



# Appendix 4

## Clearing Revegetation Management Plan





Mr Daniel Panickar  
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CLOISTERS SQUARE WA 6850

**EPBC 2010/5785: Catalina Residential Community, Clarkson, WA: variation to conditions of approval.**

Dear Mr Panickar,

Thank you for your letter of 13 July 2018, on behalf of Tamala Park Regional Council, requesting a variation to the *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act) conditions of approval for EPBC 2010/5785. I note subsequent correspondence with the Department on this matter, particularly your email of 2 October 2018, agreeing to the variation of conditions proposed by the Department.

Officers of this Department have reviewed and advised me on your request. As a delegate of the Minister for the Environment and Energy, I have decided to vary the conditions of approval to EPBC 2010/5785 so as to vary the EPBC Act approval requirements for certain plantings of trees and shrubs for Carnaby's Black Cockatoo.

Please refer to the attached variation notice that specifies the varied conditions of approval, and note that the variation will soon be published on the Department's referral notices webpage.

Should you require any further information regarding the variation please contact Vaughn Cox on (02) 6274 2005 or by email to [postapproval@environment.gov.au](mailto:postapproval@environment.gov.au).

Yours sincerely

Declan O'Connor-Cox  
Acting Assistant Secretary  
Assessment (WA, SA, NT) & Post Approvals Branch  
Environment Standards Division

5 October 2018

Attach: Variation to conditions of approval for EPBC 2010/5785.



## VARIATION TO CONDITIONS ATTACHED TO APPROVAL

### Catalina residential development, Marmion Avenue, Clarkson, WA (EPBC 2010/5785)

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

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<b>Person to whom the approval is granted</b>	Tamala Park Regional Council ABN: 77 069 468 271
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<b>Approved action</b>	Clearing of native vegetation on Lot 9504 and the construction of a residential development at 1700 Marmion Avenue, Clarkson, WA [See EPBC Act referral 2010/5785].
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#### Variation

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<b>Variation of conditions of approval</b>	The variation is:  Delete condition 3 attached to the approval and substitute with condition 3 specified below.
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<b>Date of effect</b>	This variation has effect on the date the instrument is signed.
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#### Person authorised to make decision

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<b>Name and position</b>	Declan O'Connor-Cox Acting Assistant Secretary Assessment (WA, SA, NT) & Post Approvals Branch
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**Signature**

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<b>Date of decision</b>	5 October 2018
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### Conditions attached to the approval

3. To protect habitat for **listed threatened species**, the person taking the action must ensure that:
  - a) no more than 72.5 ha of **foraging habitat** and 11 ha of **potential breeding habitat** for Carnaby's Black Cockatoo (*Calyptrorhynchus latirostris*) is **cleared**;
  - b) no **clearing** of native vegetation is undertaken in the areas marked with the numbers '2' and '3' in Attachment A, except for maintenance of necessary management or **formalisation** of passive use pathways within the Northern and Southern Biodiversity Conservation Areas (BCAs). These areas are to be maintained as **natural bushland** as per the Northern and Southern Conservation Area Management Plans (CAMPs);
  - c) all previously **cleared** or disturbed land in areas marked with the numbers '2' and '3' in Attachment A, and at least 50% of the previously cleared land in the area marked with number '1' in Attachment A are **revegetated**;
  - d) no **clearing** of native vegetation that is potential foraging or breeding habitat for Carnaby's Black Cockatoo is undertaken within the areas marked in dark blue in Attachment B, except for maintenance or **formalisation** of necessary management or passive use pathways within the Northern and Southern Biodiversity Conservation Areas (BCAs). These areas are to be maintained as **natural bushland** per the Northern and Southern CAMPs;
  - e) within 2 years of the **commencement** of the action, the areas marked with the numbers '2' and '3' in Attachment A must be protected in perpetuity under an irrevocable conservation covenant: and
  - f) plantings of trees and shrubs in street-scaping and other public areas (excluding the areas described in condition 3.c) include a minimum of 1,600 trees (including *Xanthorrhoea preissii*) and 20,000 shrubs that are **primary feeding plants** for Carnaby's Black Cockatoo.



# Clearing and Revegetation Management Plan

## Catalina Residential Development

Prepared for  
**Tamala Park Regional Council**

20 December 2018



**DOCUMENT TRACKING**

ITEM	DETAIL
Project Name	Clearing and Revegetation Management Plan, Catalina Residential Development.
Project Number	17PER-7687
File location	N:\17PER\Projects\7687 Variation to EPBC Approval Condition\Report
Project Manager	Daniel Panickar 6218 2200 Level 1, Bishop See, 235 St Georges Terrace, Perth WA 6000
Prepared by	AW, JT, JL, DP
Approved by	Michelle Doak/ Jen Longstaff
Status	FINAL
Version Number	V4
Last saved on	20/12/2018
Cover photo	Catalina, Eco Logical Australia 2011.

This report should be cited as 'Eco Logical Australia 2018. *Clearing and Revegetation Management Plan, Catalina Residential Development*. Prepared for Tamala Park Regional Council.'

**ACKNOWLEDGEMENTS**

This document has been prepared by Eco Logical Australia Pty Ltd with support from Tamala Park Regional Council.

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# Abbreviations

ABBREVIATION	DESCRIPTION
AHD	Australian Height Datum
BCA	Biodiversity Conservation Areas
CRMP	Clearing and Revegetation Management Plan
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)
DEC	Department of Environment and Conservation (now Department of Biodiversity, Conservation and Attractions [DBCA])
POS	Public Open Space
DotEE	Department of the Environment and Energy (previously Department of Sustainability, Environment, Water, Population, and Communities)
TPRC	Tamala Park Regional Council

# 1. Introduction

## 1.1 DESCRIPTION OF PROJECT

Tamala Park Regional Council (TPRC) is the corporate entity representing the interests of seven local governments as the proponent of the 180 ha Catalina Residential Development (the Project). The TPRC includes the Cities of Perth, Joondalup, Stirling, Wanneroo and Vincent and the Towns of Cambridge and Victoria Park.

The Project is located at Lot 9504, 1700 Marmion Avenue, Clarkson; approximately 34 km north of Perth, Western Australia (**Figure 1**).

Together with residential housing, the development features smaller commercial and mixed-use precincts as well as dedicated public open space (POS) areas for the purposes of recreation and conservation (**Figure 2**). The POS includes habitat for one threatened fauna species, Carnaby's Black Cockatoo (*Calyptrorhynchus latirostris*) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Clearing of native vegetation is also required for the development of the Project.

## 1.2 FEDERAL ENVIRONMENTAL APPROVAL

The Project was referred for assessment under the EPBC Act on 21 December 2010 (EPBC 2010/5785). The proposal was determined a controlled action, and was assessed on preliminary documentation, with listed Threatened Species and Communities (sections 18 & 18A) as the controlling provision, referring to both Carnaby's Black-Cockatoo and Graceful Sun Moth. The Graceful Sun Moth has subsequently been delisted and the species no longer relates to the EPBC Act approval or conditions (de-listed as of May 2013).

After public exhibition of the preliminary documentation report, no comments were received and the Project was subsequently approved with conditions. A copy of the (now) Department of the Environment and Energy (DotEE) approval (herein, the approval) is provided in **Appendix 1**.

Preparation of a Clearing and Revegetation Management Plan (CRMP) was originally proposed by TPRC as a means of minimising the impact of the Project on the habitat of listed threatened species. This commitment was subsequently incorporated into the approval with the preparation of a CRMP stipulated under Condition 5 of the approval. Other conditions of approval relevant to the clearing and revegetation were also prescribed. A summary is provided in

Table 1.

A series of variations to the original conditions of approval have occurred as a common part of the planning process under s143 of the EPBC Act. The variations to the conditions are included as **Appendix 2**. This CRMP has been updated to reflect the amended conditions and the delisting of the Graceful Sun Moth.



### 1.2.1 Variation 1

Minor variation to the Approval was lodged in September 2011 to amend the boundaries of the Biodiversity Conservation Areas (BCAs) to allow for a realignment of the entry road to the east of Marmion Avenue. The realignment was required due to engineering and planning constraints. The realignment altered the footprint of the BCAs, however, there was no net loss of habitat for Carnaby's Black Cockatoo. There was a resulting increase of 1.15 ha of land to one BCA land package and a decrease of 1.15 ha of land to another BCA land package. The variation was approved and is included in **Appendix 2**.

### 1.2.2 Supplementary variation request (decision not determined)

A second variation to the Approval was requested in January 2012. The variation aimed to redefine the boundary of the western cell of the estate, which included Carnaby's Black Cockatoo habitat. As the south-east corner of the western cell contains cleared land that is not habitat for the Carnaby's Black Cockatoo, TPRC proposed to exclude this land from the boundary constrained by Conditions 5 and 6 of the approval. The land was then to be used as the location of a site office, given that at the time there was no other practical location. TPRC liaised with DotEE and consequently prepared a request to vary the approval under s143 of the EPBC Act.

No formal/final determination was issued for the variation request and accordingly an alternative location for the site office was ultimately secured.

### 1.2.3 Variation 2

A third variation request for the Approval was lodged in August 2013. The variation sought to enable the clearing of three small, isolated patches of public open space (POS) containing Carnaby's Black Cockatoo habitat within the central and eastern cells of the development. This impact was compensated by an increase in the area of POS containing Carnaby's Black Cockatoo habitat that had been previously identified for retention and protection in the south of the eastern cell. The increase in habitat represented slightly more than a 1:1 exchange with regard to the 1.08 ha that was removed, ensuring a no net loss outcome. Moreover, the enhanced areas of POS also delivered consolidation, greater condition habitat and increased direct connectivity corridors with Neerabup National Park, which is immediately adjacent to the development. The variation also sought to remove conditions that specifically related to the de-listed Graceful Sun Moth.

This variation was approved in October 2013 and required the amendment of condition 3 to reflect the approved variation and associated conditions. The variation notice is contained within **Appendix 2**.

### 1.2.4 Variation 3

A fourth variation request for the approval was lodged in October 2014. The variation sought changes to condition 3 of the approval to enable the clearance of a small 'to be retained' area of Carnaby's Black Cockatoo habitat (0.03 ha) remaining in the western cell of the estate. The small patch of habitat was isolated, presented a very small patch size (0.03 ha) and would have been subject to considerable edge effects, being surrounded on all sides by future urban pressures. This variation was approved on 1 February 2015. The variation notice is contained within **Appendix 2**.

### 1.2.5 Variation 4

A fifth variation request was lodged in February 2015. This variation sought to enable management activities to be undertaken within the BCAs associated with the re-establishment of access pathways. This variation was approved on 20 May 2015. The variation notice is contained within **Appendix 2**.

### 1.2.6 Variation 5

A sixth variation request was lodged in November 2017. This variation sought to clear a partially degraded area containing habitat for Carnaby's Black Cockatoo identified for retention as POS and replacing it with a larger area of better quality Carnaby's Black Cockatoo habitat. This variation was approved on 1 December 2017. The variation notice is contained within **Appendix 2**.

### 1.2.1 Variation 6

A sixth variation request was lodged in July 2018. This variation sought to amend the number of plants constituting foraging habitat for Carnaby's Black-Cockatoo required to be planted in street-scaping and other public areas within the estate as a result of landscaping constraints and providing an improved safety outcome for Carnaby's Black-Cockatoo. This variation was approved on 5 October 2018.

