to manage the offset area at a reduced intensity, focussing on maintenance of firebreaks, annual inspections, aerial imagery-based measurements of canopy cover and maintenance of cockatoo nest boxes, and five-yearly surveys for possum and cockatoo usage.

The management arrangements will be reviewed at the end of the five-year intensive management period following achievement of the completion criteria. Should the DBCA express a preference to take over management of the site, Mr Piacentini will be open to providing funding at that time to DBCA to cover the ongoing management, subject to the negotiation of a suitable funding agreement and the approval of DEE.

If, at the end of the five-year intensive management period or at any time during the following 15 years, the DBCA obtains State government funding for management of the site as part of the Regional Parks network in the Greater Bunbury Region, Mr Piacentini will cease managing the site and hand responsibility to the DBCA, subject to the approval of DEE.

Mr Piacentini will review and audit the revegetation works each year against the requirements of the EPBC Act approval and the objectives and criteria of the Revegetation Management Plan. The results of the annual audit will be reported to the DEE along with the results of monitoring.

—

TABLE OF CONTENTS

	Page
1.0 INTRODUCTION	1
1.1 Background	1
1.2 Objectives of Revegetation	2
1.3 Purpose of the Plan	2
1.4 Risk Assessment and Management	2
2.0 SITE DESCRIPTION	5
2.1 Location and Tenure	5
2.2 Existing Vegetation	5
2.2.1 Overview	5
2.2.2 Vegetation Type and Condition	6
2.2.3 Flora	7
2.2.4 Weeds	9
3.0 PLANTING PLAN	11
3.1 Implementation	11
3.2 Site Preparation	11
3.2.1 Weed Control	11
3.2.2 Ground Preparation	12
3.3 Species Selection and Source	12
3.4 Planting Density	13
3.5 Timing of Planting	14
3.6 Planting Method	14
3.7 Protection of Seedlings	15
3.8 Pre-Planting Trials	15
4.0 POST-PLANTING MAINTENANCE	17
4.1 Weed Control	17
4.2 Monitoring	17
4.2.1 Objectives of Monitoring	17
4.2.2 Monitoring Programme	18
4.3 Completion and Success Criteria	19
4.4 Contingency Response	20
4.5 Reporting	20
5.0 IMPLEMENTATION	21
5.1 Roles and Responsibilities	21
5.2 Implementation Schedule	22
5.3 Adaptive Implementation	22
5.4 Long-Term Management	23
5.5 Review and Audit	24
6.0 REFERENCES	25

LIST OF TABLES

Table	Title	Page
1.1	Risk Workshop Outcomes	3
2.1	Native Flora Species List – Planting Site and Surrounds	8
2.2	Weed Species – Planting Site and Surrounds	9
3.1	Planting Zones	14
5.1	Implementation Schedule	22

LIST OF FIGURES

Figure	Title
1	Planting Site Layout

LIST OF APPENDICES

Appendix	Title
A	DEE Approval and Conditions
B	WAPC Advice on Access and Long-Term Management
C	Annual Report Template

1.0 INTRODUCTION

1.1 Background

Mr Colin Piacentini is proposing to clear 39ha of native vegetation on Lots 2-5 Maidment Parade (formerly Pt Lots 313-316 Minninup Road), Dalyellup. The vegetation consists of parkland-cleared Tuart woodland in Degraded to Completely Degraded condition, which has been identified as poor quality feeding habitat for Carnaby's and Forest Red-tailed Black Cockatoos and Western Ringtail Possums. It includes 292 Tuart trees with diameter at breast height (dbh) of at least 0.5m. Of these, 54 have visible hollows or spouts with openings large enough (>100mm) to be potentially suitable as nesting sites for black cockatoos, plus another 74 with smaller hollows that might be potential future nest sites. Figure 1 shows the area to be cleared.

The site would formerly have supported a mid-storey including Banksia (*B. attenuata* and *B. grandis*) and Peppermint (*Agonis flexuosa*) on the upland parts and paperbarks (*Melaleuca preissiana* and *M. raphiophylla*) in the wetland, which would have provided feeding habitat for Black Cockatoos as well as feeding and nesting habitat for Western Ringtail Possums.

Clearing and development of the site is expected to begin at the northern end of the development area. Depending on the terms of State government development approvals, the clearing may occur in one campaign or may take place in stages over approximately ten years.

A delegate of the Minister for the Environment approved, under the EPBC Act, the clearing on 17 October 2017, subject to conditions including a requirement to prepare and implement a Revegetation Management Plan dealing with the revegetation of at least 28ha of black cockatoo and Western Ringtail Possum habitat on land adjacent to the development site. The approval conditions are attached in Appendix A, along with a table showing where in this Revegetation Management Plan each relevant approval condition is addressed.

In accordance with Approval Condition No. 4, Mr Piacentini will plant 28ha of Tuart-Banksia-Peppermint woodland on land recently transferred to the ownership of the WAPC, comprising Pt Lots 6 and 317 Minninup Rd. This land is zoned Regional Open Space (Parks & Recreation) under the Greater Bunbury Region Scheme (GBRS) and is expected to be vested in the Department of Biodiversity, Conservation & Attractions (DBCA) for conservation. The WAPC has agreed to the proposed planting within the ROS and has confirmed its intent to manage the land solely for conservation. A letter from the WAPC to this effect is attached in Appendix B.

1.2 Objectives of Revegetation

The objective of the planting is to restore foraging habitat and potential breeding habitat for black cockatoos and Western Ringtail Possums in a 28ha area within ROS adjacent to the development area, by increasing the density of food resources and nesting trees and by creating a continuously connected tree canopy between areas of existing bushland to the west and east of the project area.

1.3 Purpose of the Plan

The purposes of this Revegetation Management Plan (RMP) are to:

- set out the proposed planting programme, including site preparation, planting techniques, species lists and planting density;
- set completion and success criteria for the planting;
- set out a monitoring programme to assess the success of the plantings;
- assess the risks to the success of the programme and ways to mitigate those risks;
- establish a review structure to ensure the plan stays current and relevant;
- identify contingency response measures in the event of adverse events;
- set out a reporting schedule for reporting the outcomes of the planting; and
- identify roles and responsibilities for implementing and funding the programme.

1.4 Risk Assessment and Management

A risk workshop was undertaken by correspondence between April and July 2018 with representatives of Mr Piacentini, the DBCA, the Forest Black Cockatoo and Carnaby's Cockatoo Recovery Teams and the Western Ringtail Possum Recovery Team. The purpose of the workshop was to identify risks to the success of the revegetation programme, their likelihood, the severity of their consequences and the management measures available to mitigate those risks. Where appropriate, the outcomes of the workshop have been incorporated in formulating and finalising the Revegetation Management Plan.

The participants in the workshop were:

For Mr Piacentini	Richard Denby (Development Manager)
	Phillip Bayley (Bayley Environmental Services)
DBCA	Kim Williams (Project Leader, Nature Conservation)
	Peter Hanly (Senior Regional Planning Officer)
Forest Black Cockatoo Recovery Team	Kim Williams, DBCA
Carnaby's Cockatoo Recovery Team	Geoff Barrett, DBCA (Executive Officer)
WRP Recovery Team	Deon Utber, DBCA (Chairman)

Table 1.1 summarises the outcomes of the risk workshop.

Table 1.1 Risk Workshop Outcomes

<i>Risk</i>	<i>Likelihood</i>	<i>Consequence</i>	<i>Inherent Risk</i>	<i>Mitigation</i>	<i>Residual Risk</i>
Minor fire	Likely	Minor	Low	Control access Maintain firebreaks	Low
Major fire	Rare	Critical	High	Control access Maintain firebreaks	Low
General failure of regrowth	Unlikely	Critical	High	Professional contractor Monitor growth Replant as necessary	Low
Local failure of regrowth	Likely	Minor	Low	Professional contractor Monitor regrowth Replant as necessary	Low
Damage by vandals	Likely	Minor	Low	Control access Maintain fences Monitor Replant as necessary	Low
Piacentini bankruptcy	Rare	Major	Medium	Hand over to DBCA	Low
Piacentini sells the project	Rare	Minor	Low	Include management responsibility in sale	Low
Damage by grazers/browsers	Possible	Major	High	Fence planting area Eradicate rabbits by baiting Monitor and maintain fences Monitor vegetation	Low
Defective or unviable tube stock	Rare	Major	Medium	Obtain stock from accredited nursery Locally source seed Replant as necessary	Low
Drought during early stage growth	Likely	Major	High	Monitor seedling health Water seedlings as necessary Replant as necessary	Low
More than 5% of revegetation area overrun/outcompeted by weeds	Possible	Major	High	Increase monitoring frequency Undertake post-planting weed control	Low
Planting density insufficient to achieve effective WRP canopy connectivity within the period	Likely	Major	High	Increase planting density of WRP-specific mid-storey elements (Peppermint)	Low

Monitoring regime insufficient to detect negative changes and respond in a timely manner	Likely	Major	High	Increase frequency of monitoring regime.	Low
Disease including dieback (<i>Phytophthora cinnamomi</i>) and Agonis canker	Unlikely	Major	High	Not susceptible to P.c. due to calcareous soils and species selection Obtain tube stock from accredited disease-free nursery Prohibit importation of fill Practise hygiene of vehicles & machinery Control vehicle access during & after planting Clean down vehicles before entry 3-monthly surveillance to detect Agonis canker	Low
Failure to meet completion criteria	Unlikely	Major	High	Monitor regrowth Remedial planting as necessary	Low
Failure to secure land for conservation	Rare	Moderate	Low	Published WAPC advice and policy designates land for conservation	Low
Insufficient funds allocated	Possible	Major	High	Mr Piacentini has committed & is obliged to carry out works Allocate extra funds as required	Low

2.0 SITE DESCRIPTION

2.1 Location and Tenure

The proposed planting site is located in Lots 6 and 317 Minnipup Road, Dalyellup, about 10km south of Bunbury and immediately south and west of the site of the proposed clearing. The boundaries of the planting site have been agreed with the DBCA so as to provide the greatest habitat benefits while offering the most practical configuration for planting and future management. Figure 1 shows the agreed location and layout of the planting site.

