

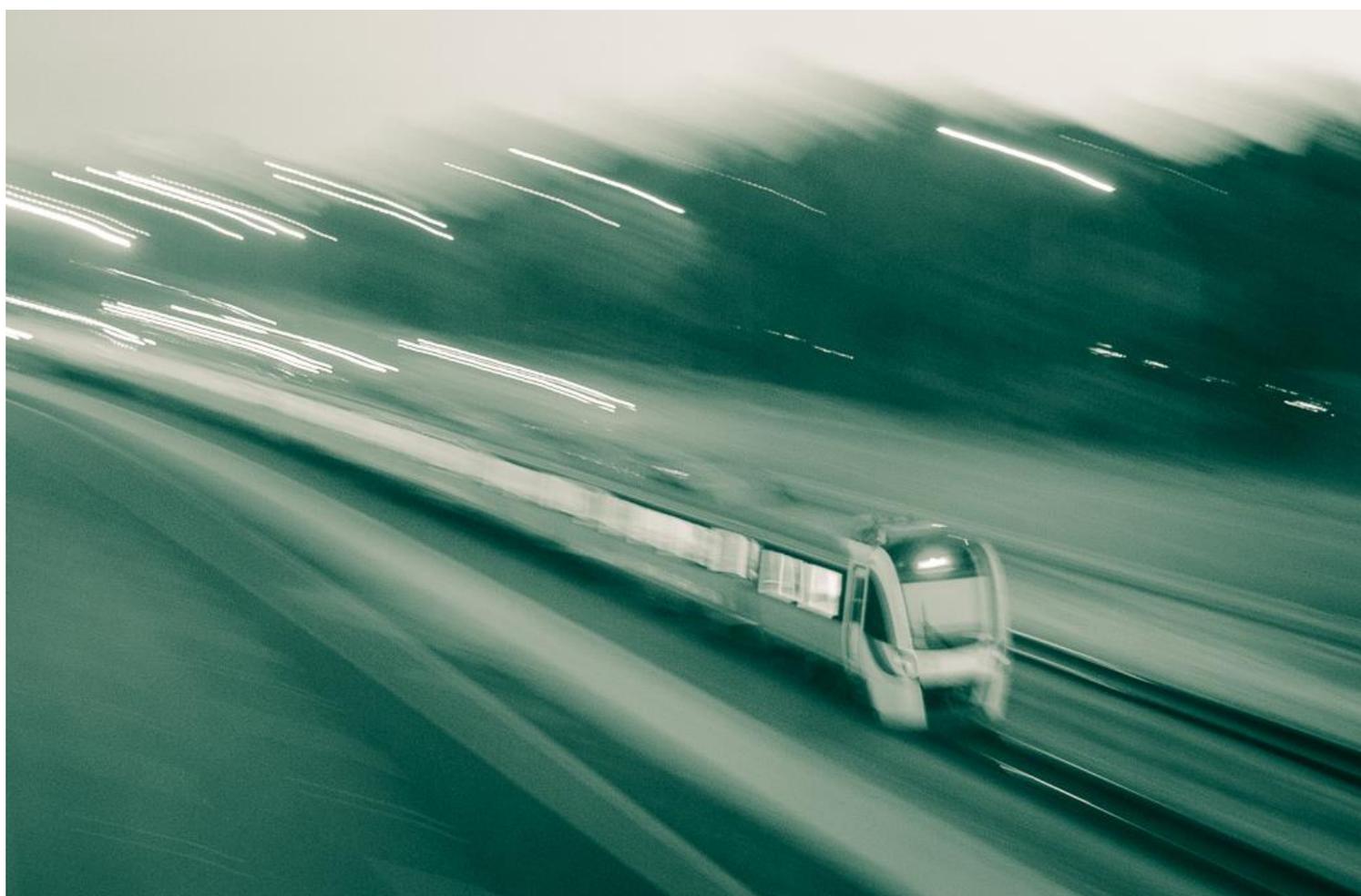


# Yanchep Rail Extension: Part 1 – Butler to Eglinton

## Preliminary Offsets Strategy

Prepared for  
**Public Transport Authority**

22 November 2018



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Template 29/9/2015

# Contents

<b>Executive summary</b> .....	<b>vi</b>
<b>1 Introduction</b> .....	<b>1</b>
1.1 Background.....	1
1.2 Assessment and approvals processes.....	1
1.3 Relationship to other planning and approvals processes.....	2
1.3.1 Proposed Mitchell Freeway Transport Corridor (Environmental Review) through MRS Amendment 992/33.....	2
1.3.2 Butler Jindee District Structure Plan / associated MRS amendment 1132/57.....	2
1.3.3 Alkimos Eglinton District Structure Plan / associated MRS 1029/33.....	2
1.3.4 Northern Suburbs Railway Alignment Definition (Alkimos to Yanchep) (MRS 1192/57).....	2
1.4 Commonwealth approvals.....	3
<b>2 Identification of significant residual impacts</b> .....	<b>6</b>
2.1 Development envelope.....	6
2.2 Avoidance.....	6
2.3 Minimisation.....	6
2.4 Rehabilitation.....	9
2.5 Residual impacts.....	10
2.6 Significant residual impacts to be offset.....	12
2.6.1 Flora and vegetation.....	16
2.6.2 Terrestrial fauna.....	17
2.6.3 Other factors.....	17
2.7 Adjustment of significant residual impacts to Carnaby's Black Cockatoo habitat to account for clearing permit CPS 7843/1.....	18
<b>3 Offsetting of significant residual impacts</b> .....	<b>19</b>
3.1 Approach.....	19
3.2 Determining new offsets.....	19
3.3 Types of offsets considered.....	19
3.4 TEC 26a.....	20
3.4.1 Description.....	20
3.4.2 Required offset/s.....	21
3.4.3 Relevant previous approval offsets.....	21
3.5 Carnaby's Black Cockatoo.....	21
3.5.1 Description (adapted from Species Profile and Threats Database (SPRAT) DEE 2018).....	21
3.5.2 Required offset(s).....	22
3.5.3 Carnaby's Black Cockatoo relevant previous approval offsets.....	22

<b>4</b>	<b>TEC 26a offset 1 – Acquisition and maintenance .....</b>	<b>23</b>
4.1	Overview of offset .....	23
4.2	Criteria for site selection .....	23
4.2.1	Desirable characteristics .....	24
4.3	Objectives and intended outcomes .....	24
4.4	Actions to be undertaken .....	24
4.5	Success criteria .....	25
4.6	Timelines and milestones .....	25
4.7	Monitoring to assess offset implementation .....	25
4.8	Reporting details and timing .....	25
4.9	Financial arrangements .....	26
4.10	Risks and contingency measures .....	26