**Table 1: Environmental approval conditions relevant to clearing and revegetation**

COND. NO.	SUMMARY OF THE CONDITION
3	<p>To protect habitat for <b>listed threatened species</b>, the person taking the action must ensure that:</p> <ul style="list-style-type: none"> <li>a) No more than 72.5 ha of <b>foraging habitat</b> and 11 ha of <b>potential breeding habitat</b> for Carnaby's Black Cockatoo (<i>Calyptrorhynchus latirostris</i>) is <b>cleared</b>;</li> <li>b) No <b>clearing</b> of native vegetation is undertaken in the areas marked with the numbers '2' and '3' in Attachment A, except for maintenance of necessary management or <b>formalisation</b> of passive use pathways within the Northern and Southern Biodiversity Conservation Areas (BCAs). These areas are to be maintained as <b>natural bushland</b> as per the Northern and Southern Conservation Area Management Plans (CAMPs);</li> <li>c) All previously <b>cleared</b> or disturbed land in areas marked with the numbers '2' and '3' in Attachment A, and at least 50% of the previously cleared land in the areas marked with number '1' in Attachment A are <b>revegetated</b>;</li> <li>d) No <b>clearing</b> of native vegetation that is potential foraging or breeding habitat for Carnaby's Black Cockatoo is undertaken within the areas marked in dark blue in Attachment B, except for maintenance or <b>formalisation</b> of necessary management or passive use pathways within the Northern and Southern Biodiversity Conservation Areas (BCAs). These areas are to be maintained as <b>natural bushland</b> per the Northern and Southern CAMPs;</li> <li>e) Within 2 years of the <b>commencement</b> of the action, the areas marked with the numbers '2' and '3' in Attachment A must be protected in perpetuity under an irrevocable conservation covenant; and</li> <li>f) Street-scaping and other public areas (excluding the areas described in condition 3.c) must contain a minimum of 1,300 trees (including <i>Xanthorrhoea preissii</i>), 50% of which must be primary feeding plants for Carnaby's Black Cockatoo.</li> </ul>
5	<p>The person taking the action must prepare and submit a <i>Clearing and Revegetation Management Plan</i> for the <b>Minister's</b> approval to demonstrate how the impact of <b>clearing</b> of habitat for <b>listed threatened species</b> will be minimised. The plan must detail how:</p> <ul style="list-style-type: none"> <li>• on-site <b>revegetation</b> will be undertaken;</li> <li>• seed from native vegetation will be collected from the area contained within the red lines marked in Attachment C;</li> <li>• topsoil obtained from the <b>clearing</b> of native vegetation on the proposal site within the red lines marked in Attachment C will be used for <b>revegetation</b> on-site or stored and</li> </ul>

	<p>made available for the <b>DEC</b> or other conservation agencies for the purpose of <b>revegetation</b> elsewhere; and</p> <ul style="list-style-type: none"><li>• the <b>DEC</b>, or other conservation agencies, have been consulted in the development of the plan to determine the optimal time for <b>clearing</b> and provision of seed or soil for <b>revegetation</b>.</li></ul> <p>If the <b>Minister</b> approves the plan then the approved plan must be implemented</p>
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6	<p>The person taking the action must not undertake any <b>clearing</b> in the area within the red lines marked in Attachment C<sup>1</sup> unless:</p> <ul style="list-style-type: none"> <li>the Clearing and Revegetation Management Plan described in condition 5 has been approved by the <b>Minister</b>; and</li> <li>evidence has been provided to the <b>Department</b> confirming that the purchase(s) of the land parcels required for offsets under condition 4a or condition 4b has been completed.</li> </ul>
8	<p>The person taking the action may choose to revise a Plan approved by the <b>Minister</b> under condition 5 without submitting it for approval under section 143A of the <b>EPBC Act</b>, if the taking of the action in accordance with the revised Plan would not be likely to have a new or increased impact. If the person taking the action makes this choice they must:</p> <ol style="list-style-type: none"> <li>Notify the <b>Department</b> in writing that the approved Plan has been revised and provide the <b>Department</b> with an electronic copy of the revised Plan;</li> <li>Implement the revised Plan from the date that the Plan is submitted to the Department; and</li> <li>For the life of this approval, maintain a record of the reasons the person taking the action considers that taking the action in accordance with the revised Plan would not be likely to have a <b>new or increased impact</b>.</li> </ol> <p>8A. The person taking the action may revoke their choice under condition 8 at any time by notice to the <b>Department</b>. If the person taking the action revokes the choice to implement a revised Plan, without approval under section 143A of the <b>EPBC Act</b>, the Plan approved by the <b>Minister</b> must be implemented.</p> <p>8B. If the <b>Minister</b> gives a notice to the person taking the action that the <b>Minister</b> is satisfied that the taking of the action in accordance with the revised Plan would be likely to have a <b>new or increased impact</b>, then:</p> <ol style="list-style-type: none"> <li>condition 8 does not apply, or ceases to apply, in relation to the revised Plan; and</li> <li>the person taking the action must implement the Plan approved by the <b>Minister</b>.</li> </ol> <p>To avoid any doubt, this condition does not affect any operation of conditions 8 and 8A in the period before the day the notice is given.</p> <p>At the time of giving the notice the <b>Minister</b> may also notify that, for a specified period of time, condition 8 does not apply for one or more specified Plans required under the approval.</p> <p>8C. Conditions 8, 8A and 8B are not intended to limit the operation of section 143A of the <b>EPBC Act</b> which allows the person taking the action to submit a revised Plan to the <b>Minister</b> for approval.</p>

<sup>1</sup> Refer to **Figure 3**.



Figure 1: Project location



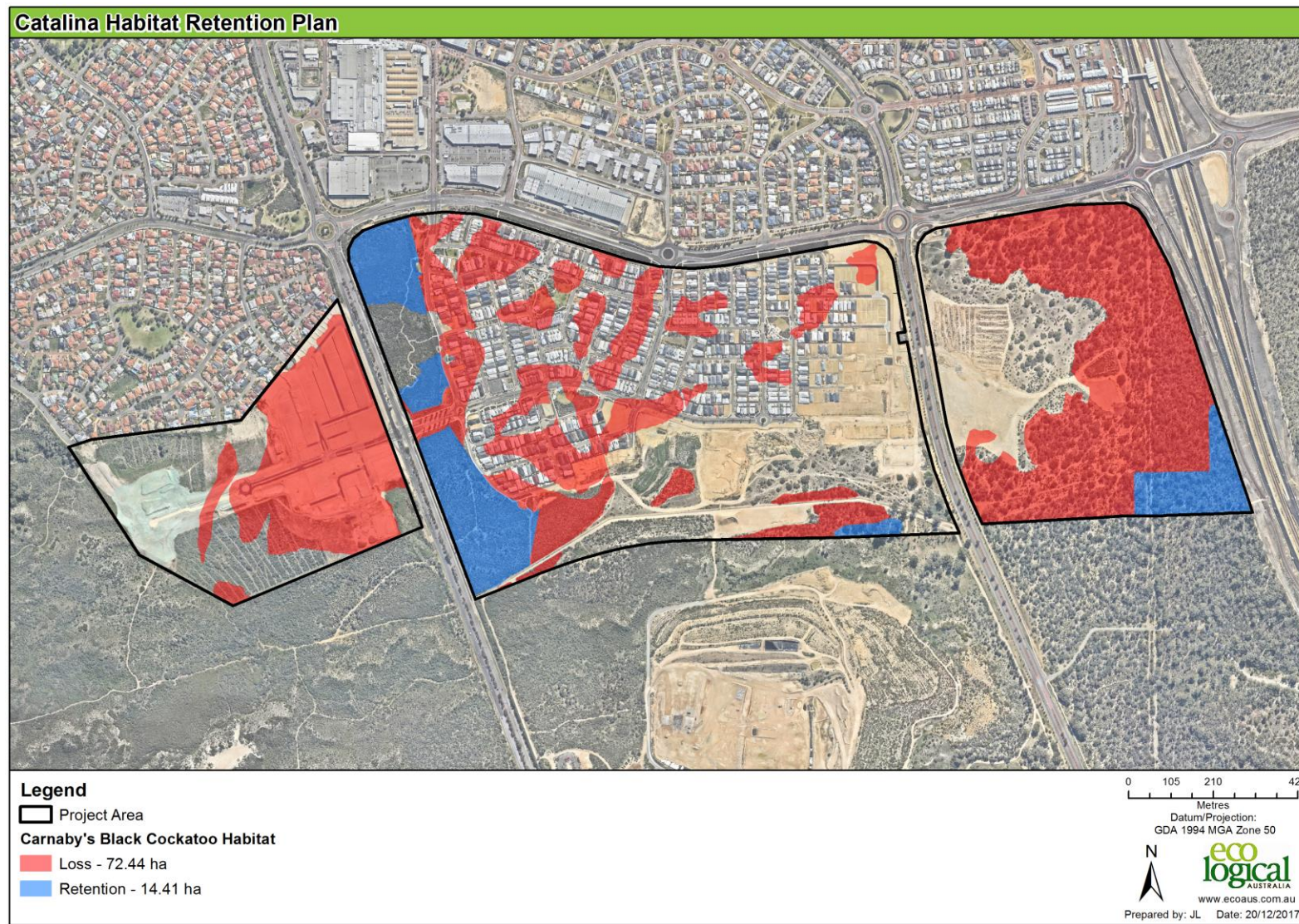


Figure 2: Catalina habitat retention plan

### 1.3 PURPOSE AND SCOPE

The purpose of this CRMP is to:

- Address Conditions 5 and 6 of the approval, and
- Demonstrate how the impact of clearing of habitat for listed threatened species will be minimised during development of the site.

The CRMP also takes into account the broader environmental management requirements of the approval.

In accordance with Condition 5, this CRMP identifies how:

- On-site revegetation will be undertaken,
- Seed from native vegetation will be collected from designated seed collection areas (refer to **Figure 3**),
- Topsoil obtained from the clearing of native vegetation in the Project Area within the designated topsoil collection areas (refer to **Figure 3**) will be used for revegetation, and
- The DEC and other conservation agencies have been consulted in the development of the CRMP to determine the optimal time for clearing and provision of seed or soil for revegetation.

The TPRC is cognisant of Condition 6, which stipulates that no clearing in the area within the red lines marked in Attachment D of the Approval (**Figure 3**) will be undertaken until:

- The Clearing and Revegetation Management Plan is approved by the Federal Minister for Environment, and
- Evidence has been provided to DotEE that the purchase of the land parcels required for offsets under Approval Condition 4a or 4b has been completed.

This CRMP comprises four key sections: clearing, revegetation, monitoring and reporting. A works schedule is also included.

### 1.4 STAKEHOLDER CONSULTATION

In accordance with Condition 5, the DEC (now Department of Biodiversity, Conservation and Attractions; DBCA) was consulted in the development of this plan to determine the optimal time for vegetation clearing and provision of seed or soil for revegetation. The outcomes of these meetings are summarised in **Table 2**.

**Table 2: Summary of consultation undertaken to date**

DATE	STAKEHOLDER	SUMMARY OF MEETING OUTCOMES
January 5, 2012	DEC – Jacqui Maguire	Discussed topsoil and seed availability and intention to make this material available to conservation agencies including the DEC.  Jacqui was unaware of any particular revegetation projects or sites that required materials. Noted issues regarding transport and storage, as well as concerns about weed seed store in topsoil; based on experience in other similar projects.
January 11, 2012	DEC – Barbara Wilson	Stakeholder not aware of any projects that require revegetation materials. Expressed concern about cost of relocating materials from Catalina site to DEC revegetation site (if DEC were required to cover the cost of transporting materials).  Referred to Mark Brundrett.
January 20, 2012	DEC – Mark Brundrett	Advised that Tamala Park Regional Council would like to offer seed and topsoil to DEC, for revegetation projects in the vicinity of Catalina.  DEC provided some information relevant to topsoil management on the Swan Coastal Plain.





Figure 3: Topsoil and seed collection areas - Attachment C to the EPBC approval

## 2. Site Description

### 2.1 LAND USE

The Project Area is currently comprised of natural bushland, cleared areas, and various stages of residential development. The Project Area is surrounded by residential land to the north, regional open space (conservation) to the west, vacant freehold land to the south and Neerabup National Park to the east.

### 2.2 LANDFORM AND SOILS

The Project Area is located on the Swan Coastal Plain, dominated by ancient sedimentary dune systems deposited during the ice ages and interglacial periods (City of Wanneroo, 2005).

The topography of the Project Area is undulating and variable across the site, generally reflecting the dune systems of the western Swan Coastal Plain. Elevation ranges from 10 to 50 m AHD (metres Australian Height Datum) in a series of dune swales and ridges lying roughly parallel to the coast.

The Project Area forms part of the Spearwood Dune System, including both the Cottesloe and Karrakatta major soil units. Karrakatta sands are yellow, highly leached dune sands. Cottesloe sands are characterised as shallow brown or bright yellow sand-loam over limestone with limestone outcropping occurring in some areas.

### 2.3 VEGETATION AND FLORA

The Project Area is located within the Swan Coastal Plain biogeographic region of the South West botanical province (Thackway and Cresswell 1995; Paczkowska and Chapman 2000). The vegetation of the Project Area is representative of two vegetation complexes:

- The Cottesloe Complex: mosaic of Tuart woodland and an Open Forest of Tuart, Jarrah and Marri; and
- The Karrakatta Complex: predominantly of an Open Tuart, Jarrah and Marri forest with *Banksia attenuata*, *Banksia menziesii*, *Banksia grandis* and *Allocasuarina fraseriana*.

A total of 12 vegetation types were identified within the central and east cells of the Project Area, described according to the following landform types (Syrinx Environmental PL 2010):

- Dune Swale (5 vegetation types);
- Dune Crest and Slope (4 vegetation types); and
- Limestone Outcrop (3 vegetation types).

Vegetation condition in these areas ranged from Excellent to Completely Degraded (Syrinx Environmental 2009, 2010). Threats to vegetation condition were noted as:

- Weed invasion, resulting in impacts on vegetation understory;
- Grazing by kangaroos and rabbits in cleared areas; and
- Presence of 4WD tracks and rubbish dumping.

A vegetation condition map of the Project Area is provided in **Figure 4**. A total of 199 flora species were identified within the Project Area including 48 weed species (Syrinx Environmental PL, 2010) and two species of conservation significant flora (listed under State legislation); *Fabronia hampeana* and *Sarcozona bicarinata*. A full species list is provided in

Appendix 3.

ELA completed supplementary vegetation and Carnaby's Black Cockatoo habitat mapping within the eastern portion of the Project Area in 2014 (ELA 2014; **Figure 4**). This mapping was undertaken to identify vegetation condition in the context of providing habitat specifically for Carnaby's Black Cockatoo in order to inform the design of POS areas, to ensure the retention of the highest condition areas of habitat for the listed species.