The planting site has an area of 28ha and is owned freehold by the WAPC. It is part of a larger 98ha parcel acquired from Mr Piacentini by the State government in 2014, which is expected to be vested in the DBCA to be managed for conservation via a management agreement under the *Conservation and Land Management Act 1984*.

2.2 Existing Vegetation

2.2.1 Overview

The planting site has been used for grazing for a number of decades, with the result that the remaining vegetation consists largely of widely-spaced mature trees over pasture grasses.

Hedde *et al.* (1980) mapped the following vegetation complexes within the planting site (Figure 1):

- Quindalup Complex – A variable coastal dune complex consisting mainly of two alliances: the strand and foredune alliance and the mobile and stable dune alliance. The latter is the only one represented within the planting site, and consists of *Eucalyptus gomphocephala* open woodland over an understorey including *Agonis flexuosa*, *Acacia cyclops*, *Lepidosperma gladiatum*, *Myoporum insulare* and *Olearia axillaris*.
- Vasse Complex – Typically closed scrub of *Melaleuca* species in low-lying wet areas with fringing woodlands of *Eucalyptus rudis* – *Melaleuca* spp. and open forest of *Eucalyptus gomphocephala* – *E. marginata* – *Corymbia calophylla*. This complex is mapped in the central part of the planting site.
- Karrakatta Complex - Central and South – Predominantly open forest of *Eucalyptus gomphocephala*, *E. marginata*, *Corymbia calophylla* and *E. marginata* - *Banksia* spp. woodlands. This complex is mapped in the eastern part of the planting site.

The Heddlé *et al.* (1980) mapping is broad-scale and generally follows the landform-soil boundaries mapped by Churchward and McArthur (1980). Closer examination of the vegetation on the site suggests that the Quindalup Complex is confined to the dunes west of the wetland, the Vasse Complex to the wetland itself and the Karrakatta Complex-Central and South to the area east of the wetland.

2.2.2 Vegetation Type and Condition

The vegetation and flora of the subject land have been surveyed on four occasions by McCutcheon (2001 and 2002), RPS Bowman Bishaw Gorham (2006) and Weston (2007 and 2009). The findings of these surveys were consolidated in the Environmental Summary Report (BES, 2010) and are summarised below.

The eastern part of the planting site supports an open forest of Tuart (*Eucalyptus gomphocephala*) with Jarrah (*E. marginata*) and Marri (*Corymbia calophylla*) over a woodland of *Banksia attenuata* and *B. grandis* over scattered native understorey species including *Hibbertia cuneiformis*, *Jacksonia furcellata*, *Macrozamia reidleyi*, *Lepidosperma gladiatum* and *Pteridium esculentum* over pasture grasses and weeds including *Lagurus ovatus*, *Avena barbata*, *Bromus diandrus*, *Briza maxima* and *Lupinus cosentinii*.

The low-lying central part contains the wetland and is largely cleared, with scattered paperbarks (*Melaleuca preissiana*) over pasture grasses and scattered native species including *Baumea articulata*.

The dunes west of the wetland support a mosaic of Tuart open forest to woodland with a middle storey of Peppermint (*Agonis flexuosa*). Except for a few small areas, the understorey comprises various mixtures of pasture grasses and other established alien grasses and herbaceous weeds. The most common or conspicuous native understorey species include the shrubs *Rhagodia baccata*, *Diplolaena dampieri*, *Myoporum caprarioides*, *Templetonia retusa*, *Leucopogon parviflorus* and *Spyridium globulosum*, the lianes *Hardenbergia comptoniana* and *Clematis linearifolia*, the herbs *Acanthocarpus preissii* and the sedge *Lepidosperma gladiatum*. Significant areas west of the wetland have been cleared and consist only of pasture grasses and weeds.

Figure 1 shows a vegetation map of the planting site. Tuart is the dominant tree in all of the native upland units shown on the map, and Peppermint is a common tree in all of them. *Hibbertia cuneiformis*, a shrub under 2m tall, and *Lepidosperma gladiatum*, a large broad-leafed sedge, are the most common and widespread upland native species. Dune Onion Weed (*Trachyandra divaricata*) and Arum Lily (*Zantedeschia aethiopica*) are conspicuous weeds.

The wetland section is mostly dominated by alien species, mainly pasture grasses.

The mapped vegetation units within the planting site (Figure 1) are:

Upland (dry land) Units

TPW	Tuart (<i>Eucalyptus gomphocephala</i>) Woodland over Peppermint (<i>Agonis flexuosa</i>) Low Woodland.
TP	Tuart (<i>Eucalyptus gomphocephala</i>) Open Woodland to Scattered Trees over Peppermint (<i>Agonis flexuosa</i>) Low Open Woodland to Scattered Trees.
TPF	Tuart (<i>Eucalyptus gomphocephala</i>) Open Forest over Peppermint (<i>Agonis flexuosa</i>) Low Open Forest.
PBT	Peppermint (<i>Agonis flexuosa</i>) – <i>Banksia attenuata</i> Low Open Forest to Woodland, with Tuart tree(s).
Tfw	Tuart Open Forest to Woodland.
Pw	Peppermint Woodland.
AH	Aliens – mixed grasses and other herbaceous plants.

Wetland Units

M	<i>Melaleuca raphiophylla</i> Open to Closed Low Forest.
C	<i>Cirsium vulgare</i> – <i>Centella asiatica</i> Closed mixed, mostly alien Herbland.

The condition of the vegetation is assessed as Degraded or Completely Degraded based on the condition scale of Keighery (1994). Disturbance to the vegetation structure has been caused by partial clearing, grazing, weed invasion, tree deaths and disease. The eastern part of the wetland is particularly severely degraded, having been used for several decades as cleared grazing land and regularly slashed.

2.2.3 Flora

One hundred and four native plant species were recorded during a series of traverses conducted in the planting site and surrounds, as well as 51 introduced weed species. Table 2.1 shows the native species recorded on the site. The species list for planting will be drawn mostly from this list, with individual species targeted to the appropriate wetland or upland situation.

Table 2.1 Native Flora Species List – Planting Site and Surrounds

Upland Species	Sowerbaea laxiflora
Acacia alata	Spyridium globulosum
Acacia cochlearis	Templetonia retusa
Acacia pulchella	Thysanotus ?manglesianus
Acacia rostellifera	Trachymene pilosa
Acanthocarpus preissii	Xanthorrhoea brunonis
Banksia attenuata	Xanthorrhoea gracilis
Banksia grandis	
Burchardia congesta	Wetland Species
Caladenia latifolia	Apium prostratum
Cassytha ?racemosa	Baumea articulata
Clematis linearifolia	Baumea juncea
Clematis pubescens	Baumea rubiginosa
Conostylis aculeata subsp. ?preissii	Caesia ?micrantha
Corymbia calophylla	Caladenia hirta
Corynotheca micrantha	Centella asiatica
Daucus glochidiatus	Chamaescilla corymbosa
Daviesia divaricata	Conostephium preissii
Desmocladius sp.	Craspedia variabilis
Dichopogon preissii	Cyathochaeta avenacea
Diplolaena dampieri	Drosera ?menziesii
Drosera macrantha subsp. macrantha	Drosera stolonifera
Eucalyptus gomphocephala	Epilobium ?billardioreanum
Eucalyptus marginata	Ficinia nodosa
Exocarpos sparteus	Gahnia ?trifida
Geranium solanderi	Isotropis cuneifolia
Hardenbergia comptoniana	Lagenophora huegelii
Hibbertia hypericoides	Lepidosperma ?longitudinale
Hibbertia racemosa	Lobelia anceps
Hovea trisperma	Meionectes ?brownii
Jacksonia ?sternbergiana	Melaleuca raphiophylla
Jacksonia furcellata	Patersonia occidentalis
Kennedia prostrata	Pelargonium ?littorale
Lasiopetalum membranaceum	Pteridium esculentum
Lepidosperma ?gracile	Senecio ?pinnatifolius
Lepidosperma ?tenuis	
Lepidosperma angustatum	Upland and Wetland Species
Lepidosperma gladiatum	Acacia saligna
Leucopogon propinquus	Agonis flexuosa
Liparophyllum violifolium	Austrostipa ?compressa
Logania vaginalis	Caladenia flava
Lomandra sp.	Dichondra repens
Luzula meridionalis	Eryngium pinnatifidum subsp. ?pinnatifidum
Macrozamia riedlei	Haemodorum spicatum
Olearia axillaris	Hibbertia cuneiformis
Opercularia vaginata	Myoporum caprarioides
Orthrosanthus laxus	Opercularia ?hispidula
Oxalis ?perennans	Parietaria debilis
Pelargonium australe	Phyllanthus calycinus
Persoonia longifolia	Tetraria capillaris
Ptilotus drummondii var. drummondii	Tricoryne elatior
Rhagodia baccata subsp. baccata	

2.2.4 Weeds

Most of the planting area (excepting parts of the western dunes) is heavily infested with weeds, with 51 species recorded in the planting site and surrounds. In the upland areas the cover is mostly pasture grasses such as Veldt Grass, Couch and Clover, with a large number of other species present. Large areas of the wetland are covered by Asian Bulrush (Typha), although there is little of this in the planting area, which is mostly covered by Couch grass with a heavy population of Spear Thistle (*Cirsium vulgare*). Table 2.2 lists the weed species found on the site.