4.11	Governance arrangements .....	26
<b>5</b>	<b>TEC 26a offset 2 – Rehabilitation.....</b>	<b>27</b>
5.1	Overview of offset .....	27
5.2	Criteria for site selection .....	27
5.2.1	Desirable characteristics .....	28
5.3	Objectives and intended outcomes .....	28
5.4	Actions to be undertaken .....	28
5.5	Success criteria .....	29
5.6	Timelines and milestones .....	29
5.7	Monitoring to assess offset implementation .....	29
5.8	Reporting details and timing .....	29
5.9	Financial arrangements .....	29
5.10	Risks and contingency measures .....	29
5.11	Governance arrangements .....	30
<b>6</b>	<b>TEC 26a offset 3 – Acquisition and rehabilitation.....</b>	<b>31</b>
6.1	Overview of offset .....	31
6.2	Criteria for site selection .....	31
6.2.1	Desirable characteristics .....	32
6.3	Objectives and intended outcomes .....	32
6.4	Actions to be undertaken .....	32
6.5	Success criteria .....	33
6.6	Timelines and milestones .....	33
6.7	Monitoring to assess offset implementation .....	34
6.8	Reporting details and timing .....	34
6.9	Financial arrangements .....	34

6.10	Risks and contingency measures.....	34
6.11	Governance arrangements.....	35
<b>7</b>	<b>TEC 26a offset 4 - Research .....</b>	<b>36</b>
7.1	Overview of offset.....	36
7.2	Key characteristics/criteria.....	36
7.3	Objectives and intended outcomes .....	36
7.4	Actions to be undertaken.....	36
7.5	Success criteria .....	36
7.6	Timelines and milestones .....	37
7.7	Reporting details and timing.....	37
7.8	Financial arrangements .....	37
7.9	Risks and contingency measures.....	37
7.10	Governance arrangements.....	37
<b>8</b>	<b>Carnaby's Black Cockatoo offset 1 – Acquisition of foraging habitat.....</b>	<b>38</b>
8.1	Overview of offset.....	38
8.2	Criteria for site selection .....	38
8.2.1	Objectives and intended outcome .....	39
8.2.2	Role of previous offsets .....	39
8.2.3	Finalisation.....	39
<b>9</b>	<b>Carnaby's Black Cockatoo offset 2 – Habitat trees .....</b>	<b>42</b>
<b>10</b>	<b>Stakeholder consultation.....</b>	<b>43</b>
<b>11</b>	<b>Implementation, review and revision .....</b>	<b>44</b>
	<b>References .....</b>	<b>45</b>

**Appendix A WA Environmental Offsets Template**

**Appendix B EPBC Act Offsets Assessment Guide**

## List of figures

Figure 1: Commonwealth assessments relevant to YRE Part 1 .....	5
Figure 2: MRS amendment 1192 for change in the rail alignment to avoid impacts to Alkimos dune system showing reduction in impact to Alkimos PRR.....	8