## 2.4 FAUNA

### 2.4.1 Carnaby's Black Cockatoo

Carnaby's Black-Cockatoo is endemic to the south-west of Western Australia. The species feeds on seeds, nuts and flowers of a variety of native species including *Banksia*, *Hakea*, *Grevillea*, *Allocasuarina*, *Eucalyptus* and *Corymbia*. A literature review conducted by Valentine and Stock (2008) found that the Carnaby's Black Cockatoo have been observed feeding on 73 plant species, 55 of which are native to the South West.

Carnaby's Black Cockatoo habitat has been mapped within the Project Area. The vegetation of the Project Area includes a number of Carnaby's Black Cockatoo foraging habitat species, including: *Banksia attenuata*, *Banksia menziesii* and *Banksia sessilis*, *Eucalyptus gomphocephala*, *Eucalyptus marginata*, *Allocasuarina humilis*, *Xanthorrhoea preissii* and *Hakea lissocarpha*. The *E. gomphocephala* and *E. marginata* recorded in the Project Area have also been identified as potential nesting habitat. Large sections of Carnaby's Black Cockatoo habitat will be protected in conservation areas.





Figure 4: Vegetation condition (Syrinx Environmental PL, 2010) and Carnaby's Black Cockatoo vegetation/habitat condition (ELA, 2014)



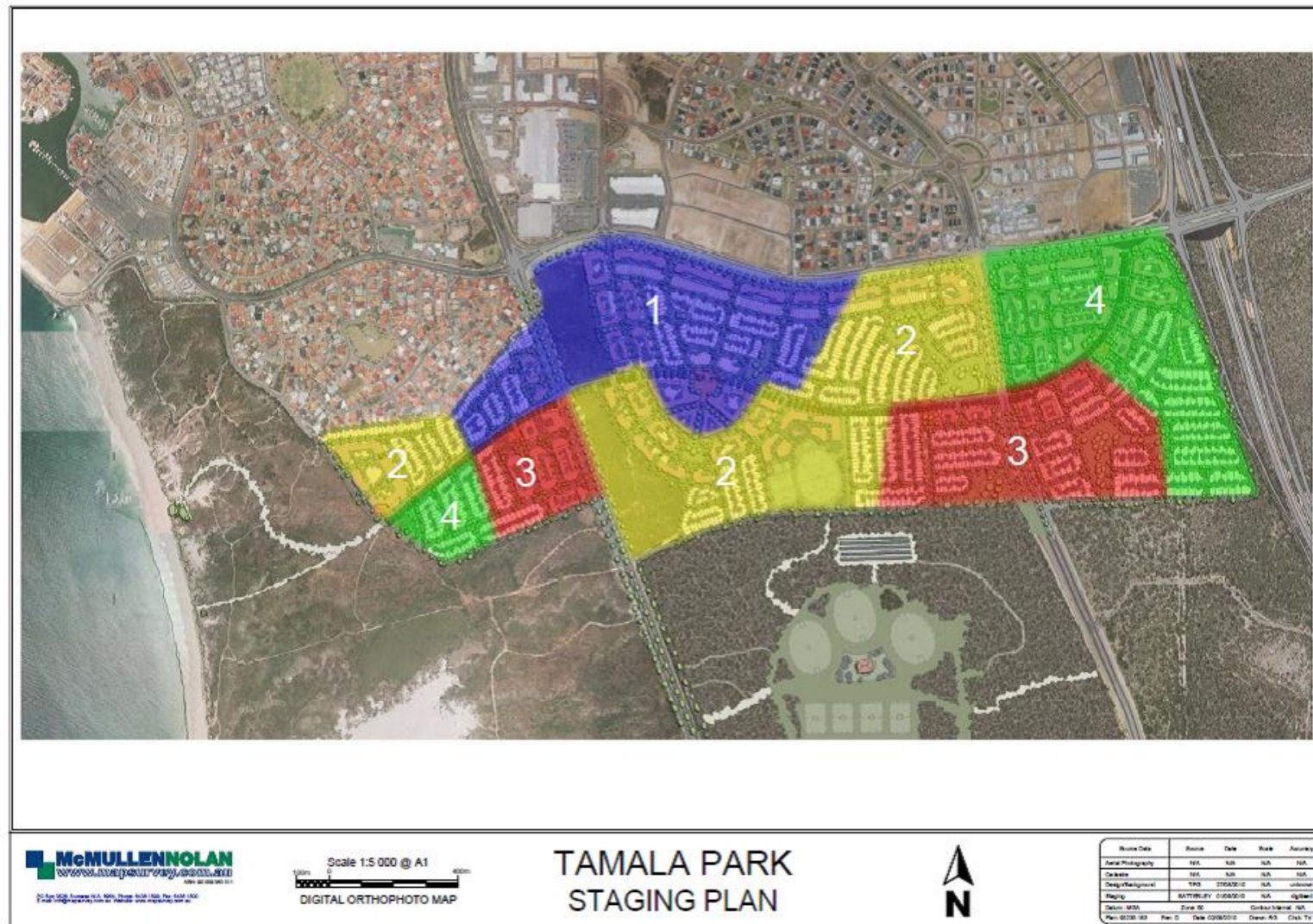


Figure 5: Indicative development staging

### 3. Objectives and Performance Measures

The following objectives and key performance measures have been prescribed for clearing and revegetation in the Project Area (**Table 3**).

**Table 3: Objectives and performance measures**

	OBJECTIVE	KEY PERFORMANCE MEASURES
Clearing	Area of clearing occurs only within approved clearing areas.	No reports of clearing outside of approved areas during site inspections and post clearing audits.
	Recovery of suitable topsoil material is maximised.	Annual reporting includes summary of suitable topsoil made available for revegetation
Revegetation	Disturbed areas in Biodiversity Conservation Areas will be revegetated with suitable habitat species prior to the ceding of BCA areas to the City of Wanneroo (end of year two).	A minimum success rate of 80% is achieved for all species planted within revegetated areas. Monitored annually to achieve the target (80% success) at year two (2) end.
	Disturbed areas in POS area 1 will be revegetated with suitable habitat species prior to the ceding of POS to the City of Wanneroo (end of year two).	A minimum success rate of 80% is achieved for all species planted within revegetated areas. Monitored annually, to achieve the target (80% success) at year two (2) end.
	The use of Carnaby's Black Cockatoo habitat species will be maximised in landscape and streetscape plantings.	At least 50% of plantings across the Project Area are Carnaby's Black Cockatoo primary feeding species.
Monitoring	Success of clearing and revegetation activities will be regularly monitored in accordance with stipulated monitoring criteria.	All monitoring activities are completed and monitoring criteria assessed annually.
	Revegetation and clearing activities will respond to the outcomes of monitoring.	Annual reports will document how monitoring results were considered in the implementation of subsequent clearing and revegetation actions.
Reporting	Reporting will be conducted annually to completion (year 5) in compliance with monitoring conditions.	All reporting requirements (as stipulated in the approval conditions) are satisfied in the preparation of annual reports.  Annual reports will be made available on the TPRC website and DotEE notified.

## 4. Management of Clearing

### 4.1 BACKGROUND

While habitat avoidance was included in the structure planning process, development of the Project will require the clearing of native vegetation that cannot be avoided, including up to 72.5 ha of foraging habitat and 11 ha of potential breeding habitat for Carnaby's Black Cockatoo.

In accordance with the Catalina Residential Development Offsets and Mitigation Plan (Eco Logical Australia 2011), relevant conditions of approval and variations (

Table 1) a number of management strategies and objectives for clearing have been designed with the overall aim of minimising the impacts of the development on listed threatened species.

This section provides further details relevant to the clearing objectives prescribed in Section 3.

### 4.2 OBJECTIVES

The management objectives for clearing are:

- Minimise the area of clearing within the Project Area and ensure that clearing occurs only within approved areas; and
- Ensure topsoil recovery is undertaken in the prescribed areas.

### 4.3 SEED COLLECTION

#### 4.3.1 Species

Seed material from flora species suitable for use in rehabilitation and landscaping works will be collected. This will include:

- Collection of seed from Carnaby's Black Cockatoo foraging species, which will later be used for on-site revegetation (including landscaping of POS and street-scaping); and
- Collection of seed from local native species within target floristic communities, which will later be used for production of seedlings for on-site revegetation.

A list for targeted seed collection species (including Carnaby's Black Cockatoo foraging species) is provided in

Appendix 3.

#### 4.3.2 Timing

Seed collection will be undertaken in the prescribed areas at the time of clearing.

Seed will be collected by licenced seed collectors.

Seed collection will be conducted in the period of optimal seed availability – that is in the peak seed setting season for each target species. Seed collection will be conducted during summer, with further

confirmation from contractors sought prior to seed collection in order to determine detailed seed collection schedules.

#### 4.3.3 Treatment, storage and use

Treatment of collected seeds will be undertaken by a licenced seed collector. Seed will be stored in an air-conditioned room until required for direct seeding or seedling production.

Surplus seed may be used for other restoration and revegetation activities within the City of Wanneroo or will be made available to DBCA or Perth NRM for use in revegetation and restoration works.

### 4.4 CLEARING

#### 4.4.1 No clearing areas

Areas of vegetation that are to be retained and protected as natural bushland include:

- Areas marked with the numbers '2' and '3' in Attachment A of the EPBC Act Varied Conditions Attached to Approval (**Appendix 2** of this CRMP); and
- Areas that are mapped as retained Carnaby's Black Cockatoo foraging habitat in Attachment B of the EPBC Act Varied Conditions Attached to Approval (**Appendix 2** of this CRMP).

Clearing areas will be clearly demarcated with flagging tape by the site surveyor prior to commencement of clearing and must be located in accordance with **Figure 6**. Clearing contractors will be shown via a site walkover which areas of vegetation have been marked for retention prior to the commencement of clearing.

Site development, including clearing will be 'staged' to permit fauna present on the site to disperse into adjacent conservation areas to be retained and rehabilitated.

#### 4.4.2 Timing and method

Clearing is likely to be undertaken in alignment with the staged development of the Project (**Figure 5**) except where revegetation or other requirements dictate otherwise.

To minimise impacts on Carnaby's Black Cockatoos, a search of any identified hollows will be undertaken on site by a suitably qualified zoologist prior to clearing on site, to ensure no presence of nesting birds.

While considered highly unlikely, should nesting birds be observed, TPRC will engage a qualified zoologist to provide advice on the expected duration of nesting and appropriate management responses. DotEE will be consulted during any required decision making.

Native Animal Rescue will be contacted immediately should any injured wildlife be discovered on site by telephone on (08) 9249 3434.

### 4.5 HANDLING OF TOPSOIL

#### 4.5.1 Area of collection

Topsoil will be collected only from within designated areas (areas marked in red on Attachment D of the EPBC Act Approval and see **Figure 3** above).

To minimise the spread of weeds, only topsoil that is visually identified as having relatively low weed density and previously supporting vegetation in good condition or better will be collected.



The upper 100 mm of the soil profile will be skimmed and/or scraped and then applied directly to designated revegetation areas as required. The direct return process involves the removal of topsoil and direct application of the topsoil product to prescribed areas undergoing revegetation without the need for stockpiling. Direct return will also assist with preserving the physical and biological characteristics of the soil (including nutrients, organic matter, and soil microbes) (Rokich et al 2000).

Topsoil material will be collected by scraper/excavator. The placement of excavated material will be undertaken as part of any rehabilitation/revegetation landscaping works and be conducted by suitably qualified professionals.

#### **4.5.2 Topsoil use**

Topsoil in the first instance is proposed to be used for revegetation and rehabilitation works in the abutting (to the south) Mindarie rehabilitation project (being undertaken by Mindarie Regional Council). Surplus seed may be used for other restoration and revegetation activities within the City of Wanneroo or will be made available DBCA or Perth NRM for use in revegetation and restoration works.



Figure 6: No clearing areas – areas to be retained

#### 4.6 SUMMARY OF CLEARING ACTIONS

**Table 4: Summary of clearing management actions**

ACTIONS	
1	Seed collection will be conducted in accordance with the optimal period for seed collection from designated seed collection areas <sup>2</sup> prior to scheduled clearing.
2	Seed collection and treatment will be conducted by licensed seed collectors.
3	Collected seed will be stored until required, in specified conditions as recommended by a licenced seed collector.
4	All collected seed will be used for onsite revegetation and/or provided to third parties for the purposes of revegetation and restoration works.
5	No-clearing areas will be demarcated with flagging tape by the site surveyor prior to commencement of clearing.
6	Clearing contractors will be shown via a site walkover which areas of vegetation are marked for retention (no-clearing).
7	Clearing will be staged to allow for fauna movement into neighbouring native vegetation.
8	All site workers will be inducted on the identification of Carnaby's Black Cockatoo.
9	Native Animal Rescue will be contacted (T: 9249 3434) immediately should any injured wildlife be discovered on site.
10	The top 100 mm of soil will be collected from designated topsoil collection zones for direct relocation (also known as direct return) to revegetation areas. Surplus topsoil will be made available to third-parties for the purposes of revegetation. Topsoil collection and relocation will occur only between January and March.