Weed control before and after planting will be essential to ensuring the success of the plantings. Methods of pre-planting weed control including knockdown herbicides (one month and twelve months prior), scalping and burning will be tested in trial plots before the major planting program is undertaken.

Table 2.2 Weed Species - Planting Site and Surrounds

Latin Name	Common Name	Occurrence (U=Upland W=Wetland)
<i>Anagallis arvensis</i>	Scarlet Pimpernel	U
<i>Arctotheca calendula</i>	Cape Weed	U
<i>Avena sativa</i>	Common Oat Grass	U
<i>Briza minor</i>	Shivery Grass	U
<i>Bromus diandrus</i>	Great Brome	U
<i>Carduus pycnocephalus</i>	Slender Thistle	U
<i>Carex ?divisa/appressa</i>	Divided/Tall Sedge	W
<i>Centaureum ?erythraea</i>	Common Centaury	W
<i>Cerastium glomeratum</i>	Mouse Ear Chickweed	U
<i>Cirsium vulgare</i>	Spear Thistle	U/W
<i>Cotula coronopifolia</i>	Water Buttons	U/W
<i>Cotula turbinata</i>	Funnel Weed	U
<i>Crassula glomerata</i>	Crassula	U
<i>Cynodon dactylon</i>	Couch	U/W
<i>Dipogon lignosus</i>	Dolichos Pea	U
<i>Ehrharta longiflora</i>	Annual Veldt Grass	U
<i>Euphorbia peplus</i>	Petty Spurge	U
<i>Ficus carica</i>	Commn Fig	W
<i>Fumaria capreolata</i>	Whiteflower Fumitory	U
<i>Galium ?murale</i>	Small Goosegrass	U
<i>Geranium sp.</i>	Geranium	U
<i>Gomphocarpus fruticosus</i>	Narrow-leaf Cottonbush	U/W
<i>Heliophila pusilla</i>	Fine Sunflax	U
<i>Holcus lanatus</i>	Yorkshire Fog	U/W
<i>Hypochaeris glabra</i>	Smooth Cats-ear	U
<i>Isolepis prolifera</i>	Budding Club-rush	W
<i>Lagurus ovatus</i>	Hare's Tail Grass	U/W

<i>Lupinus cosentinii</i>	WA Blue Lupin	U/W
<i>Medicago ?polymorpha</i>	Burr Medic	U
<i>Melilotus indicus</i>	Sour/Indian Sweet Clover	U
<i>Mentha pulegium</i>	Pennyroyal	W
<i>Ornithopus sp.</i>	Serradella	W
<i>Orobanche minor</i>	Lesser Broomrape	U
<i>Parentucellia viscosa</i>	Sticky Bartsia	W
<i>Paspalum distichum</i>	Water Couch	W
<i>Pelargonium capitatum</i>	Rose Pelargonium	U
<i>Petrorhagia dubia</i>	Hairy Pink	U
<i>Romulea rosea</i>	Guildford Grass	U
<i>Rumex acetosella</i>	Sorrell	U/W
<i>Scabiosa atropurpurea</i>	Purple Pincushion	U
<i>Sherardia arvensis</i>	Field Madder	U
<i>Solanum ?laciniatum</i>	Kangaroo Apple	U
<i>Solanum linnaeanum</i>	Apple of Sodom	U
<i>Solanum nigrum</i>	Blackberry Nightshade	U
<i>Sonchus oleraceus</i>	Common Sowthistle	U
<i>Stellaria ?media</i>	Chickweed	U
<i>Trachyandra divaricata</i>	Dune Onion Weed	U
<i>Typha orientalis</i>	Asian Bulrush	W
<i>Verbascum virgatum</i>	Twiggy Mullein	U
<i>Zantedeschia aethiopica</i>	Arum Lily	U

3.0 PLANTING PLAN

3.1 Implementation

The planting will be undertaken by a professional rehabilitation specialist engaged by Mr Piacentini. The rehabilitation contractor will be a member of the Revegetation Industry Association of Western Australia or equivalent.

The planting will begin with a series of trials to test different weed control and ground preparation techniques (herbicides, scalping, burning, ripping, mulching), planting methods (tube stock vs direct seeding) and seedling protection measures (fencing vs tree guards). Details of the trials are given in Section 3.8.

3.2 Site Preparation

The focus of site preparation will be to remove weeds and ground compaction from the planting site so as to give the seedlings the best possible chance of survival.

3.2.1 Weed Control

Herbicide Treatment

- A knockdown herbicide (usually glyphosate-based) will be used to kill all weeds in the planting area.
- Less weed-infested and upland areas may require only a single treatment one month before planting, in late autumn or early winter (depending on the timing of planting).
- Heavily weed-infested sites (especially wetland, with grasses) may require repeated treatments over twelve months.
- In and close to the wetland, a herbicide approved for aquatic use such as Roundup Biactive® will be required. Residual herbicides will not be used within 50m of the wetland.
- Herbicide may be applied broadacre (by boom spray) or by spot application (targeting individual planting sites). Broadacre application is more likely to be used in the east of the site and in the wetland, while spot application may be used for infill plantings in the west.

Scalping

- In areas with very heavy grass growth, particularly the wetland, machinery may be used after herbicide treatment to remove the top 20cm or so of soil, thereby removing much of the weed seed store and surviving rhizomes.
- This has the advantage of delaying weed re-emergence.
- The main disadvantage is loss of the most fertile part of the soil profile.
- The effectiveness of scalping will depend on the depth of rhizomes and roots.

Burning

- After herbicide treatment, fire may be used (depending on the density of grass growth and the results of trials) to remove the dead plant material and kill surviving parts of plants and seeds.
- This may delay the re-emergence of weeds.
- Burning also creates an ash bed into which seeds or seedlings can be planted.
- Woody debris from the clearing in the development area may also be burned in the revegetation area to create an ash bed for seedlings.
- The effectiveness of burning depends on the intensity of the fire. Sufficient heat to kill seeds and rhizomes typically penetrates only a few centimetres into the soil, while grass rhizomes may penetrate to 0.5m and roots to over 3m.

3.2.2 Ground Preparation

Ripping

Ripping to a depth of 0.5m helps to break up ground compaction (caused by vehicles and/or cattle) and aids root penetration. Shallower ripping to 0.2-0.3m may be used in areas where existing tree roots need to be protected. Ripping will not be employed within the “drip line” of existing trees.

Mounding

Mounding with a disc plough or similar may be used to create mounds into which tube stock are planted.

Mulching

Mulched debris from the clearing may be applied to a depth of about 5cm and ploughed into the topsoil to help maintain soil aeration, increase organic content and reduce moisture loss.

3.3 Species Selection and Source

Tuart, Jarrah, Banksias, Peppermint and Paperbarks will be the primary tree species used in the planting, with a particular emphasis on Peppermint (the main food source for possums) and Banksias (the main food source for black cockatoos). Understorey species will also be planted to increase the diversity and habitat value of the vegetation. These will be a mixture of species drawn from the local species listed in Table 2.1.

The planting will be carried out by a combination of direct seeding and tube stock sourced from local nurseries, grown from seed collected on or within 5km of the planting site. The exact understorey species grown will depend upon the species in fruit at the time of the seed collection.

3.4 Planting Density

Tube stock planting will be undertaken at a minimum density of 825 seedlings per hectare (average 3.5m spacing), giving a total of about 23,000 seedlings over the 28ha planting site. Overstorey trees (Tuart and Jarrah in uplands, Flooded Gum in wetland) will be planted at a spacing of about 20m (25/ha). Mid-storey species (Banksias and Peppermint in uplands, Peppermint and Paperbarks in wetland) and understorey species will each be planted at 5m spacing.

On the advice of the DBCA (K. Williams, pers. comm.), in order to maximise the habitat value for possums and to minimise the time required for the habitat values to develop, Peppermint will be planted at a higher density of 400/ha (5m spacing) in a mosaic of 1ha patches across the upland area, focussing on the TPW (Tuart-Peppermint woodland) and TP (Tuart-Peppermint Open Woodland) areas as shown on Figure 1. Within these patches, the Peppermints and Banksias will give a combined mid-storey density of 600/ha (4m spacing). About eight of these denser patches will be created across the planting area. Each patch will be of sufficient size to form a viable ringtail possum habitat, with animals able to move through the lower-density areas between the patches.