<sup>2</sup> The area contained within red lines marked in Attachment D of the EPBC Approval (**Figure 3**)

## 5. Revegetation

### 5.1 BACKGROUND

Revegetation of public open space (POS) was proposed as an approach to mitigate the impact of the Project on threatened fauna species and was subsequently stipulated within the conditions of approval (

Table 1). Three sites are identified within the Project Area as targets for revegetation: two Biodiversity Conservation Areas (Site 2 and Site 3) and one POS parcel (Site 1) (**Figure 6**). Background information, including survey reports and spatial data (including aerial imagery) were used to develop an understanding of the restoration potential of each revegetation site; as discussed below.

### 5.2 REVEGETATION OBJECTIVES

The objectives for revegetation are:

- Disturbed/cleared areas within Biodiversity Conservation Areas (Site '2' and '3' in Attachment A of the approval) will be revegetated with suitable habitat species at a similar density to that currently present within the BCA, prior to ceding these areas to the City of Wanneroo; and
- Disturbed/cleared areas within POS (Site 1 in Attachment A of the approval) will be revegetated with suitable habitat species at a similar density to that currently present within the POS prior to ceding to the City of Wanneroo.

The conditions stipulate that revegetation is considered to include the activities of weed removal and the establishment of native vegetation.

### 5.3 RESTORATION POTENTIAL

#### 5.3.1 Biodiversity Conservation Areas (Site 2 and Site 3)

Vegetation types, including those within the Biodiversity Conservation Areas (BCAs), were mapped and described by Syrinx Environmental PL (2010), (**Figure 7**). Three vegetation types occur within Site 2: types 1, 2, and 3 (refer to **Table 5** for a description of each type).

The vegetation condition within Site 2 is identified as predominantly good to very good condition (Syrinx Environmental PL, 2010). Small areas of degraded and completely degraded vegetation exist within Site 2 as described below:

- On the north-west boundary of the Site (Site 2A), 0.04 ha; and
- Within the north-east corner of the Site (Site 2B) 0.3 ha.

As condition 3c of the approval stipulates that all previously cleared land within Sites 2 and 3 must be revegetated, these two areas of degraded vegetation form the targets for revegetation in Site 2, and are depicted on **Figure 8**.



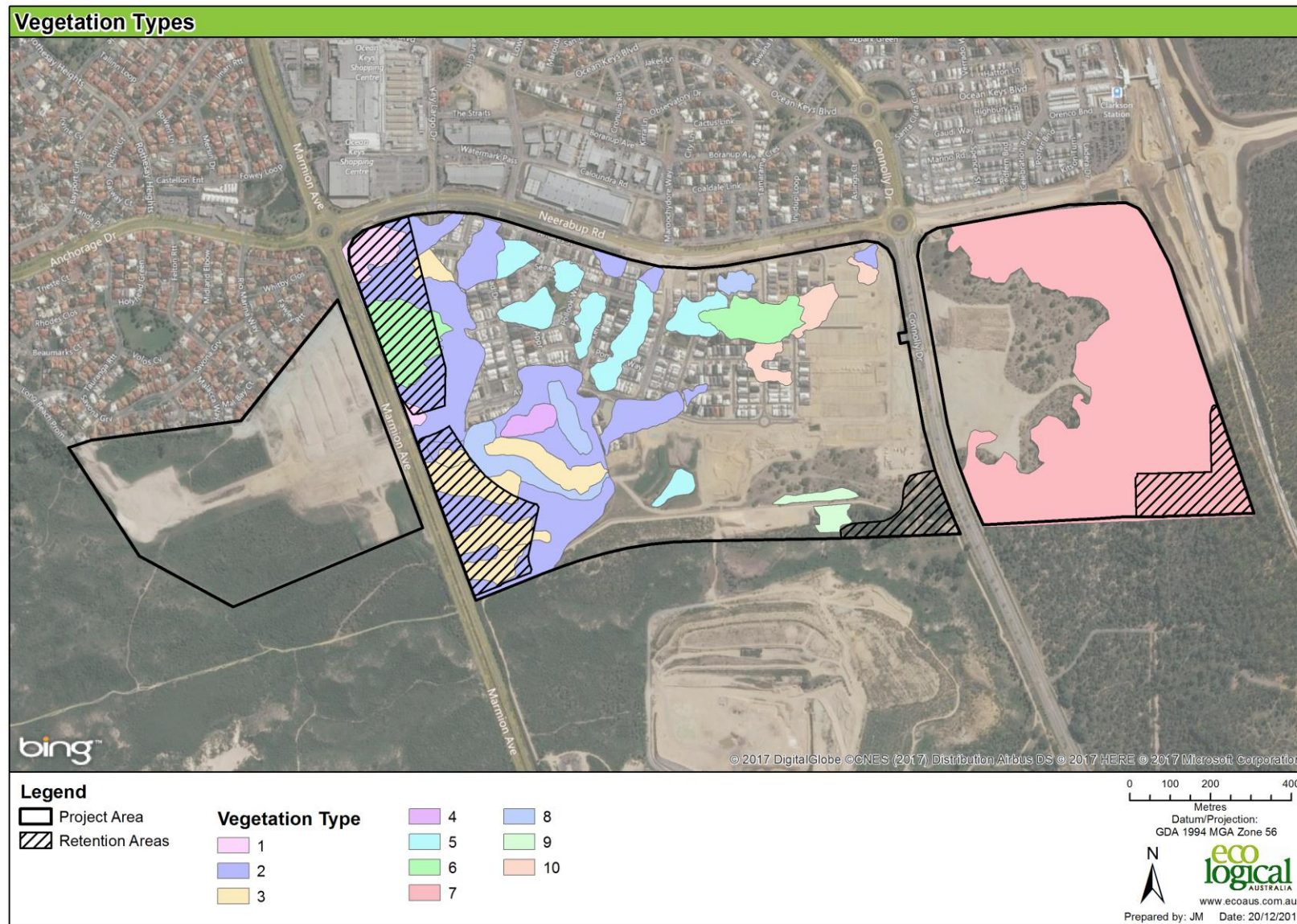


Figure 7: Vegetation types and extent

The vegetation condition within Site 3 is also identified as predominantly good to very good (Syrinx Environmental PL 2010). Similar to Site 2, small areas of degraded and completely degraded vegetation exist within Site 3 as described below:

- Through the centre of Site 3A = 0.11 ha; and
- On the southern boundary 3B = 0.07 ha.

These areas form the targets for revegetation within Site 3, and are marked on **Figure 9** as Site 3A and 3B, respectively.

### 5.3.2 Public Open Space (Site 1)

The intention for Site 1 is to promote passive mixed use of the POS site in a way that is compatible with maintaining or improving the Carnaby's Black Cockatoo habitat value of the site.

Condition 3c of the approval stipulates that at least 50% of previously cleared land in this area must be revegetated (defined as the removal of weeds and establishment of native vegetation). The process for identifying the revegetation potential of these two sites was as follows:

- Identification of the extent of Carnaby's Black Cockatoo habitat within Site 1; and
- Identification of areas suitable for revegetation (outside the mapped habitat areas), taking into account the passive public recreation and amenity values of the site; and
- Calculation of the area of revegetation (outside of mapped Carnaby's Black Cockatoo habitats), to ensure that the area designated for revegetation would be compliant with Condition 5.

The minimum area for revegetation within POS Site 1 is 0.65 ha and the indicative location mapped in **Figure 10**.

Note: The final location of revegetation works will be confirmed during more detailed planning phases, to ensure that the POS design is integrated with, and complementary to, adjacent land use and form. Accordingly, the location/area depicted in **Figure 10** is indicative only.





Figure 8: Revegetation Site 2



Figure 9: Revegetation Site 3





Figure 10: Revegetation Site 1

## 5.4 REVEGETATION GUIDE

### Site preparation

Site preparation in designated revegetation areas will involve:

- Weed control. Targeted spraying will be conducted by a suitably qualified contractor, experienced in weed identification and control. Spraying will occur in the summer or autumn, prior to seed being set and will be conducted prior to revegetation commencing in the following winter (Section 5.5.3). Target spraying will occur throughout Site 2 and Site 3 to ensure weeds are controlled prior to planting. Target spraying will be conducted through revegetation areas and habitat enhancement areas in POS Site 1; and
- Ripping. Site assessments will be completed approximately 8 weeks prior to planting to identify the presence of compacted soils and the need for ripping. If required, ripping will be conducted to a depth of approximately 10 – 20 cm. Ripping will be conducted within 1-2 weeks prior to planting on site in areas identified as having compacted soils (such as tracks and pathways).

### Planting and brushing

A combination of direct planting combined with direct seeding will be used.

Species for revegetation will be selected on the basis of the surrounding vegetation types, as set out in **Table 5**, with a preference for Carnaby's Black Cockatoo habitat species (see **Table 7**) at POS Site 1.

**Table 5: Floristic community types**

REVEGETATION SITE	VEGETATION TYPE	
		DESCRIPTION
BCA Site 2A	Type 1	<i>Banksia sessilis</i> , <i>Melaleuca huegelii</i> and <i>Acacia cyclops</i> Closed Heath over <i>Melaleuca systema</i> , <i>Conostephium pendulum</i> , <i>Grevillea preissii</i> subsp. <i>preissii</i> Very Open Shrubland over <i>*Ehrharta brevifolia</i> Grassland / <i>* Hypochaeris glabra</i> Herbland / <i>Desmocladius flexuosus</i> Very Open Shrubland.
BCA Site 2B, 3A, 3B	Type 2	<i>Banksia sessilis</i> Tall Shrubland over <i>Acacia pulchella</i> , <i>Xanthorrhoea preissii</i> and <i>Hibbertia hypericoides</i> Open Heath over mixed Grassland and Herbland.
	Type 3	<i>Banksia attenuata</i> and <i>B. menziesii</i> Low Woodland over <i>Macrozamia riedlei</i> , <i>Hakea lissocarpha</i> Open Heath, over <i>Hibbertia hypericoides</i> , <i>Phyllanthus calycinus</i> Low Shrubland over <i>*Ehrharta brevifolia</i> Grassland / <i>*Ursinia anthemoides</i> and <i>* Hypochaeris glabra</i> Herbland / <i>Mesomelaena pseudostygia</i> Sedgeland.
POS Site 1	Type 9	<i>Banksia menziesii</i> / <i>B. attenuata</i> Low Woodland over <i>Allocasuarina humilis</i> <i>Hakea lissocarpha</i> Open Heath over <i>Daviesia triflora</i> .

Planting densities will be achieved using similar densities to those already present within the respective revegetation area. This is estimated to typically be in the range of 300 – 500 plants per hectare.

Planting will occur in early- to mid- winter. Tree guards will be used on all direct plantings. Tree guard removal will occur within one season following planting. Seedlings will be ordered approximately 12 months ahead of scheduled planting.

Brushing with brush material from cleared areas (see Section 4.5) will be used wherever appropriate to assist in providing a source of seed to the target revegetation site. Direct seeding will be used as an alternative to brushing if brush material (in seed) is unavailable.

#### *Access control*

Access to Site 2 and 3 will be controlled through the use of a permanent fence. As the purpose of the site is for biodiversity conservation, recreational access will be prevented through the use of fencing installed around the boundary of Site 2 and Site 3, following the completion of planting and brushing.

Suitable access control at Site 1 will be installed as required during the revegetation period.

#### *Feral animal control*

Feral animals, including foxes, cats, rabbits and introduced bees, are a key management issue in the Yanchep National Park (Department of Environment and Conservation 1989).

Feral animal control programs, focused on the control of foxes and rabbits, will be conducted annually across Biodiversity Conservation Areas (Site 2 and Site 3).

#### *Site Maintenance*

Following direct planting, seedlings will be monitored in mid- to late- summer to determine survival success. Should the rate of attrition be identified as greater than 20% (within any of the target revegetation areas) follow-up infill planting will be conducted.

Follow up weed control will be conducted annually, during summer or autumn prior to seed set, throughout Biodiversity Conservation Areas (Site 2 and 3) and within revegetation areas and habitat enhancement areas (within Site 1). Should monitoring reveal an unacceptable cover of weeds within any POS or BCA Sites (see Section 6), additional weed spraying will be undertaken as required.

## 5.5 LANDSCAPE AND STREETSCAPE PLANTINGS

The objective for landscape and streetscape plantings is that:

Street-scaping and other public areas must contain a minimum of 1,300, 50% of which must be primary feeding plants for Carnaby's Black Cockatoo. Primary feeding plants for Carnaby's Black Cockatoo are defined in EPBC 2010/5785 as:

- Any *Banksia* sp.;
- Any plants identified in a web search of the Department of Biodiversity, Conservation and Attractions "Plants for Carnaby's Search Tool"; or
- Other plants approved in writing by the Department.

A breakdown of Carnaby's Black-Cockatoo primary feed trees and the compliance with relevant management documents is provided in **Table 6**. The list of tree species that are acceptable to use within Catalina Estate is limited due to the requirements of the City's Streetscape Plan (2005) and DEC (2012), the limited number of species of primary feed trees commercially available to be used and the need to provide an improved safety outcome for Carnaby's Black-Cockatoo in the local area. The 1,300 trees to be planted allows for the estate to incorporate other varying floral species into the streetscape and will assist in obtaining enough vegetation to landscape the estate through to completion.

**Table 6: Carnaby's Black Cockatoo primary feeding trees**

Primary feed species	Comments
<i>Allocasuarina fraseriana</i>	Possible street tree, similar in habit and form as <i>Casuarina</i> .
<i>Allocasuarina humilis</i>	Possible street tree
<i>Agonis flexuosa</i>	Currently proposed on STMP.
<i>Araucaria heterophylla</i>	CoW issues with use/currently proposed on STMP.
<i>Banksia ashbyi</i>	Available in dwarf format
<i>Banksia nivea</i>	Species has proved temperamental at Brighton.
<i>Banksia sessilis</i>	Suitable street tree.
<i>Callistemon viminalis</i>	Currently proposed on STMP.
<i>Corymbia calophylla</i>	Can be used
<i>Corymbia ficifolia</i>	Being used as a substitute for <i>Eucalyptus tottiana</i>
<i>Eremophila glabra</i>	Possible street tree
<i>Eucalyptus caesia</i>	Possible street tree
<i>Eucalyptus gomphocephala</i>	Concerns with size of tree on streets
<i>Eucalyptus marginata</i>	Possible street tree
<i>Eucalyptus tottiana</i>	Concerns with size of tree on streets – refer to <i>Corymbia ficifolia</i> as a substitute
<i>Grevillia robusta</i>	Possible street tree

Primary feed species	Comments
<i>Hakea laurina</i>	Possible street tree – will need protection from the wind
<i>Tipuana tipu</i>	CoW approval required

To achieve the above objective, at least 50 % of landscape and streetscape plantings will be of Carnaby's Black Cockatoo foraging habitat species native to the site. A list of Carnaby's Black Cockatoo suitable habitat species was generated by identifying foraging habitat species (as described in Valentine *et al* 2008, DBCA – Plant for Carnaby's), before refining the list to species that are known to occur on site (as identified by Syrinx Environmental PL 2010). The resulting list is provided in **Table 7**.

The area for replanting will be identified at the subdivision planning stage. Once the planting area has been identified, advice will be sought on planting densities at the time of placing seedling orders. Local provenance will be maintained through the use of seed collected on site for seedling production. Seedlings will be ordered approximately 12 months in advance of planting.

**Table 7: Carnaby's Black Cockatoo habitat species native to the Project Area**

Species	Form
Family: Casuarinaceae	
<i>Allocasuarina fraseriana</i>	Tree
<i>Allocasuarina humilis</i>	Shrub
Family: Fabaceae	
<i>Acacia saligna</i>	Shrub
Family: Myrtaceae	
<i>Eucalyptus tottiana</i>	Tree
<i>Eucalyptus gomphocephala</i>	Tree
<i>Eucalyptus marginata</i>	Tree
Family: Proteaceae	
<i>Banksia attenuata</i>	Tree
<i>Banksia grandis</i>	Tree
<i>Banksia ilicifolia</i>	Tree
<i>Banksia menziesii</i>	Tree



Species	Form
<i>Hakea costata</i>	Shrub
<i>Hakea lissocarpa</i>	Shrub
<i>Hakea prostrata</i>	Shrub
<i>Hakea trifurcata</i>	Shrub
<i>Banksia sessilis</i>	Shrub
Family Xanthorrhoeaceae	
<i>Xanthorrhoea preissii</i>	Herb

## 5.6 SUMMARY OF REVEGETATION ACTIONS

**Table 8: Summary of revegetation actions**

ACTIONS	
1	A minimum of 0.65 ha will be revegetated and enhanced through weed control within POS Site 1.
2	Revegetation of all degraded areas within Sites 2 and 3 will be completed.
3	Follow up in-fill planting will be conducted annually to ensure an 80% survival success rate within each revegetation Site.
4	Site preparation including targeted weed control (using licenced expert contractors will be conducted) prior to planting.
5	Annual follow-up weed control (spot spraying) will be conducted across all vegetated areas in Sites 1-3.
6	Ripping will be conducted as needed, following a site inspection for presence of compacted soils.
7	Direct planting will occur during early to mid-winter.
8	Removal of tree guards and other materials (e.g. stakes) will occur within 12 months of planting.
9	Direct seeding will be used as an alternative to brushing if sufficient brush material is unavailable.
10	Feral animal control will be conducted across Biodiversity Conservation Areas on the advice of the WA DBCA.
11	Monitoring of seedling survival rates will occur in mid to late summer.

## 6. Monitoring and Reporting

The objective of the monitoring and reporting program is to record changes in vegetation condition as a result of revegetation and to monitor the success of clearing controls in terms of protecting vegetation that is designated for retention on site, as per DotEE approval conditions.

### 6.1 OBJECTIVES

Monitoring and reporting objectives are identified as follows:

- Measure the success of revegetation through regular monitoring and respond to monitoring outcomes as soon as possible; and
- Annual reporting will be conducted in compliance with monitoring conditions.

Progress and compliance with the clearing and revegetation management actions set out in this plan will be monitored and reviewed on a 6-monthly basis. This process will involve the lead supervisor on behalf of Tamala Park Regional Council and input from relevant site contractors. This information will be integrated into the 6-monthly monitoring reports.

### 6.2 REVEGETATION MONITORING CRITERIA

Revegetation monitoring criteria are:

- Commencement of all tasks outlined in this plan or evidence of planning for their implementation;
- Control of noxious and larger woody weeds;
  - Year 1 – All adult seeding individuals to be controlled;
  - Years 2 to 5 – no plants allowed to set seed;
  - All years – no establishment of new noxious species;
- At the end of each year, a minimum of 80% survival rate of all planted seedlings is achieved;
- Any localised plant failure within planting areas are addressed with no area larger than 2 metres x 2 metres existing without surviving plants;
- Maintenance replanting is to be undertaken in accordance with the approved species list; and
- Vegetation condition across Biodiversity Conservation Areas (Sites 2 and 3) is very good to excellent, and within vegetated areas of POS Site 1 is very good condition.

Maintenance will be undertaken for a period of **two (2) years** subject to the performance criteria above being met to the satisfaction of the City of Wanneroo.

Photo monitoring points will also be established for areas to be revegetated to provide a visual reference of changes in the vegetation and other site conditions. This will be undertaken prior to the commencement of works and at the beginning of each summer season. The lead supervisor will:

- Set-up four photo points within revegetated areas;
- Mark the photo point with a 1.8 m star picket and map the location of each photo point;
- Take a digital photo of each photo point facing south-east with the whole length of the star picket visible in the photo to act as a reference point; and
- Organise the digital photos logically with each image labelled with a unique reference number indicating the location of the photo point and the date the photo is taken.

### 6.3 MONITORING OF CLEARING

Monitoring of clearing activities will be conducted as follows:

- Daily site inspections of clearing area boundary demarcation to verify no evidence of disturbance within no-clearing areas by all contractors;
- Opportunistic monitoring of presence of Carnaby's Black Cockatoo by all contractors; and
- Continuous monitoring for presence of injured fauna by all contractors.

### 6.4 REPORTING

Reporting will be conducted to maintain consistency with reporting requirements stipulated in relevant conditions of approval. A brief report outlining works undertaken will be prepared on behalf of the TPRC annually and will be provided to DotEE and other stakeholders (DBCA and the City of Wanneroo) on request and published on the Tamala Park Regional Council website.

Reports will include:

- A statement ensuring that practical completion has been carried out consistent with the specifications in this document;
- Time period of the report and summary of conditions during that time;
- Qualifications and experience of contractors undertaking the work;
- Verification of site walkovers and inductions completed by site contractors;
- Carnaby's Black Cockatoos recorded on site (include number of birds observed, sex, behaviour);
- Injured fauna;
- Seed certification and provenance;
- Identification of who propagated plant material;
- Initial and replacement plantings and date of planting of each species;
- Any agreed changing to planting or species during that period;
- Photos of the vegetation progress during that period;
- Densities planted;
- Planting survival/success rates and weed coverage estimates;
- Any problems that impacted on survival rates (fire, flood, rabbits, vandalism etc.);
- Location plan of any staged activities;
- Proof of topsoil relocation from designated topsoil collection areas;
- Amount and type of fauna habitat material relocated;
- Any damage or breakdown on flagging of no-clearing areas;
- Any clearing or disturbance of no-clearing areas or other non-compliances; and
- Any observations made including new species, particularly threatened entities, comments on weed control success and problems beyond the scope of the Clearing and Revegetation Management Plan which impacted on the delivery of the Plan.

# References

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# Appendix 1: Environmental Approval (Original)



Australian Government

Department of Sustainability, Environment, Water, Population and Communities

## Approval

**Catalina residential development, Marmion Avenue, Clarkson, WA  
(EPBC 2010/5785)**

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

### Proposed action

<b>person to whom the approval is granted</b>	Tamala Park Regional Council
<b>proponent's ABN</b>	77 069 468 271
<b>proposed action</b>	Clearing of native vegetation on Lot 9504 and the construction of a residential development at 1700 Marmion Avenue, Clarkson WA [see EPBC Act referral 2010/5785].

### Approval decision

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

### conditions of approval

This approval is subject to the conditions specified below.

### expiry date of approval

This approval has effect until 31 December 2036

### Decision-maker

**name and position** Barbara Jones  
Assistant Secretary  
Environment Assessment Branch

**signature**

**date of decision**

10 AUGUST 2011

### Conditions attached to the approval

1. 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.
2. The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the management plan required by this approval, and must 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.
3. To protect habitat for **listed threatened species**, the person taking the action must ensure that:
  - a) no more than 72.5 ha of **foraging habitat** and 11 ha of **potential breeding habitat** for Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) is **cleared**;
  - b) no more than 5.5 ha of Graceful Sun Moth (*Synemon gratiosa*) habitat is **cleared**;
  - c) no **clearing** of native vegetation is undertaken in the areas identified as 'Biodiversity Conservation Areas' in Attachment A, and that these areas are maintained as **natural bushland**;
  - d) all previously **cleared** or disturbed land in areas identified as 'Biodiversity Conservation Area' (and marked with '2' and '3') in Attachment A, and at least 50% of the previously cleared land in areas marked as 'POS' with the numbers '1' and '4' in Attachment A are **revegetated**;
  - e) no **clearing** of native vegetation that is potential foraging or breeding habitat for Carnaby's Black Cockatoo is undertaken within the areas marked in dark blue in Attachment B;
  - f) no **clearing** of native vegetation that is habitat for the Graceful Sun Moth may be undertaken within the areas marked in dark blue in Attachment C;
  - g) within 2 years of the **commencement** of the action, the following areas must be protected in perpetuity under an irrevocable conservation covenant:
    - the areas identified as 'Biodiversity Conservation Area' in Attachment A; and
    - all Graceful Sun Moth Habitat in the area of 'POS' marked with the number '4' in Attachment A.
  - h) at least 50% of plantings of trees and shrubs in street-scaping and other public areas (excluding the areas described in condition 3.d) must consist of plant species known to be **primary feeding plants** for Carnaby's Black Cockatoo.
4. To offset the loss of habitat for Carnaby's Black Cockatoo, the person taking the action must:
  - a) within 6 months after the commencement of the action, provide funds to the DEC for the acquisition of the offset as described on pages 6 - 8 of the Eco Logical Australia report *Catalina Residential Development Assessment Documentation – Further Information* dated March 2011, and the offset as described on page 3 of a letter by Tamala Park Regional Council dated 23 June 2011; or
  - b) if the abovementioned offsets cannot be acquired, the person taking the action must provide details of an alternative offset package to the **Department**. Any alternative offset package must include one or more land parcels that contain a total of at least 420 ha of Carnaby's Black Cockatoo foraging habitat and 66 ha of Carnaby's Black Cockatoo **potential breeding habitat**. If the **Department** considers that an alternative offset package does not provide sufficient Carnaby's Black Cockatoo habitat to compensate for the impacts of the action, then the person taking the action must provide details of further alternative offset package to the **Department**. Once the written approval of the **Department** has been obtained for an alternative offset package, the person taking the action must



provide sufficient funds to **DEC** to acquire the land parcel(s) in the offset package within 6 months of the **Department's** written approval.

5. The person taking the action must prepare and submit a *Clearing and Revegetation Management Plan* for the **Minister's** approval to demonstrate how the impact of **clearing** of habitat for **listed threatened species** will be minimised. The plan must detail how:
  - on-site **revegetation** will be undertaken;
  - seed from native vegetation will be collected from the area contained within the red lines marked in Attachment D;
  - topsoil obtained from the **clearing** of native vegetation on the proposal site within the red lines marked in Attachment D will be used for **revegetation** on-site or stored and made available for the **DEC** or other conservation agencies for the purpose of **revegetation** elsewhere; and
  - the **DEC**, or other conservation agencies, have been consulted in the development of the plan to determine the optimal time for **clearing** and provision of seed or soil for **revegetation**.