If direct seeding is employed, seed will be applied at a rate of approximately 4 kg/ha, depending upon the particular species being seeded. The seed will be prepared by scarifying, soaking and/or smoking before planting, as appropriate to the species.

In much of the upland area, a partial upper storey of Tuarts already exists. In these areas, Tuarts and other overstorey species will be planted at varying spacings as required to achieve an overall overstorey density of 25/ha.

Similarly, in areas where a mid-storey and/or understorey already exists (particularly in the western upland), planting will be carried out at sufficient density to raise the overall density to 400/ha in each of the mid-storey and understorey.

The planting density is designed to allow for 20% attrition over the first few years of growth, leading to an ultimate density of 320 mid-storey trees per hectare at a spacing of about 5.6m overall and 480/ha (4.5m spacing) in the higher-density patches. This compares favourably with the typical Banksia density in the Perth region of about 150-200 trees/ha (Bamford, 2012). It will create a continuous mixed tree canopy and a mosaic of denser Peppermint patches throughout the rehabilitated area, thus providing high-quality habitat for possums and a substantial food source for black cockatoos.

Table 3.1 summarises the areas, species mix and planting density within each of the planting zones. Figure 1 shows the conceptual layout of the planting zones.

Table 3.1 Planting Zones

<i>Zone</i>	<i>Area</i>	<i>Species Mix</i>	<i>Density (Including existing cover)</i>
Upland West (Dunes)	7.84 ha	Tuart, Peppermint Upland (Quindalup) understorey	Overstorey: 25/ha Mid storey: 400/ha Understorey: 400/ha
Wetland	3.73 ha	Paperbarks, Peppermint, Flooded Gum Wetland (Vasse) understorey	Overstorey: 25/ha Mid storey: 400/ha Understorey: 400/ha
Upland East	8.44 ha	Tuart, Jarrah, Peppermint, Banksias Upland (Karrakatta) understorey	Overstorey: 25/ha Mid storey: 400/ha Understorey: 400/ha
Upland High Density	8 ha	As above	As above plus additional 200/ha Peppermint

3.5 Timing of Planting

Tube stock planting will be undertaken nominally in June after the first significant winter rains. The timing may be varied depending on the arrival of significant rainfall.

Direct seeding will be undertaken approximately one to two months earlier than tube stock planting, before the start of winter rains.

3.6 Planting Method

Tube Stock

A hand planter (“Pottiputki” or similar) will be used to drill a hole approximately 175mm deep and 55mm wide for each seedling. Each seedling will be planted with a slow-release native plant fertiliser pill.

Direct Seeding

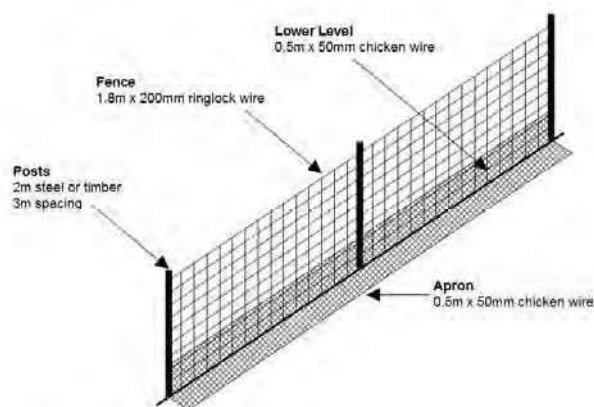
Direct seeding has the ability to create high-density seedling growth of certain species at significantly less effort and cost than tube stock planting. Because the seedlings germinate *in-situ*, direct seeding also tends to produce more robust plants and a more diverse, naturally-structured vegetation form (M. Blunt, Tranen, pers. comm.).

Mr Piacentini’s company is well equipped and experienced in direct seeding through its extensive rehabilitation work for mining companies. If direct seeding is used, it will be carried out with equipment designed for native seed, with the seeding depth and configuration set for the particular species being seeded.

3.7 Protection of Seedlings

The seedlings will be protected from grazing by kangaroos and rabbits by fencing or tree guards. Fencing is likely to be used in the larger planting areas, while tree guards may be used in smaller infill planting areas west of the wetland. Planting areas less than about 4,000m² will use tree guards rather than fences.

The fences will be constructed of 1.8m high ringlock wire on posts with a 0.5m chicken wire lower layer and a 0.5m apron to prevent kangaroos and rabbits from digging or pushing under the fence. The diagram below shows an example of the type of fencing proposed.



Indicative Fence Design

The tree guards will be kept in place and maintained for at least two years, after which the new growth is expected to be large enough to withstand grazing. After two years, the tree guards will be inspected and progressively removed once the plants reach a height of 1m for trees and 0.5m for shrubs (based on advice from Tranen Revegetation Systems Pty Ltd). The fences will be left in place for five years. After this time, provided the completion criteria have been met, they will be either removed or left in place, depending on the wishes of the WAPC and the DBCA.

3.8 Pre-Planting Trials

In order to optimise the site preparation, planting and protection techniques for the site, a series of trials will be carried out before the full-scale planting begins. The trials will be conducted in three 2.5ha – 3.75ha plots on upland, wetland and wetland buffer locations and will test:

- Site preparation
 - Duration of pre-planting weed control (1 month vs 12 months)
 - Burning
 - Scalping (wetland and buffer only)
 - Ripping

- Planting method - Tube stock vs direct seeding (understorey species)

- Protection
 - Fencing vs tree guards
 - Mulching

The trials will begin in the autumn immediately following the start of clearing (Year 1), with the commencement of 12-month weed control in the wetland and buffer. The plantings will be undertaken in April - June of the following year. Each set of plots will include a control plot, which will be planted with no pre-planting weed control, ground preparation or protection (fencing or tree guards). The plots (except the control plot) will be surrounded by a 10m weed-free buffer to minimise weed encroachment from untreated areas.

The trial plots will be monitored for twelve months after planting and the success of the different strategies (including seedling survival, growth rates and need for follow-up weed control) assessed. The most successful and practical methods will be used for the major planting works to be completed in the year following the trial plantings (Year 3).

Figure 1 shows the proposed locations of the trial plots.

4.0 POST-PLANTING MAINTENANCE

4.1 Weed Control

Follow-up weed control treatments using an appropriate herbicide applied by hand sprayer or wand will be undertaken in spring in the year of planting and the year following. For the subsequent three years (i.e. 3-5 years after planting), annual quantitative weed monitoring will be carried out in spring and visual weed inspections will be carried out quarterly. Weed control will be undertaken as and where necessary, based on the results of the quarterly inspections and annual monitoring. This may include additional weed control treatments in other seasons.

The necessity for weed control will be assessed not on fixed criteria but on the judgement of the contractor as to whether the height and density of weeds is likely to impede the growth of the planted vegetation. The point at which weed control becomes necessary will vary with the area and the stage of growth of the plantings.

4.2 Monitoring

4.2.1 Objectives of Monitoring

The primary objective of post-planting monitoring is to confirm that the planted vegetation is thriving and creating viable habitat for black cockatoos and Western Ringtail Possums. These habitat values are expected to develop gradually over a period of up to twenty years. Within the five-year intensive management period, the development of habitat values will be visible as an increase in vegetation cover, particularly in the critical Peppermint, Flooded Gum and Banksias.

Within this overall framework, specific objectives of the monitoring include demonstrating that:

- the new plantings are achieving, or progressing towards achieving, the completion criteria of species richness, vegetation cover and health;
- the new plantings are forming viable and high-quality habitat for Western Ringtail Possums, as evidenced by the development of an interconnected canopy of Peppermint, Banksias and Paperbarks;
- the new plantings are forming foraging habitat for black cockatoos, as evidenced by the presence of foraging species across the revegetation area according to completion criteria, species richness criteria and revegetation zone;
- the regrowth is not being significantly impaired by grazing, weed growth, drought or vandalism;

- fences and other protective measures are in good repair and functioning effectively; and
- fires, disease and other catastrophic events are avoided.

4.2.2 Monitoring Programme

Hardware and Structures

The condition of tree guards and fences will be monitored quarterly for the first three years after planting. Any guards that become displaced or damaged will be repositioned or replaced. Fences will be monitored for integrity and security on the same schedule and repaired as necessary.

Vegetation

The success of the plantings will be quantitatively monitored annually for five years after the completion of the planting programme. For the first two years this will be undertaken by the planting contractor; thereafter it may be done by the planting contractor or by a botanist contracted by Mr Piacentini.

The quantitative monitoring will be undertaken by a combination of high-resolution aerial photography and fixed 100m² quadrats selected and set out during the planting works. Approximately twenty quadrats will be established to cover the four major planting areas (upland, upland high-density, wetland and dunes). The distribution of quadrats between the planting zones will be based on area and planting density, as follows:

- | | | |
|-----------------------|---------|--------------------------|
| • Upland West (Dunes) | 7.84 ha | 5 quadrats |
| • Wetland | 3.73 ha | 3 quadrats |
| • Upland East | 8.44 ha | 4 quadrats |
| • Upland High Density | 8 ha | 8 quadrats (1 per patch) |

Figure 1 shows the distribution of the quadrats

The identity, height, width and condition of all plants within each quadrat will be recorded to give data on species composition, cover, structure and health. Weed occurrence, identity and cover will be measured. Photographs will be taken at fixed points in each quadrat. Comparison between monitoring dates will provide data on survival rates.