If the **Minister** approves the plan then the approved plan must be implemented
6. The person taking the action must not undertake any **clearing** in the area within the red lines marked in Attachment D unless:
  - the *Clearing and Revegetation Management Plan* described in condition 5 has been approved by the **Minister**; and
  - evidence has been provided to the **Department** confirming that the purchase(s) of the land parcels required for offsets under condition 4a or condition 4b has been completed.
7. Within three months of every 12 month anniversary of the commencement of the action, 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.
8. If the person taking the action wishes to carry out any activity otherwise than in accordance with the approved management plan, the person taking the action must submit to the department for the **Minister's** written approval a revised version of that management plan. The varied activity shall not commence until the **Minister** has approved the varied management plan in writing. The **Minister** will not approve a varied management plan unless the revised management plan would result in an equivalent or improved environmental outcome over time. If the **Minister** approves the revised management plan, then that management plan must be implemented in place of the management plan originally approved.
9. If the **Minister** believes that it is necessary or convenient for the better protection of listed threatened species to do so, the **Minister** may request that the person taking the action make specified revisions to the management plan specified in the conditions and submit the revised management plan for the **Minister's** written approval. The person taking the action must comply with any such request. The revised approved management plan must be implemented. Unless the **Minister** has approved the revised management plan, then the person taking the action must continue to implement the management plan originally approved, as specified in the conditions.
10. Unless otherwise agreed to in writing by the **Minister**, the person taking the action must publish the management plan referred to in these conditions of approval on their

website. The management plan must be published on the website within 30 calendar days of being approved.

11. If, at any time after 5 years from the date of this approval, the person taking the action has not **commenced** the action, then the person taking the action must not **commence** the action without the written agreement of the **Minister**.

## Definitions

Clearing: The removal of vegetation.

Commencement of the action is the commencement of **construction**.

Construction includes **clearing** associated with the proposed action or the erection/building of any infrastructure, excluding fences and signage.

DEC is the Western Australian Government's Department of Environment and Conservation (or equivalent agency).

The Department: The Australian Government Department administering the *Environment Protection and Biodiversity Conservation Act 1999*.

Diameter-at-breast-height is a measurement of tree diameter, which measures the diameter of the widest part of the tree at approximately 1.3m from the ground.

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

Foraging habitat for Carnaby's Black Cockatoo is any vegetation community that is known to provide foraging resources for Carnaby's Black Cockatoo.

Listed Threatened Species: Species listed under the EPBC Act including Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) and the Graceful Sun Moth (*Synemon gratiosa*).

Minister: The Minister administering the *Environment Protection and Biodiversity Conservation Act 1999* and includes a delegate of the Minister.

Natural bushland must have a tree canopy, an understorey and ground cover of native vegetation.

Potential breeding habitat for Carnaby's Black Cockatoo includes any known tree of a species known to be used by Carnaby's Black Cockatoo for breeding that are greater than 500mm **diameter-at-breast-height**. In the project area Tuart (*Eucalyptus gomphocephala*) is a species known to be used for breeding by Carnaby's Black Cockatoo. In mapping and calculating areas, the **Department** considers potential breeding habitat to be any 0.5 ha patch of native vegetation that contains 3 or more trees that are greater than 500mm **diameter-at-breast-height**.

Preliminary documentation is the referral submitted to the **Department** 21 December 2010, including figures and attachments and the additional information provided to the Department on 28 March 2011 including figures and attachments.

Primary feeding plants for Carnaby's Black Cockatoo include: any *Banksia*; any plants identified in a relevant search of the **DEC's** Plants for Carnaby's Search Tool (at <http://www.dec.wa.gov.au/content/view/5983/1556/>); or other plants approved in writing by the **Department**.

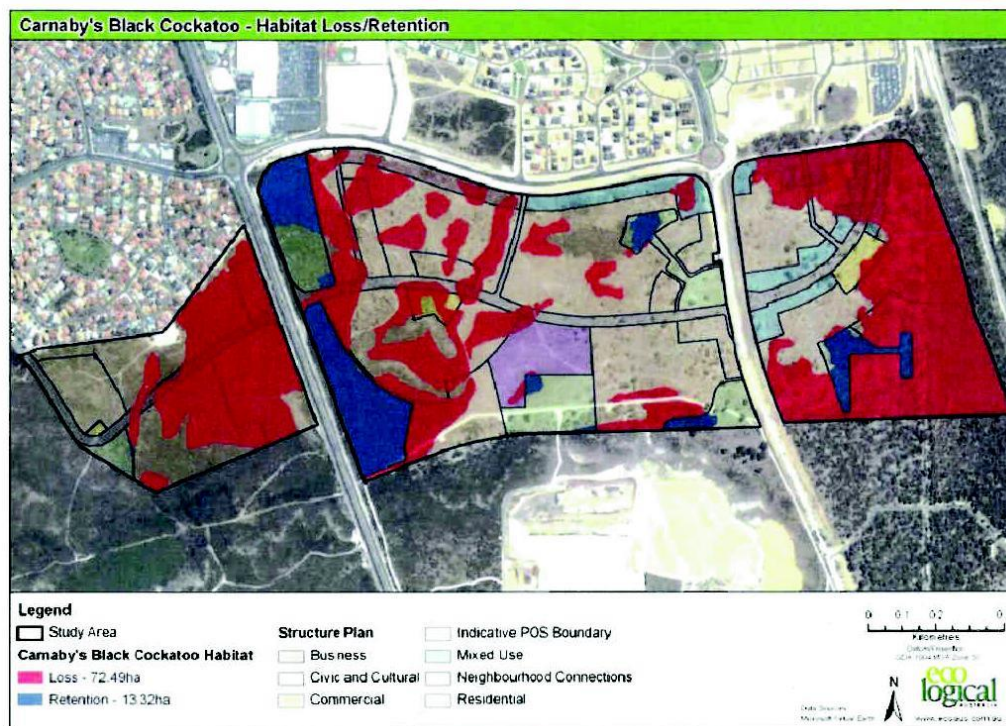
Revegetation is the removal of weeds and the establishment of native vegetation.

Attachment A

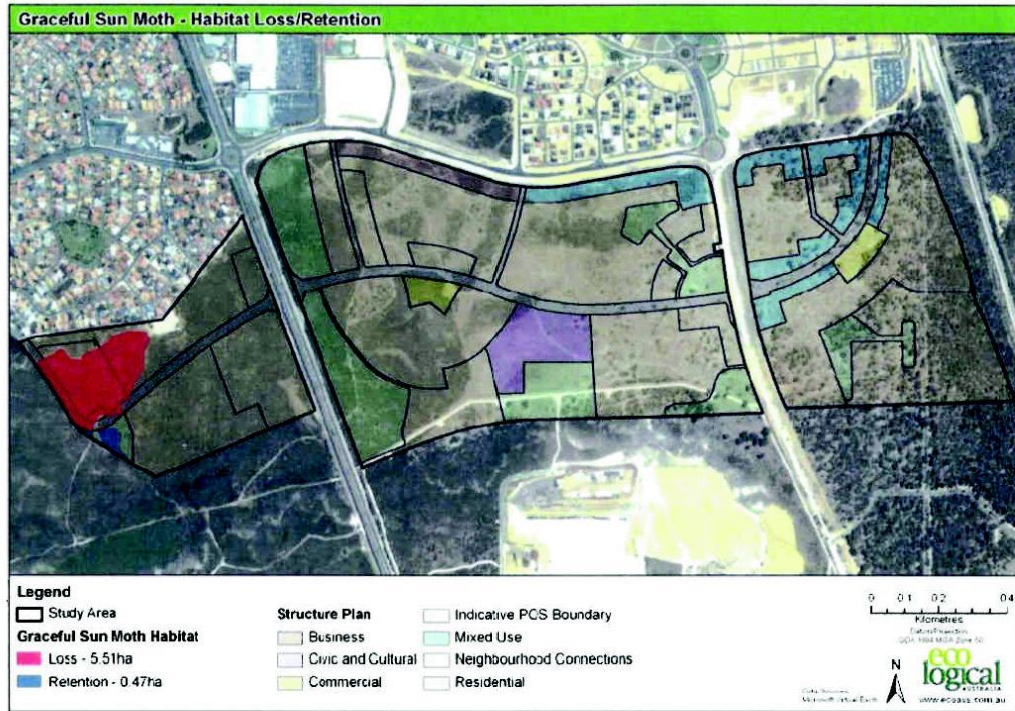




## Attachment B



Attachment C



Attachment D





# Appendix 2: Variation to Conditions Attached to Approval



Australian Government

Department of Sustainability, Environment, Water, Population and Communities

## VARIATION TO CONDITIONS ATTACHED TO APPROVAL

### Catalina residential development, Marmion Avenue, Clarkson, WA (EPBC 2010/5785)

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

#### Proposed action

Person to whom the approval is granted Tamala Park Regional Council  
ABN: 77 069 468 271

Proposed action Clearing of native vegetation on Lot 9504 and the construction of a residential development at 1700 Marmion Avenue, Clarkson WA [see EPBC Act referral 2010/5785].

#### Variation

Variation of conditions of approval The variation is:  
Delete Approval condition 3, Attachment A and Attachment B attached to the approval dated 10 August 2011, and substitute with the approval condition and attachments specified below.

Date of effect This variation has effect from the date the instrument is signed.

#### Person authorised to make decision

Name and position Richard McAllister  
Assistant Secretary  
Environment Assessment Branch

Signature

Date of decision 14 October 2011

### Conditions attached to the approval

3. To protect habitat for **listed threatened species**, the person taking the action must ensure that:
  - a) no more than 72.5 ha of **foraging habitat** and 11 ha of **potential breeding habitat** for Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) is **cleared**;
  - b) no more than 5.5 ha of Graceful Sun Moth (*Synemon gratiosa*) habitat is **cleared**;
  - c) no **clearing** of native vegetation is undertaken in the areas marked with the numbers '2' and '3' in Attachment A, and that these areas are maintained as **natural bushland**;
  - d) all previously **cleared** or disturbed land in areas marked with the numbers '2' and '3' in Attachment A, and at least 50% of the previously cleared land in areas marked with the numbers '1' and '4' in Attachment A are **revegetated**;
  - e) no **clearing** of native vegetation that is potential foraging or breeding habitat for Carnaby's Black Cockatoo is undertaken within the areas marked in dark blue in Attachment B;
  - f) no **clearing** of native vegetation that is habitat for the Graceful Sun Moth may be undertaken within the areas marked in dark blue in Attachment C;
  - g) within 2 years of the **commencement** of the action, the following areas must be protected in perpetuity under an irrevocable conservation covenant:
    - the areas marked with the numbers '2' and '3' in Attachment A; and
    - all Graceful Sun Moth Habitat in the area marked with the number '4' in Attachment A.
  - h) at least 50% of plantings of trees and shrubs in street-scaping and other public areas (excluding the areas described in condition 3.d) must consist of plant species known to be **primary feeding plants** for Carnaby's Black Cockatoo.





**Australian Government**  
**Department of the Environment**

## VARIATION TO CONDITIONS ATTACHED TO APPROVAL

### Catalina residential development, Marmion Avenue, Clarkson, WA (EPBC 2010/5785)

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

#### Proposed action

<b>Person to whom the approval is granted</b>	Tamala Park Regional Council 77 069 468 271
<b>Proposed action</b>	Clearing of native vegetation on Lot 9504 and the construction of a residential development at 1700 Marmion Avenue, Clarkson WA [see EPBC Act referral 2010/5785].

#### Variation

<b>Variation of conditions of approval</b>	The variation is: Delete condition 3 of the approval dated 10 August 2011 and substitute with the condition (including Attachments A & B) specified below.
<b>Date of effect</b>	This variation has effect from the date this instrument is signed.

#### Person authorised to make decision

<b>Name and position</b>	Shane Gaddes Assistant Secretary Compliance and Enforcement Branch
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#### Signature

*S. Gaddes*

<b>Date of decision</b>	31 October 2013
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## Condition attached to the approval:

3. To protect habitat for **listed threatened species**, the person taking the action must ensure that:
- no more than 72.5 ha of **foraging habitat** and 11 ha of **potential breeding habitat** for Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) is **cleared**;
  - no **clearing** of native vegetation is undertaken in the areas marked with the numbers '2' and '3' in Attachment A, and that these areas are maintained as **natural bushland**;
  - all previously **cleared** or disturbed land in areas marked with the numbers '2' and '3' in Attachment A, and at least 50% of the previously cleared land in the area marked with number '1' in Attachment A are **revegetated**;
  - no **clearing** of native vegetation that is potential foraging or breeding habitat for Carnaby's Black Cockatoo is undertaken within the areas marked in dark blue in Attachment B;
  - within 2 years of the **commencement** of the action, the areas marked with the numbers '2' and '3' in Attachment A must be protected in perpetuity under an irrevocable conservation covenant; and
  - at least 50% of plantings of trees and shrubs in street-scaping and other public areas (excluding the areas described in condition 3.c) must consist of plant species known to be **primary feeding plants** for Carnaby's Black Cockatoo.