High-resolution aerial photography (sourced either from Landgate, other commercial supplier or drone) will be used each year to measure total canopy cover across the planting area. The canopy cover will be measured as a percentage cover of all native species. The aerial imagery will be provided to DEE each year as part of the annual report. The percentage cover of existing native vegetation will be measured before planting to provide a baseline against which post-planting growth can be compared.

After five years have passed and the completion criteria have been met to the satisfaction of DEE, the transect monitoring will cease but monitoring of canopy cover by aerial imagery will continue.

As well as the annual quantitative monitoring, qualitative visual monitoring (consisting of foot traverses of the quadrats and photography) will be undertaken quarterly. The objectives of the qualitative monitoring will be to detect damage to tree guards and fences, detect disease (including dieback and Agonis canker) and assess weed growth.

Fauna

Observations of black cockatoo and Western Ringtail Possum presence in the revegetation area will be recorded during the annual and quarterly monitoring visits. Indications of presence will include:

- Black cockatoos – birds seen or heard feeding, roosting or overflying the area, chewed nuts or banksia cones, dropped leaves and twigs beneath trees.
- Western Ringtail Possum – direct sightings, dreys, signs of browsing on Peppermints, droppings beneath trees.

At the end of the five-year intensive management period, at the request of DBCA a detailed fauna survey will be carried out by a fauna specialist to assess the habitat value of the revegetation area for Western Ringtail Possums and black cockatoos and to search for the presence of each species within the site.

Reporting

The results of each round of monitoring will be reported to the DEE and published on Mr Piacentini's website.

4.3 Completion and Success Criteria

The planting density is designed to allow for 20% attrition of seedlings. Success of the planting will therefore be defined as:

- a density of at least 20 overstorey trees, 320 mid-storey trees and 320 understorey species per hectare in good health in each quadrat across the revegetation area after five years;
- a density of at least 320 Peppermint trees per hectare in good health in each quadrat within the high-density upland patches after five years; and
- the planted trees and shrubs having reached sufficient height (defined as 1m for trees and 0.5m for shrubs) after five years that tree guards are no longer required;
- achievement and maintenance of an 80% canopy cover over the planting area at (or before) twenty years.

Although the conditions of approval, and hence the completion criteria, do not refer to usage of the revegetation area by fauna, a further indicator of success will be any observed direct or indirect evidence of black cockatoo and/or Western Ringtail Possum presence in the revegetation area.

4.4 Contingency Response

If, at any time within five years after planting, monitoring shows that the survival rate of any planted structural element (overstorey, mid-storey or lower storey) in any quadrat or planting zone is below 80%, infill planting of the same structural element will be undertaken.

If, at any time within five years after planting, monitoring shows that the survival rate of Peppermint within any quadrat is below 80%, infill planting of Peppermint will be undertaken.

If aerial imagery monitoring shows that the total canopy cover after twenty years is less than 80%, infill planting of appropriate canopy species (Peppermint in upland, Paperbark in wetland) will be undertaken. In practice, aerial imagery monitoring in previous years will provide an indication of whether the 80% target is likely to be achieved, thus allowing pre-emptive infill planting to be undertaken if necessary.

4.5 Reporting

The EPBC Act conditions of approval require that Mr Piacentini report each year on his compliance with each of the conditions of approval, including the implementation of this Revegetation Management Plan.

Mr Piacentini will report regularly to the DEE on the progress of the pre-planting trials, the planting programme and post-planting monitoring. The reports will be forwarded to the DEE and published on Mr Piacentini's website. A preliminary reporting schedule is shown below.

<i>Item</i>	<i>Expected timing of report</i>
Start of trials	May following start of clearing (Year 1)
Completion of trial plantings	July Year 2
Results of trials	June Year 3
Start of major site preparation	June Year 3
Completion of full-scale plantings	July Year 3 – Year 4
Annual monitoring results	December Year 3 – Year 8
Adverse events (eg fire, vandalism)	With annual compliance report
Report success after 5 years	December Year 7 – Year 8
Annual monitoring results	December Year 8 – Year 23

A template for the annual reports is attached in Appendix C.

5.0 IMPLEMENTATION

5.1 Roles and Responsibilities

Mr Piacentini will commission and fund the revegetation work described in this plan. Following planting, Mr Piacentini will monitor and maintain the revegetation for five years, undertaking infill planting as necessary to achieve and maintain the completion criteria. The annual monitoring and infill planting, if required, will be undertaken by professional contractors with suitable experience in revegetation and vegetation surveys.

The intensive management and monitoring will continue for five years and until the DEE has advised that the completion criteria have been met.

After five years, provided the completion criteria as set out in this management plan have been achieved to the satisfaction of DEE, Mr Piacentini will continue to manage the offset area at a reduced intensity, focussing on annual inspections, aerial measurement of canopy cover and maintenance of firebreaks and cockatoo nest boxes. During this period, infill planting will be undertaken if the total percentage canopy cover appears unlikely to reach 80% after 20 years.

Every five years, Mr Piacentini will carry out a fauna survey to track the development of the vegetation and habitat values and to assess black cockatoo and Western Ringtail Possum usage of the revegetation area.

Mr Piacentini will keep accurate records of all aspects and stages of the activities described under this plan. The records will include:

- a copy of this Revegetation Management Plan, including updates;
- the conduct and results of pre-planting trials;
- copies of all quarterly and annual reports;
- results (including raw data) of annual and special-purpose monitoring;
- photographic records of revegetation activities and photographic monitoring of regrowth;
- records of activities including site preparation, stock ordering, planting and maintenance;
- invoices and other relevant documentation from suppliers and contractors to substantiate records of work carried out; and
- correspondence with DEE, DBCA and other parties with an interest in this plan.

The records will be kept in a computer database and made available to the DEE on request.

5.2 Implementation Schedule

Table 5.1 summarises the schedule for implementation of the plan. The schedule may vary depending on the outcome of the trials and the results of monitoring.

Table 5.1 Implementation Schedule

(Note: May of Year 1 is the May immediately following the start of clearing)

<i>Year</i>	<i>Month</i>	<i>Activity</i>
1	May	Pre-planting weed control with knockdown herbicide. Trial treatments with herbicide, burning, hoeing, scalping, ripping
1	September	Weed inspection and control if required. Follow-up weed control in 12-month trial areas. Baseline measurement of percentage cover using aerial imagery.
2	June	Commence trial plantings.
3	June	Monitor trial plots, report results to DEE and DBCA. Commence full-scale plantings.
3	September	Weed inspection and control if required.
4	June	Monitor transects, report results to DEE and DBCA. Infill planting if necessary. Canopy cover measurement using aerial imagery.
5	June	Monitor transects, report results to DEE and DBCA. Infill planting if necessary. Canopy cover measurement using aerial imagery.
6	June	Monitor transects, report results to DEE and DBCA. Infill planting if necessary. Canopy cover measurement using aerial imagery.
7	June	Monitor transects, report results to DEE and DBCA. Infill planting if necessary. Canopy cover measurement using aerial imagery.
8	June	Monitor transects, fauna survey, final report of results to DEE and DBCA (intensive monitoring, weed control and infill planting will continue beyond this point if completion criteria have not been met or maintained). Canopy cover measurement using aerial imagery.
9 - 23	June	Ongoing annual inspections, canopy cover measurement using aerial imagery, nest box and firebreak maintenance, 5-yearly fauna surveys. Infill planting if canopy cover appears unlikely to reach 80% after 20 years).

5.3 Adaptive Implementation

Mr Piacentini recognises that circumstances may change over a period as long as 20 years. It is important that the maintenance regime is sufficiently flexible to allow for changing circumstances. Accordingly:

- The management arrangements will be reviewed at the end of the five-year intensive management period. Should the DBCA express a preference to take over management of the site, Mr Piacentini will be open to providing funding at that time to DBCA to cover the ongoing management, subject to the negotiation of a suitable funding agreement and the approval of DEE.

- If, at the end of the five-year intensive management period or at any time during the following 15 years, the DBCA obtains State government funding for management of the site as part of the regional park network in the Greater Bunbury Region, Mr Piacentini will cease managing the site and hand responsibility to the DBCA, subject to the approval of DEE. Transfer of management responsibility will be subject to the achievement of all completion criteria and to the written approval of DEE.

5.4 Long-Term Management

The terms of the EPBC Act approval require that the habitat values of the planting site be maintained and protected for at least twenty years. This may be achieved by the site (along with other regional parks in the Greater Bunbury Region) being vested in the DBCA, but this is dependent on the outcome of negotiations between DBCA and the State government over funding for management.

In the meantime, Mr Piacentini will continue to take responsibility for management of the planting site until twenty years have elapsed or until DBCA takes over management responsibility via a management agreement under the *Conservation and Land Management Act 1984*.

After five years, the plantings are expected to be well established and self-sustaining, although the cockatoo nesting boxes will require ongoing management and monitoring. For the following fifteen years, therefore, management will comprise:

- maintenance of firebreaks around the planting area;
- annual visual inspection of plantings to detect significant tree deaths or other adverse events;
- annual aerial imagery-based measurements of canopy cover;
- infill planting as required if canopy cover appears unlikely to reach 80% after 20 years;
- annual inspections and maintenance/repair of cockatoo nesting boxes; and
- five-yearly surveys for cockatoo and possum usage of the site.