**Australian Government**  
**Department of the Environment**

## VARIATION TO CONDITIONS ATTACHED TO APPROVAL

### **Catalina Residential Development, Marmion Avenue, Clarkson, WA (EPBC 2010/5785)**

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

#### **Approved action**

Person to whom the approval is granted	Tamala Park Regional Council 77 069 468 271
--	--

Approved action	Clearing of native vegetation on Lot 9504 and the construction of a residential development at 1700 Marmion Avenue, Clarkson, WA [see EPBC Act referral 2010/5785].
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#### **Variation**

Variation of conditions of approval	The variation is: Delete Condition 3 of the approval dated 1 February 2015 and substitute with the Condition specified below.
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Date of effect	This variation has effect on the date the instrument is signed
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#### **Person authorised to make decision**

name and position	Shane Gaddes Assistant Secretary Compliance and Enforcement Branch
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Signature

*S. Gaddes*

Date of decision

20 May 2015

**Condition attached to the approval**

3. To protect habitat for **listed threatened species**, the person taking the action must ensure that:
- a) no more than 72.5 ha of **foraging habitat** and 11 ha of **potential breeding habitat** for Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) is **cleared**;
  - b) no **clearing** of native vegetation is undertaken in the areas marked with the numbers '2' and '3' in Attachment A, except for maintenance of necessary management or **formalisation** of passive use pathways within the Northern and Southern Biodiversity Conservation Areas (BCAs). These areas are to be maintained as **natural bushland** as per the Northern and Southern Conservation Area Management Plans (CAMPs);
  - c) all previously **cleared** or disturbed land in areas marked with the numbers '2' and '3' in Attachment A, and at least 50% of the previously cleared land in the area marked with number '1' in Attachment A are **revegetated**;
  - d) no **clearing** of native vegetation that is potential foraging or breeding habitat for Carnaby's Black Cockatoo is undertaken within the areas marked in dark blue in Attachment B, except for maintenance or **formalisation** of necessary management or passive use pathways within the Northern and Southern Biodiversity Conservation Areas (BCAs). These areas are to be maintained as **natural bushland** per the Northern and Southern CAMPs;
  - e) within 2 years of the **commencement** of the action, the areas marked with the numbers '2' and '3' in Attachment A must be protected in perpetuity under an irrevocable conservation covenant: and
  - f) at least 50% of plantings of trees and shrubs in street-scaping and other public areas (excluding the areas described in condition 3.c) must consist of plant species known to be **primary feeding plants** for Carnaby's Black Cockatoo.

**Definitions**

Formalisation includes the mapping of tracks, potential signage and defining the specific geographic layout



Attachment A







© Eco Logical Australia Pty. Ltd. This map is not guaranteed to be free from error or omission. Eco Logical Australia Pty. Ltd. and its employees disclaim liability for any act done on the information in the map and any consequences of such acts or omissions.



Australian Government  
Department of the Environment and Energy

## VARIATION TO CONDITIONS ATTACHED TO APPROVAL

### Catalina residential development, Marmion Avenue, Clarkson, WA (EPBC 2010/5785)

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

**Person to whom the approval is granted** Tamala Park Regional Council  
ABN: 77 069 468 271

**Approved action** Clearing of native vegetation on Lot 9504 and the construction of a residential development at 1700 Marmion Avenue, Clarkson, WA [See EPBC Act referral 2010/5785].

#### Variation

**Variation of conditions of approval** The variation is:  
  
Delete condition 5, 6, 8, Attachment B, Attachment C, Attachment D and definitions of **primary feeding plants** and **listed threatened species** attached to the approval and substitute with the conditions, Attachment B, Attachment C and definitions specified below.

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

#### Person authorised to make decision

**Name and position** Greg Manning  
Assistant Secretary  
Assessment (WA, SA, NT) & Post Approvals Branch

**Signature**

**Date of decision**

November 2017  
1 December

**Conditions attached to the approval**

5. The person taking the action must prepare and submit a *Clearing and Revegetation Management Plan* for the **Minister's** approval to demonstrate how the impact of **clearing** of habitat for **listed threatened species** will be minimised. The plan must detail how:
- on-site **revegetation** will be undertaken;
  - seed from native vegetation will be collected from the area contained within the red lines marked in Attachment C;
  - topsoil obtained from the **clearing** of native vegetation on the proposal site within the red lines marked in Attachment C will be used for **revegetation** on-site or stored and made available for the **DEC** or other conservation agencies for the purpose of **revegetation** elsewhere; and
  - the **DEC**, or other conservation agencies, have been consulted in the development of the plan to determine the optimal time for **clearing** and provision of seed or soil for **revegetation**.

If the **Minister** approves the plan then the approved plan must be implemented

6. The person taking the action must not undertake any **clearing** in the area within the red lines marked in Attachment C unless:
- the *Clearing and Revegetation Management Plan* described in condition 5 has been approved by the **Minister**; and
  - evidence has been provided to the **Department** confirming that the purchase(s) of the land parcels required for offsets under condition 4a or condition 4b has been completed.
8. The person taking the action may choose to revise a Plan approved by the **Minister** under condition 5 without submitting it for approval under section 143A of the **EPBC Act**, if the taking of the action in accordance with the revised Plan would not be likely to have a **new or increased impact**. If the person taking the action makes this choice they must:
- a) notify the **Department** in writing that the approved Plan has been revised and provide the **Department** with an electronic copy of the revised Plan;
  - b) implement the revised Plan from the date that the Plan is submitted to the **Department**; and
  - c) for the life of this approval, maintain a record of the reasons the person taking the action considers that taking the action in accordance with the revised Plan would not be likely to have a **new or increased impact**.

8A. The person taking the action may revoke their choice under condition 8 at any time by notice to the **Department**. If the person taking the action revokes the choice to implement a revised Plan, without approval under section 143A of the **EPBC Act**, the Plan approved by the **Minister** must be implemented.

8B. If the **Minister** gives a notice to the person taking the action that the **Minister** is satisfied that the taking of the action in accordance with the revised Plan would be likely to have a **new or increased impact**, then:

- a) condition 8 does not apply, or ceases to apply, in relation to the revised Plan; and
- b) the person taking the action must implement the Plan approved by the **Minister**.

To avoid any doubt, this condition does not affect any operation of conditions 8 and 8A in the period before the day the notice is given.

At the time of giving the notice the **Minister** may also notify that, for a specified period of time, condition 8 does not apply for one or more specified Plans required under the approval.

8C. Conditions 8, 8A and 8B are not intended to limit the operation of section 143A of the **EPBC Act** which allows the person taking the action to submit a revised Plan to the **Minister** for approval.

#### **Definitions**

**Listed Threatened Species:** Species listed under the **EPBC Act** including Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*).

**New or increased impact** means a new or increased environmental impact or risk relating to any **Listed Threatened Species**, when compared to the likely impact under an management plan that has been approved by the **Minister** (as outlined in the Guidance on 'New or Increased Impact' relating to changes to approved management plans under EPBC Act environmental approvals (2017) available from <http://www.environment.gov.au/epbc/publications/new-increased-impact-guidance>.

**Primary feeding plants** for Carnaby's Black Cockatoo include: any *Banksia* sp., any plants identified in a web search of the Department of Biodiversity, Conservation and Attractions "Plants for Carnaby's Search Tool", or other plants approved in writing by the **Department**.



Attachment B



Attachment C







Australian Government  
Department of the Environment and Energy

## VARIATION TO CONDITIONS ATTACHED TO APPROVAL

### Catalina residential development, Marmion Avenue, Clarkson, WA (EPBC 2010/5785)

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

<b>Person to whom the approval is granted</b>	Tamala Park Regional Council ABN: 77 069 468 271
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<b>Approved action</b>	Clearing of native vegetation on Lot 9504 and the construction of a residential development at 1700 Marmion Avenue, Clarkson, WA [See EPBC Act referral 2010/5785].
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#### Variation

<b>Variation of conditions of approval</b>	The variation is:  Delete condition 3 attached to the approval and substitute with condition 3 specified below.
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<b>Date of effect</b>	This variation has effect on the date the instrument is signed.
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#### Person authorised to make decision

<b>Name and position</b>	Declan O'Connor-Cox Acting Assistant Secretary Assessment (WA, SA, NT) & Post Approvals Branch
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**Signature**

<b>Date of decision</b>	5 October 2018
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**Conditions attached to the approval**

3. To protect habitat for **listed threatened species**, the person taking the action must ensure that:
  - a) no more than 72.5 ha of **foraging habitat** and 11 ha of **potential breeding habitat** for Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) is **cleared**;
  - b) no **clearing** of native vegetation is undertaken in the areas marked with the numbers '2' and '3' in Attachment A, except for maintenance of necessary management or **formalisation** of passive use pathways within the Northern and Southern Biodiversity Conservation Areas (BCAs). These areas are to be maintained as **natural bushland** as per the Northern and Southern Conservation Area Management Plans (CAMPs);
  - c) all previously **cleared** or disturbed land in areas marked with the numbers '2' and '3' in Attachment A, and at least 50% of the previously cleared land in the area marked with number '1' in Attachment A are **revegetated**;
  - d) no **clearing** of native vegetation that is potential foraging or breeding habitat for Carnaby's Black Cockatoo is undertaken within the areas marked in dark blue in Attachment B, except for maintenance or **formalisation** of necessary management or passive use pathways within the Northern and Southern Biodiversity Conservation Areas (BCAs). These areas are to be maintained as **natural bushland** per the Northern and Southern CAMPs;
  - e) within 2 years of the **commencement** of the action, the areas marked with the numbers '2' and '3' in Attachment A must be protected in perpetuity under an irrevocable conservation covenant: and
  - f) plantings of trees and shrubs in street-scaping and other public areas (excluding the areas described in condition 3.c) include a minimum of 1,600 trees (including *Xanthorrhoea preissii*) and 20,000 shrubs that are **primary feeding plants** for Carnaby's Black Cockatoo.

## Appendix 3: Flora species list

## APPENDIX 2 Tamala Park Development Area Species List

Family	Species name after ID	Form	Vegetation Type No.											
			1	2	3	4	5	6	7	8	9	10	11	12
Aizoaceae	*Carpobrotus edulis	Herb	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓
	<b>Sarcosoma bicarinata (Priority 3)</b>	Herb	✓											
Amaranthaceae	Ptilotus drummondii	Herb			✓				✓					
	Ptilotus manglesii	Herb							✓					
	Ptilotus polystachyus	Herb											✓	
Apiaceae	Daucus glochidiatus	Herb		✓	✓	✓		✓	✓					
	Eryngium pinnatifidum	Herb	✓	✓					✓					
Asparagaceae	*Asparagus asparagoides	Herb									✓			
	Lepidosperma sp.	Herb				✓								
	Lomandra caespitosa	Herb			✓									
	Lomandra hermaphrodita	Herb								✓		✓		✓
	Lomandra maritima	Herb	✓	✓			✓	✓		✓				
	Lomandra sp.	Herb	✓						✓					
	Sowerbaea laxiflora	Herb			✓			✓	✓					
	Thysanotus patersonii	Climber	✓	✓	✓			✓	✓					
	*Asphodelus fistulosus	Herb												✓
Asteraceae	*Arctotheca calendula	Herb	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	*Conyza sp.	Herb				✓								
	*Dittrichia graveolens	Herb	✓										✓	✓
	*Hypochaeris glabra	Herb	✓	✓	✓	✓	✓			✓	✓		✓	✓
	*Leontodon sp.	Herb	✓											
	*Sonchus oleraceus	Herb	✓	✓		✓	✓	✓		✓				
	*Ursinia anthemoides	Herb		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
	?Waitzia suaveolens var. suaveolens	Herb	✓	✓	✓		✓	✓						
	Euchiton sphaericus	Herb						✓						
	Lagenophora huegelii	Herb							✓					
	Olearia axillaris	Shrub		✓				✓	✓	✓				
	Ozothamnus cordatus	Shrub		✓		✓				✓				
	Podolepis lessonii	Herb							✓					
	Podotrichum angustifolia	Herb		✓				✓	✓			✓		
	Quinetia urvillei	Herb			✓				✓					
Brassicaceae	*?Brassica tournefortii	Herb					✓							✓
	*Brassica ?barrelieri subsp. oxyrrhina	Herb							✓					
	*Brassica barrelieri subsp. oxyrrhina	Herb							✓					
	*Brassica tournefortii	Herb		✓				✓	✓	✓		✓		✓
	*Capsella bursa-pastoris	Herb		✓										
	*Heliophila pusilla	Herb			✓	✓			✓					
Campanulaceae	Isotoma hypocrateriformis	Herb							✓					
Caryophyllaceae	*Cerastium glomeratum	Herb				✓								
	*Petrohragia dubia	Herb	✓	✓										
Casuarinaceae	Allocasuarina fraseriana	Tree							✓	✓	✓	✓		✓
	Allocasuarina humilis	Shrub		✓				✓	✓		✓	✓		
Centrolepidaceae	Centrolepis sp.	Herb		✓										
Chenopodiaceae	Rhagodia baccata subsp. baccata	Shrub		✓	✓			✓						
Colchicaceae	Burchardia congesta	Herb		✓	✓	✓	✓	✓	✓	✓	✓		✓	
Crassulaceae	Crassula colorata	Herb		✓	✓	✓	✓	✓	✓	✓		✓		✓
	Crassula decumbens	Herb	✓							✓				
Cyperaceae	Centrolepis ?mutica	Sedges and rushes			✓									
	Mesomelaena pseudostygia	Sedges and rushes		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Schoenus curvifolius	Sedges and rushes							✓					
	Schoenus grandiflorus	Sedges and rushes			✓									
	Schoenus latitans	Sedges and rushes			✓			✓	✓					
	*Isolopis marginata	Sedges and rushes		✓	✓	✓								
	Lepidosperma ?squamatum	Sedges and rushes						✓		✓				
	Lepidosperma sp. Coastal Dunes	Sedges and rushes	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	
	Lepidosperma sp. Darling Range Heath	Sedges and rushes							✓					
	Lepidosperma squamatum	Sedges and rushes		✓			✓			✓				
Dasyopogonaceae	Acanthocarpus preissii	Herb				✓	✓			✓		✓	✓	
Dilleniaceae	Hibbertia hypericoides	Shrub		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Hibbertia racemosa	Shrub							✓					
Droseraceae	Drosera erythrorhiza	Herb			✓	✓	✓							
	Drosera macrantha	Herb					✓		✓					
	Drosera macrantha subsp. macrantha	Herb		✓			✓	✓	✓	✓				
	Drosera menziesii subsp. penicillaris	Herb						✓	✓		✓			
	Drosera pallida	Herb						✓						

? denotes that specimen collected was not adequate to make full identification;

\* denotes introduced (or weed) species.

TAMALA PARK DEVELOPMENT AREA  
LEVEL 2 VEGETATION AND FLORA SURVEY

Family	Species name after ID	Form	Vegetation Type No.											
			1	2	3	4	5	6	7	8	9	10	11	12
Epacridaceae	?Conostephium preissii	Shrub							✓					
	Astroloma pallidum	Shrub						✓						
	Conostephium pendulum	Shrub		✓										
	Conostephium preissii	Shrub							✓					
	Leucopogon ?racemosus	Shrub			✓			✓		✓				
	Leucopogon aff ? squarrosus	Shrub					✓							
	Leucopogon parviflorus	Shrub	✓	✓		✓	✓		✓	✓		✓		
	Leucopogon propinquus	Shrub							✓	✓			✓	
	Lysinema ciliatum	Shrub					✓							
Euphorbiaceae	*Euphorbia ?lathyris	Herb		✓										
	*Euphorbia terracina	Herb	✓							✓	✓			
	*Ricinus communis	Shrub												✓
	Phyllanthus calycinus	Shrub		✓	✓	✓	✓	✓	✓	✓		✓	✓	
Fabaceae	Acacia cochlearis	Shrub							✓					
	Acacia cyclops	Shrub	✓			✓	✓	✓		✓	✓		✓	
	Acacia rostellifera	Shrub	✓	✓		✓		✓				✓		
	Acacia truncata	Shrub	✓							✓				
	Acacia pulchella	Shrub		✓	✓	✓	✓			✓	✓	✓	✓	✓
	Acacia saligna	Shrub			✓	✓			✓		✓		✓	
	Daviesia triflora	Shrub									✓			✓
	*Trifolium arvense var. arvense	Herb			✓	✓			✓				✓	
	*Trifolium campestre	Herb		✓	✓	✓			✓	✓	✓			
	*Trifolium dubium	Herb	✓		✓	✓								
Fabroniaceae	<b>Fabronia hampeana (Priority 2)</b>	Moss			✓									
Geraniaceae	*Erodium botrys	Herb			✓	✓	✓	✓					✓	
	*Pelargonium capitatum	Herb		✓	✓		✓			✓	✓		✓	
Geraniaceae	Geranium solanderi	Herb	✓	✓			✓							
Goodeniaceae	Dampiera linearis	Herb					✓	✓						
	?Scaevola repens	Shrub		✓		✓			✓					
	Lechenaultia linarioides	Shrub			✓			✓						
	Scaevola canescens	Shrub			✓			✓			✓			
	Scaevola crassifolia	Shrub	✓											
	Scaevola thesioides	Shrub		✓						✓				
	Conostylis aculeata	Herb		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Haemodoraceae	Conostylis setigera subsp. setigera	Herb							✓			✓		
	Haemodorum ?paniculatum	Herb							✓	✓				
	Haemodorum laxum	Herb							✓					✓
Hemerocallidaceae	Dianella revoluta	Herb		✓				✓	✓	✓	✓		✓	
	Tricoryne elatior	Climber	✓				✓							
	Corynothea micrantha	Herb			✓									
Iridaceae	*Gladiolus caryophyllaceus	Herb		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
	*Romulea rosea	Herb	✓	✓	✓		✓	✓		✓		✓		
	Orthrosanthus latus var. latus	Herb			✓									
	*Moraea flaccida	Herb		✓	✓	✓	✓	✓	✓				✓	✓
Lamiaceae	*Lavandula dentata	Herb											✓	✓
Lauraceae	Cassytha ?racemosa	Climber								✓				
	Cassytha sp.	Climber	✓							✓		✓		
Loranthaceae	Nuytsia floribunda	Tree			✓							✓		
Myoporaceae	Myoporum insulare	Shrub								✓				
Myrtaceae	Calothamnus quadrifidus	Shrub		✓		✓	✓	✓				✓		
	Calothamnus sanguineus	Shrub										✓		
	Eremaea pauciflora	Shrub										✓		✓
	Eucalyptus todtiana	Tree									✓	✓		✓
	Hypocalymma angustifolium	Herb						✓						
	Melaleuca huegelii	Shrub	✓							✓				
	Melaleuca systena	Shrub	✓	✓		✓	✓	✓		✓		✓		
	Eucalyptus decipiens	Shrub		✓				✓						
	Eucalyptus gomphocephala	Tree							✓					✓
	Eucalyptus marginata	Tree							✓					✓
Orchidaceae	Caladenia arenicola	Herb			✓									
	Caladenia flava	Herb		✓	✓		✓	✓	✓			✓		
	Caladenia latifolia	Herb		✓	✓					✓				
	Diuris corymbosa	Herb			✓									
	Leptoceras menziesii	Herb			✓				✓					
	Thelymitra sp.	Herb							✓					
Orobanchaceae	*Parentucellia latifolia	Herb							✓					
Papilionaceae	*Lupinus angustifolius	Herb						✓				✓	✓	✓
	*Lupinus cosentinii	Herb	✓				✓	✓				✓	✓	✓
	Bossiaea eriocarpa	Shrub		✓		✓	✓		✓	✓				
	Daviesia divaricata	Shrub		✓										
	Gastolobium capitatum	Shrub		✓						✓	✓			✓
	Gompholobium tomentosum	Shrub		✓		✓		✓	✓	✓				
	Hardenbergia comptoniana	Shrub	✓	✓	✓	✓		✓	✓		✓	✓		
	Hovea pungens	Shrub											✓	
	Hovea stricta	Shrub		✓		✓								
	Hovea trisperma	Shrub		✓		✓						✓		



TAMALA PARK DEVELOPMENT AREA  
LEVEL 2 VEGETATION AND FLORA SURVEY

Family	Species name after ID	Form	Vegetation Type No.											
			1	2	3	4	5	6	7	8	9	10	11	12
Papilionaceae	<i>Isotropis cuneifolia</i> subsp. <i>cuneifolia</i>	Herb						✓	✓					
	<i>Jacksonia calcicola</i>	Shrub				✓	✓	✓				✓		
	<i>Jacksonia sternbergiana</i>	Shrub			✓			✓		✓			✓	
	<i>Kennedia prostrata</i>	Herb					✓		✓			✓	✓	
	<i>Sphaerolobium medium</i>	Shrub							✓					
	<i>*Trifolium subterraneum</i>	Herb		✓	✓	✓	✓	✓	✓	✓		✓	✓	
	<i>Templetonia retusa</i>	Shrub	✓	✓						✓				
Poaceae	<i>*Briza sp.</i>	Grass			✓				✓					
	<i>*Aira sp.</i>	Grass				✓		✓						
	<i>*Avena barbata</i>	Grass		✓				✓			✓		✓	✓
	<i>*Briza ?minor</i>	Grass	✓											
	<i>*Briza maxima</i>	Grass							✓					
	<i>*Briza minor</i>	Grass			✓			✓						
	<i>*Bromus diandrus</i>	Grass							✓	✓	✓			
	<i>*Ehrharta ?calycina</i>	Grass									✓			
	<i>*Ehrharta brevifolia</i>	Grass	✓	✓	✓			✓			✓	✓	✓	✓
	<i>*Ehrharta calycina</i>	Grass		✓		✓		✓			✓	✓	✓	✓
	<i>*Ehrharta longiflora</i>	Grass	✓	✓				✓		✓				
	<i>*Ehrharta sp.</i>	Grass		✓				✓		✓	✓			
	<i>*Lagurus ovatus</i>	Grass						✓						
	<i>*Lolium rigidum</i>	Grass	✓	✓		✓					✓		✓	✓
	<i>*Vulpia sp.</i>	Grass				✓		✓					✓	
	<i>Austrodanthonia ?occidentalis</i>	Grass							✓	✓				
	<i>*Austrostipa sp.</i>	Grass		✓										
	<i>Catapodium rigidum</i>	Herb	✓											
Portulacaceae	<i>Calandrinia ?brevipedata</i>	Herb												
Primulaceae	<i>*Anagallis arvensis</i>	Herb	✓	✓		✓		✓		✓				
Proteaceae	<i>Banksia attenuata</i>	Tree			✓			✓	✓		✓	✓	✓	
	<i>Banksia dallanneyi</i> var. <i>dallanneyi</i>	Shrub		✓	✓	✓	✓	✓		✓		✓		
	<i>Banksia grandis</i>	Tree							✓					
	<i>Banksia ilicifolia</i>	Tree							✓					
Proteaceae	<i>Banksia menziesii</i>	Tree							✓	✓	✓		✓	
	<i>Grevillea preissii</i> subsp. <i>preissii</i>	Shrub	✓	✓						✓		✓		
	<i>Hakea costata</i>	Shrub		✓										
	<i>Hakea lissocarpha</i>	Shrub		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	<i>Hakea prostrata</i>	Shrub		✓	✓	✓	✓			✓		✓	✓	
	<i>Hakea trifurcata</i>	Shrub		✓		✓		✓						✓
	<i>Stirlingia latifolia</i>	Shrub							✓		✓	✓		✓
	<i>Banksia sessilis</i>	Shrub	✓	✓	✓	✓	✓	✓		✓		✓	✓	
	<i>Petrophile linearis</i>	Shrub							✓		✓			✓
	<i>Petrophile macrostachya</i>	Shrub			✓	✓		✓			✓			
	<i>Petrophile media</i>	Shrub		✓	✓									
	<i>Petrophile sp.</i>	Shrub		✓										
Ranunculaceae	<i>Clematis linearifolia</i>	Climber		✓						✓				
Restionaceae	<i>?Desmocladus flexuosus</i>	Sedges and rushes		✓										
	<i>Desmocladus ?asper</i>	Sedges and rushes			✓	✓								
	<i>Desmocladus flexuosus</i>	Sedges and rushes	✓	✓	✓	✓	✓	✓	✓			✓		
	<i>Lyginia imberbis</i>	Sedges and rushes							✓					✓
Rhamnaceae	<i>Spyridium globulosum</i>	Shrub	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	
	<i>Trymalium ledifolium</i> var. <i>ledifolium</i>	Shrub	✓							✓		✓		
Rubiaceae	<i>*Galium murale</i>	Herb	✓	✓										
	<i>Opercularia vaginata</i>	Herb	✓	✓						✓			✓	
Rutaceae	<i>Diplolaena angustifolia</i>	Shrub						✓						
	<i>Philotheca spicata</i>	Shrub		✓						✓				
Santalaceae	<i>Santalum acuminatum</i>	Shrub	✓											
	<i>Exocarpos sparteus</i>	Herb	✓											
Sapindaceae	<i>Diplopeltis huegelii</i> subsp. <i>huegelii</i>	Shrub	✓							✓				
Scrophulariaceae	<i>*Dischisma capitatum</i>	Herb							✓					✓
Solanaceae	<i>*Solanum linnaeanum</i>	Herb								✓				
Stylidiaceae	<i>Stylidium piliferum</i>	Herb							✓					
	<i>Stylidium neurophyllum</i> Wege ms	Herb							✓					
Thymelaeaceae	<i>Pimelea cf. angustifolia</i>	Shrub		✓										
	<i>Pimelea calcicola</i>	Shrub		✓								✓		
Violaceae	<i>?Hybanthus calycinus</i>	Herb			✓			✓		✓				
	<i>Hybanthus calycinus</i>	Herb		✓		✓	✓	✓		✓		✓		
Xanthorrhoeaceae	<i>Xanthorrhoea brunonis</i>	Herb		✓	✓			✓	✓	✓		✓	✓	
	<i>Xanthorrhoea preissii</i>	Herb		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Zamiaceae	<i>Macrozamia riedlei</i>	Tree (cycad)			✓			✓	✓		✓	✓	✓	✓

## Appendix 4: Summary of vegetation condition scale

**TAMALA PARK DEVELOPMENT AREA  
LEVEL 2 VEGETATION AND FLORA SURVEY**

**Table 4 Vegetation Condition Ranking (Government of Western Australia, 2000)**

<b>Vegetation Condition</b>	<b>Description</b>
<b>Pristine</b>	Pristine or nearly so, no obvious signs of disturbance.
<b>Excellent</b>	Vegetation structure intact, disturbance affecting individual species and weeds are non- aggressive species.
<b>Very Good</b>	Vegetation structure altered obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
<b>Good</b>	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
<b>Degraded</b>	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
<b>Completely Degraded</b>	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

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