The management activities will be undertaken either directly by Mr Piacentini's staff or by a properly qualified contractor engaged by Mr Piacentini.

The WAPC has agreed to permit Mr Piacentini to continue to access the offset site for the purposes of management for the duration of the 20-year approval period. The WAPC has also confirmed its intention that the offset land and surrounding ROS will be managed for no purpose other than conservation. The WAPC's advice is attached in Appendix B.

5.5 Review and Audit

Mr Piacentini will review and audit the revegetation works each year against the requirements of the EPBC Act approval and the objectives and criteria of the Revegetation Management Plan. The review and audit will be undertaken by a professional environmental consultant with experience in environmental compliance auditing and acceptable to the DEE. The results of the annual audit will be reported to the DEE along with the results of monitoring.

The annual audit will focus on the following:

(Note: Year numbers are as set out in Table 5.1)

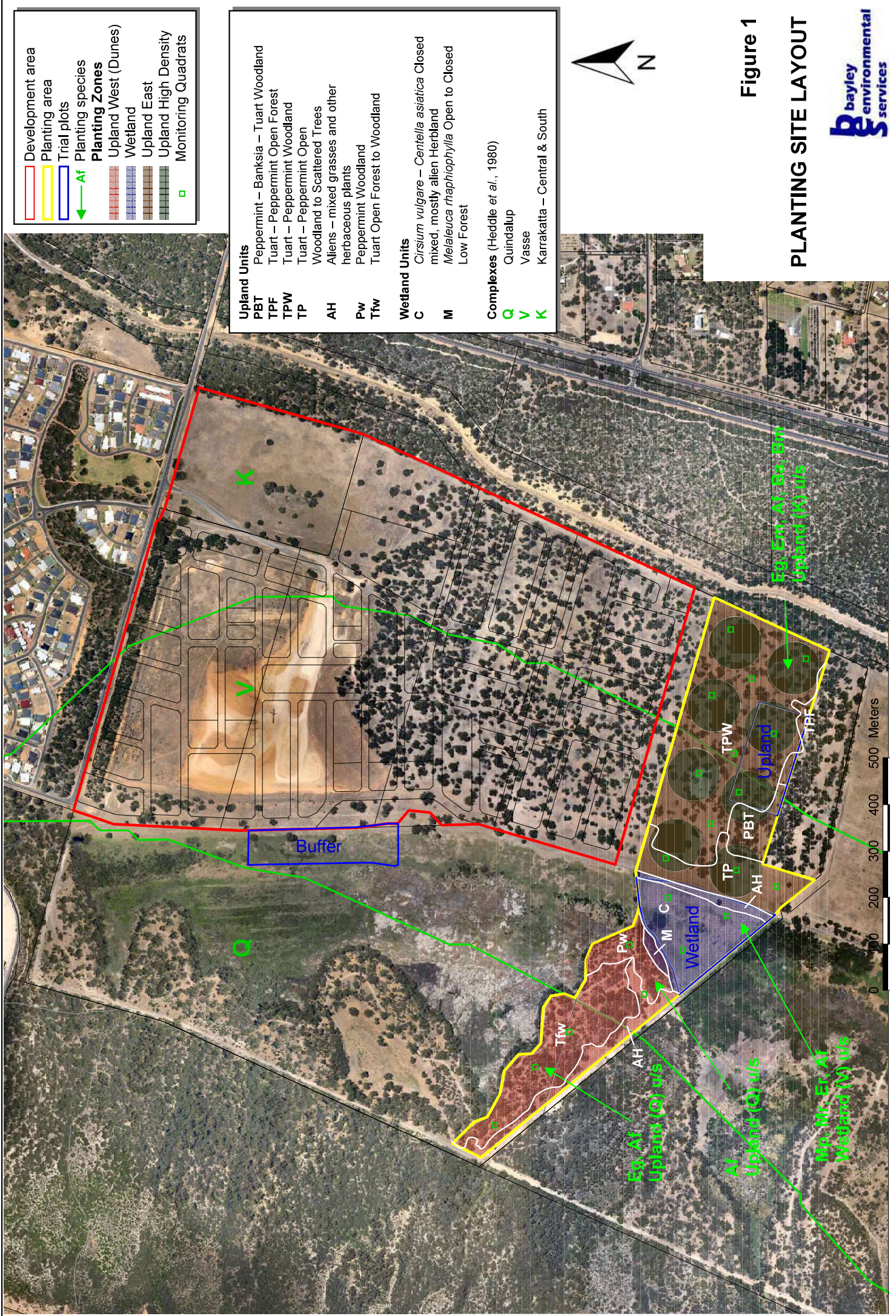
<i>Item</i>	<i>Criterion / Measure</i>
Regrowth	
Years 3-8:	Density (cf. 320 stems/ha in general areas, 480 stems/ha in high-density upland patches) 80% survival of each species, structural element and overall % Cover Health
Years 9-23:	Health Tree deaths or other adverse events Total canopy cover (measured by aerial imagery).
Weeds	
Years 3-8:	Cover Species present Impact on regrowth Effectiveness of control
Years 9-23:	Impact on regrowth Need for control
Grazing	
Years 3-8	Incursion of kangaroos or rabbits Damage to growth Loss of plants or species
Years 9-23:	Damage to growth Loss of plants or species Need for control
Fauna	Observed possums, cockatoos or other significant species
Events	Fire Drought Vandalism/damage

The results of the audit will be used to review the success of the Revegetation Management Plan and, if appropriate, propose amendments to the programme. Any such amendments will be subject to the approval of the DEE.

6.0 REFERENCES

- Bayley Environmental Services (2010). *Lots 313 to 316 Harewoods Road, Gelorup: Environmental Summary Report*. Report No. J07013a prepared for Piacentini & Son Pty Ltd, Bunbury.
- Churchward H.M. and W.M. McArthur (1980). Landforms and Soils of the Darling System, Western Australia. *In Atlas of Natural Resources: Darling System, Western Australia*. Dept of Conservation & Environment, Perth.
- Hedde E.M., Loneragan O.W. and Havel J.J. (1980). Vegetation Complexes of the Darling System, Western Australia. *In: Atlas of Natural Resources, Darling System, Western Australia*. Department of Conservation and Environment, Perth.
- Keighery, B.J. (1994). *Bushland Plant Survey. A Guide To Plant Community Survey for the Community*. Wildflower Society of WA (inc) Nedlands WA
- MJ & AR Bamford Consulting Ecologists (2012). *Assessment of Habitat for Black-Cockatoos and Western Ringtail Possums at Harewoods Road, Gelorup*. Report prepared for Bayley Environmental Services, South Fremantle.
- McCutcheon GS (2001). *Botanical Survey of Lots 313 to 317 Harewoods Road, Gelorup*. Unpublished report prepared for Piacentini & Son, Bunbury.
- McCutcheon GS (2002). *Botanical Re-Survey of Lots 313 to 313 Harewoods Road, Dalyellup*. Report prepared for Piacentini & Son, Bunbury.
- RPS Bowman Bishaw Gorham (2006). *Minninup and Harewoods Road, Gelorup: Environmental Summary Report*. Report prepared for Ironbridge Holdings Pty Ltd, Cottesloe.
- Weston AS (2007). *Vegetation and Flora of Lots 313 to 317 Harewoods Road, Gelorup*. Report prepared for Bayley Environmental Services, South Fremantle.
- Weston AS (2009). *Vegetation Surveys and Rare Flora Searches: Pt Lots 313 to 317 Harewoods Road West of Minninup Road Reserve, Gelorup*. Report prepared for Bayley Environmental Services, South Fremantle.

Figures



- Development area
- Planting area
- Trial plots
- Planting species
- Planting Zones
 - Upland West (Dunes)
 - Wetland
 - Upland East
 - Upland High Density
 - Monitoring Quadrats

- Upland Units**
- PBT Peppermint – Banksia – Tuart Woodland
 - TPF Peppermint Open Forest
 - TPW Peppermint Woodland
 - TP Peppermint Open Woodland to Scattered Trees
 - AH Aliens – mixed grasses and other herbaceous plants
 - Pw Peppermint Woodland
 - Tfw Tuart Open Forest to Woodland
- Wetland Units**
- C *Cirsium vulgare* – *Centella asiatica* Closed mixed, mostly alien Herbland
 - M *Melaleuca raphiophylla* Open to Closed Low Forest
- Complexes (Heddle et al., 1980)**
- Q Quindalup
 - V Vasse
 - K Karrakatta – Central & South

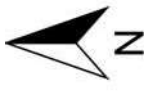


Figure 1

PLANTING SITE LAYOUT



Appendix A

EPBC Act Approval and Conditions



APPROVAL

Clearing of native vegetation on Lots 313-316, Minninup Rd, Dalyellup, WA (EPBC 2012/6274)

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999*.

Proposed action

person to whom the approval is granted	Mr Colin Piacentini
proponent's ACN (if applicable)	N/A
proposed action	To clear approximately 39 ha of native vegetation on parts of Lots 313-316 Minninup Road, Dalyellup, WA, to permit future development of a residential estate [See EPBC Act referral 2012/6274].

Approval decision

Controlling Provision	Decision
Listed threatened species and communities (sections 18 & 18A)	Approve

conditions of approval

This approval is subject to the conditions specified below.

expiry date of approval

This approval has effect until 31 December 2038.

Decision-maker

name and position Gregory Manning
Assistant Secretary
Assessments (WA, SA, NT) and Air Branch

Signature

date of decision 17 October 2017

Conditions attached to the approval

1. The person taking the action must not clear more than 39 ha of **Western ringtail possum habitat**, and 39 ha of **foraging habitat** and potential **breeding habitat** for **black cockatoos**, within the proposal site outlined in red at Attachment A.
2. To mitigate the impacts to **black cockatoos** the person taking the action must:
 - (a) Inspect all Tuart (*Eucalyptus gomphocephala*) trees felled during the **clearing for hollows suitable for use by black cockatoos**. All hollows must be inspected by a **suitably qualified expert** in consultation with **DBCA** officers to confirm whether they are **hollows suitable for use by black cockatoos**.
 - (b) Replace all confirmed **hollows suitable for use by black cockatoos** within the Regional Open Space shown in Attachment A with **artificial nest hollows** prior to the next **breeding season**.
 - i. The total number of **artificial nest hollows** must be 12 or at least 120% of the number of confirmed **hollows suitable for use by black cockatoos** cleared from the proposal site, whichever is greater.
 - ii. The construction, positioning and erection of the **artificial nest hollows** must be in accordance with the **DEC** Publication "*Artificial Hollows for Carnaby's Black Cockatoos*" (Groom, 2010).
 - iii. The **artificial nest hollows** must be inspected at least annually to check for condition and evidence of **black cockatoo** usage for a period of 20 years. Repair of damage/deterioration, removal of bee colonies, replacement of mulch and/or sacrificial chewing posts, must be undertaken prior to the next **breeding season**.
 - iv. For the first five year period inspection and maintenance of **artificial nest hollows** shall be the responsibility of the person taking the action and a **suitably qualified contractor**.
 - v. After five years, or at any time in the following 15 years, the responsibility for the ongoing inspection and maintenance of the **artificial nest hollows**, for the remaining 15 years, can be reviewed by the person taking the action, and amended, if agreed to by the **Department** in writing.
3. To offset the loss of **black cockatoo foraging habitat** and potential **breeding habitat**, prior to the **commencement of the action** the person taking the action must:
 - i. Make a financial contribution to **DBCA** to fully fund the purchase and management of an **offset site/s** containing a minimum of 113 ha of **black cockatoo foraging habitat** and potential **breeding habitat**.
 - ii. Provide the **Department** with written evidence that the financial contribution has been made to **DBCA** and that **DBCA** were satisfied with the amount.

Within 12 months of the **commencement of the action** (or as otherwise agreed by the **Minister** in writing), the person taking the action must provide the **Department** with the **offset attributes** and a **shapefile** of the **offset site/s**.

4. To offset the loss of **foraging habitat** and potential **breeding habitat** for **black cockatoos** and **Western ringtail possum habitat**, the person taking the action must prepare and submit a Revegetation Management Plan (RMP) for approval by the **Minister**. The person taking the action must not **commence** the action unless the **Minister** has approved the RMP. The RMP must be implemented.

The RMP must include or should address:

- i. Revegetation of an area of at least 28 ha with **foraging habitat** and **Western ringtail possum habitat** within the Regional Open Space shown at Attachment A.
 - ii. Diagram of the revegetation area, showing its location.
 - iii. Objectives, targets and completion criteria for the revegetation, including site preparation works, species selection and source, seedling planting program (planting density), protection of seedlings, success rates, details of replanting requirements if success rates are not achieved, post planting maintenance.
 - iv. Conservation arrangements for the long term protection of the revegetation area.
 - v. Management of the revegetation area must be undertaken for a period of 20 years. For the first five year period management of the revegetation area shall be the responsibility of the person taking the action and a **suitably qualified contractor**.
 - vi. After five years, or at any time in the following 15 years, the responsibility for the management of the revegetation areas, can be reviewed by the person taking the action, and amended, if agreed to by the **Department** in writing.
 - vii. Timeframes and implementation for the above measures.
 - viii. Descriptions of the roles and responsibilities of personnel associated with implementation of each of the above measures.
5. Within 30 days after the **commencement of the action**, the person taking the action must advise the **Department** in writing of the actual date of **commencement**.
 6. The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, and make them available upon request to the **Department**. Such records may be subject to audit by the **Department** or an independent auditor in accordance with section 458 of the **EPBC Act**, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **Department's** website. The results of audits may also be publicised through the general media.
 7. Within three months of every 12 month anniversary of the **commencement of the action**, or otherwise agreed by the **Department** in writing, the person taking the action must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the **Department** at the same time as the compliance report is published. Reports must remain

published for the life of the approval. The person taking the action must continue to publish this report each year until such time as agreed to in writing by the **Minister**.

8. Upon the direction of the **Minister**, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the **Minister**. The independent auditor must be approved by the **Minister** prior to the commencement of the audit. Audit criteria must be agreed to by the **Minister** and the audit report must address the criteria to the satisfaction of the **Minister**.
9. If, at any time after 5 years from the date of this approval, the person taking the action has not substantially **commenced the action**, then the person taking the action must not substantially **commence the action** without the written agreement of the **Minister**.
10. Unless otherwise agreed to in writing by the **Minister**, the person taking the action must publish all management plans, referred to in these conditions of approval on their website. Each management plan, must be published on the website within 1 month of being approved by the **Minister** or being submitted under condition 4.

Definitions:

Artificial nest hollows as outlined in the **DEC** Publication "*Artificial Hollows for Carnaby's Black Cockatoos*" (Groom, 2010).

Black cockatoos means Carnaby's black cockatoo (*Calyptorhynchus latirostris*) (endangered), Baudin's black cockatoo (*Calyptorhynchus baudinii*) (vulnerable) and Forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*) (vulnerable).

Breeding habitat is as defined in the *EPBC Act Referral Guidelines for three species of Western Australian black cockatoos: Carnaby's cockatoo (endangered) (Calyptorhynchus latirostris), Baudin's cockatoo (vulnerable) (Calyptorhynchus baudinii) and Forest red-tailed black cockatoo (vulnerable) (Calyptorhynchus banksii naso) (October 2012)*.

Breeding season is as defined in the *EPBC Act Referral Guidelines for three species of Western Australian black cockatoos: Carnaby's cockatoo (endangered) (Calyptorhynchus latirostris), Baudin's cockatoo (vulnerable) (Calyptorhynchus baudinii) and Forest red-tailed black cockatoo (vulnerable) (Calyptorhynchus banksii naso) (October 2012)*.

Clear or clearing includes but is not limited to cutting down, felling, thinning, logging, removing, killing, destroying, poisoning, ring-barking, uprooting, mulching or burning of native vegetation.

Commence, commenced or commencement of the action is any preparatory works required to be undertaken including **clearing**.

DBCA is the Western Australian Department of Biodiversity Conservation and Attractions.

DEC is the former WA Department of Environment and Conservation.

Department is the Australian Government Department or any other agency administering the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* from time to time.

EPBC Act is the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*.

Foraging habitat is as defined in the *EPBC Act Referral Guidelines for three species of Western Australian black cockatoos: Carnaby's cockatoo (endangered) (Calyptorhynchus latirostris), Baudin's cockatoo (vulnerable) (Calyptorhynchus baudinii) and Forest red-tailed black cockatoo (vulnerable) (Calyptorhynchus banksii naso) (October 2012).*

Hollows suitable for use by black cockatoos are defined as:

- entrance diameter at least 100 mm;
- internal diameter at least 300 mm;
- depth at least 500 mm;
- height at least 2 m above ground;
- floor sufficiently solid to support nesting materials; and
- absence of feral bees and other competing species.

Minister is the Minister administering the **EPBC Act** and includes a delegate of the Minister.

Offset attributes is an excel file ('.xls') capturing relevant attributes of the **offset site**, including the EPBC reference ID number, the physical address of the **offset site**, coordinates of the boundary points in decimal degrees, the EPBC Act protected matters that the offset compensates for, any additional EPBC Act protected matters that are benefiting from the offset, the size of the **offset site** in hectares and the mechanism used to protect and conserve the **offset site**.

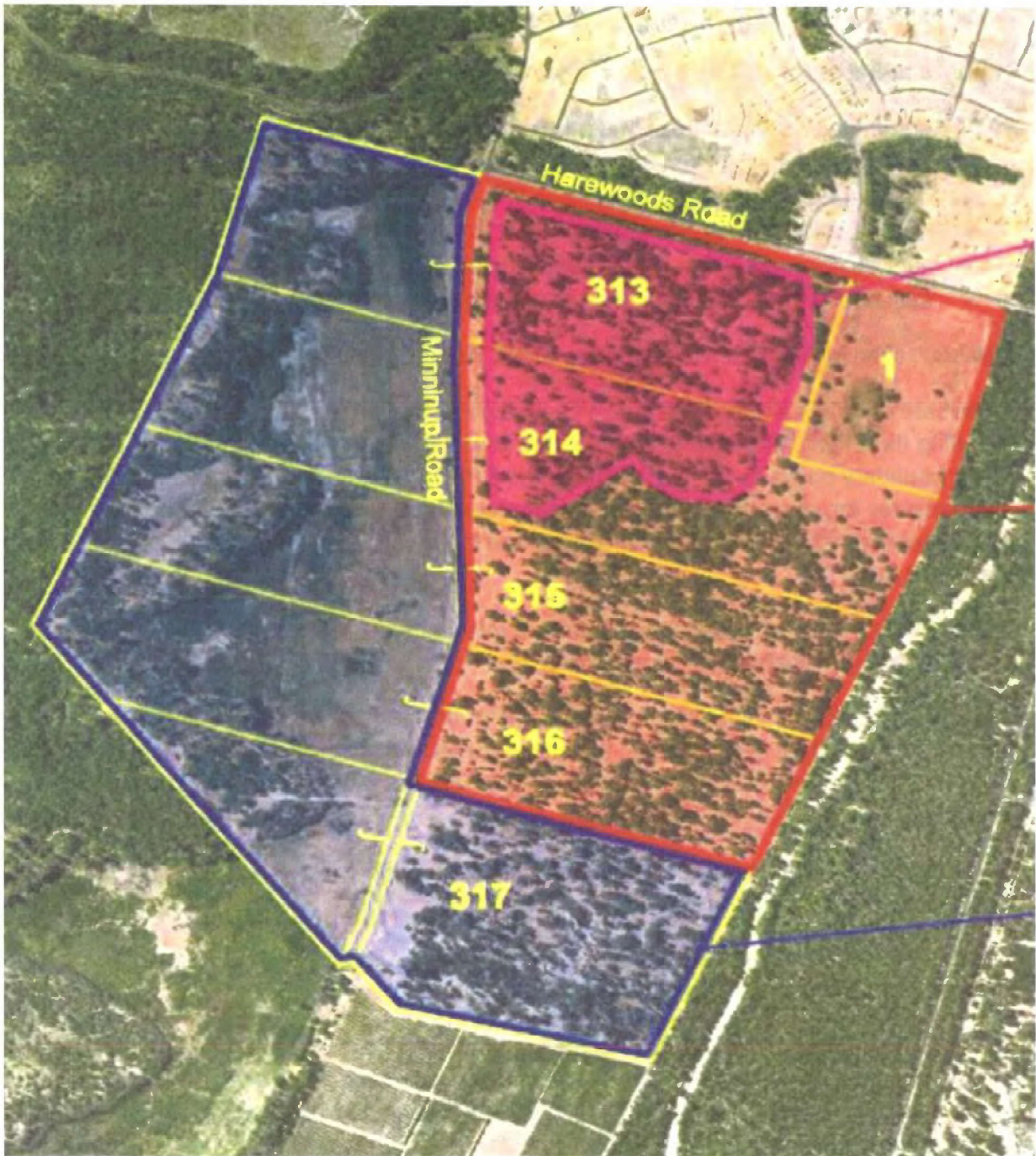
Offset site/s means an area/s that contains a minimum of 113 ha of **foraging habitat** and potential **breeding habitat** for **black cockatoos**.

Shapefile is an ESRI shapefile containing '.shp', '.shx' and '.dbf' files and other files capturing attributes of the offset site, including the shape, **EPBC Act** reference ID number and **EPBC Act** protected matters present at the relevant site. Attributes should also be captured in '.xls' format.

Suitably qualified contractor is a person or company with a proven history in managing revegetation or conservation sites.

Suitably qualified expert means a person or company with at least two years of demonstrated experience in **black cockatoo** habitat assessments.

Western ringtail possum habitat includes peppermint (*Agonis flexuosa*), jarrah (*Eucalyptus marginata*), marri (*Corymbia calophylla*) forests and woodlands with adequate hollows, coastal heath, myrtaceous heaths and shrublands, Bullich (*Eucalyptus megacarpa*) dominated riparian zones and karri (*Eucalyptus diversicolor*) forests.



Regional Open Space – Outlined in purple.
Proposal site – Outlined in red.



VARIATION TO CONDITIONS ATTACHED TO APPROVAL

Clearing of native vegetation on Lots 313-316, Minninup Rd, Dalyellup, WA (EPBC 2012/6274)

This decision to vary the conditions attached to the approval is made under section 143(1)(c) of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Approved action

Person to whom the approval is granted	Mr Colin Piacentini
	N/A

Approved action	To clear approximately 39 ha of native vegetation on parts of Lots 313-316 Minninup Road, Dalyellup, WA, to permit future development of a residential estate [See EPBC Act referral 2012/6274].
------------------------	--

Variation

Variation of conditions of approval	The variation is: Delete the definition for 'Black Cockatoos', and substitute with the definition for 'Black Cockatoos' as specified below.
--	--

Date of effect	This variation has effect on the date the instrument is signed
-----------------------	--

Person authorised to make decision

name and position	Declan O'Connor-Cox Acting Assistant Secretary Assessment (WA, SA, NT) & Post Approvals Branch
--------------------------	--

Signature

Date of decision	June 2018
-------------------------	-----------

Definition

Black cockatoos means Carnaby's black cockatoo (*Calyptorhynchus latirostris*) (endangered) and Forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*) (vulnerable).

Table A1 Satisfaction of Revegetation Conditions

No.	Condition	Section of RMP
4	To offset the loss of foraging habitat and potential breeding habitat for black cockatoos and Western ringtail possum habitat, the person taking the action must prepare and submit a Revegetation Management Plan (RMP) for approval by the Minister. The person taking the action must not commence the action unless the Minister has approved the RMP. The RMP must be implemented.	Final RMP submitted to DEE on 17/12/2018. Implementation: Section 5.0.
i.	Revegetation of an area of at least 28 ha with foraging habitat and Western ringtail possum habitat within the Regional Open Space shown at Attachment A.	Whole RMP refers.
ii.	Diagram of the revegetation area, showing its location.	Figure 1 shows revegetation area. Shapefile supplied separately to DEE.
iii.	Objectives, targets and completion criteria for the revegetation, including site preparation works, species selection and source, seedling planting program (planting density), protection of seedlings, success rates, details of replanting requirements if success rates are not achieved, post planting maintenance.	Objectives: Section 1.0. Planting details: Section 3.0. Targets & completion criteria: Section 4.3. Post-planting maintenance: Section 4.0. Contingencies (inc. replanting): Section 4.4.
iv.	Conservation arrangements for the long term protection of the revegetation area.	Section 5.4.
v	Management of the revegetation area must be undertaken for a period of 20 years. For the first five year period management of the revegetation area shall be the responsibility of the person taking the action and a suitably qualified contractor.	Section 5.0.
vi	After five years, or at any time in the following 15 years, the responsibility for the management of the revegetation areas, can be reviewed by the person taking the action, and amended, if agreed to by the Department in writing.	Sections 5.1, 5.3. 5.4.
vii	Timeframes and implementation for the above measures.	Section 5.0.
viii.	Descriptions of the roles and responsibilities of personnel associated with implementation of each of the above measures.	Section 5.1.

Appendix B

WAPC Advice on Access and Long-Term Management

Enquiries: Mr K Uhe
Our Ref: WAPC/13/0037

Department of the Environment and Energy
GPO Box 787
CANBERRA ACT 2601

Attention: Ms Rhiannon Agutter

Dear Rhiannon

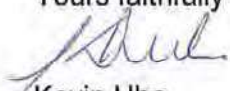
The Western Australian Planning Commission (WAPC) gives permission for Piacentini Developments Pty Ltd or its designated agent(s) to access WAPC-owned land at Lots 6 and 317 Minninup Road, Dalyellup, for the purpose of carrying out rehabilitation works, erection of cockatoo nesting boxes and associated activities as specified under the conditions of approval of EPBC 2012/6274.

The WAPC also gives permission for Piacentini Developments Pty Ltd or its designated agent(s) to continue to access the land, whilst in WAPC ownership for the purpose of ongoing monitoring and maintenance including monitoring and firebreak maintenance for twenty years from the date of approval of EPBC 2012/6274.

Lots 6 and 317 Minninup Road were purchased by the WAPC in 2016 to form part of an interconnected system of conservation reserves within the Greater Bunbury Region. It is expected that the reserve system will be ultimately vested in the Department of Parks and Wildlife to be managed for conservation once land acquisitions in the area are completed. Until that time, the land will remain in the ownership of the WAPC and will be managed for conservation. The WAPC has no intention to undertake or permit any use on the lots other than conservation due to the environmental values in the area.

Please do not hesitate to contact the undersigned if you require any clarification or further information.

Yours faithfully



Kevin Uhe
For Manager
Acquisitions, Disposals and Management

May 26 2017

Appendix C

Annual Report Template

ANNUAL REPORT TEMPLATE

- Report Date
- Project stage (trials, pre-plant, planting, <5 yrs post planting, >5 yrs post planting)
- Activities undertaken (trials, pre plant, planting, post-plant monitoring/maintenance)
- Monitoring results
 - Density and cover
 - % survival
 - Species composition
 - Health
 - Weed cover
 - Grazing
 - Fauna occurrence (possums, cockatoos or other significant species)
 - Fire, drought, vandalism/damage
 - Attainment of criteria
 - Photographs
- Incidents
 - Description
 - Response
 - Outcomes
- Evaluation
 - Progress of revegetation
 - Operation of Revegetation Management Plan
 - Proposed modifications