## List of tables

Table 1: Commonwealth assessments to relevant to YRE Part 1 .....	4
Table 2: Summary of mitigation strategy for each environmental factor .....	9
Table 3: Extent of residual impact for environmental values associated with key factors (adapted from RPS 2018 and GHD 2018a).....	10
Table 4: Summary of application of Residual Impact Significance model (from EPA 2014) .....	13
Table 5: Essential criteria for TEC 26a offset land (area, quality and % risk of loss values derived from DSEWPC 2012).....	23
Table 6: TEC 26a offset success criteria .....	25
Table 7: Key risks and contingency measures for TEC 26a offset .....	26
Table 8: Essential criteria for TEC 26a offset 2 land (area, quality and % risk of loss values derived from DSEWPC 2012).....	27
Table 9: TEC 26a offset 2 success criteria .....	29
Table 10: Key risks and contingency measures for TEC 26a offset 2 .....	30
Table 11: Essential criteria for TEC 26a offset 3 land (area, quality and %risk of loss values derived from DSEWPC 2012).....	31
Table 12: TEC 26a offset 2 success criteria .....	33
Table 13: Key risks and contingency measures for TEC 26a offset 3 .....	34
Table 14: TEC 26a research program offset success criteria .....	36
Table 15: Key risks and contingency measures for TEC 26a research offset .....	37
Table 16: Essential criteria for Carnaby's Black Cockatoo offset 1 (area, quality and %risk of loss values derived from DSEWPC 2012). .....	38
Table 17: Carnaby's Black Cockatoo impacts of YRE Part 1 mitigated by offsets provided under previous EPBC Act approvals .....	40

# Executive summary

This Preliminary Offsets Strategy is to demonstrate and provide for mitigation of significant residual impacts of Part 1 of the proposed Yanchep Rail Extension (YRE Part 1). The entire 70.22 ha YRE Part 1 development envelope is comprised of a 45.42 ha development footprint and 24.80 ha construction and access area.

Offsets have been considered where it was determined that following avoidance, minimisation, and best-practicable rehabilitation a significant residual impact is still likely to occur.

The clearing of 1.12 ha of TEC 26a will require one or a combination of the following direct offsets that involve the maintenance of or improvement in quality of an existing area of TEC and/or reduction in the risk of loss over time:

- Acquisition and/or securing of land that has no existing conservation tenure and transfer to the conservation estate. This would be supported by funding of conservation works to maintain or enhance the condition (as a measure of quality) of the area of TEC.
- Undertaking of rehabilitation works in degraded areas of TEC 26a in secured conservation land already under DBCA management.
- Acquisition of poorer quality areas of TEC 26a, and transfer to conservation estate, and undertaking of rehabilitation works to improve its quality.

The Public Transport Authority (PTA) will also consider the funding of research or monitoring that will go towards informing the conservation of this TEC, particularly if a sufficient area of TEC 26a is not able to be acquired.

If in the event, sufficient areas of TEC 26a are not able to be identified for the described offsets, then PTA will examine the potential to find areas of similar environmental value to acquire and/or undertake conservation measures (such as areas representative of other Floristic Community Type 26 sub-types).

For fauna, the impact to 52.42 ha of habitat for the listed Threatened Carnaby's Black Cockatoo *Calyptorhynchus latirostris* (Schedule 1 under the *Wildlife Conservation Act 1950*) and 21 potential breeding trees for the species is of significance. Offsets for foraging and breeding habitat are proposed however it is likely that these offsets have largely been provided by offsets provided in the six previous EPBC referrals that comprise the majority of the Part 1 development envelope. The primary offsets provided under these approvals is the acquisition of large areas of Carnaby's Black Cockatoo habitat north and north-east of the area of impact. PTA intends to operate under these Commonwealth approvals, through agreement with the approval holder.

In finalising the Offsets Strategy, PTA will demonstrate the extent to which impacts to foraging and breeding habitat has already been or is in the process of being mitigated. For residual impacts not adequately addressed by previous offsets (if any), the Final Offsets Strategy will detail a new offset proposal. The Final Offsets Strategy will detail actions to be taken to provide for the new offset as well as indicators of success criteria, timing, milestones achieved/to be achieved, any related monitoring, reporting, contingencies, and financial and governance arrangements.

# 1 Introduction

The following is a Preliminary Offsets Strategy to support the assessment of Part 1 of the Yanchep Rail Extension (YRE Part 1) under the *Environmental Protection Act 1986* (EP Act) following the Environmental Protection Authority's (EPA) decision to assess the project. This plan will be finalised following issue of condition of approval for YRE Part 1, which is likely to require the preparation or finalisation of an Offsets Strategy.

## 1.1 Background

The Public Transport Authority (PTA) is proposing to implement the first stage of the Western Australian Government's METRONET vision to transform Perth's transport network. The first stage of METRONET's priority projects includes the extension of the existing Joondalup railway line from Butler to Yanchep.

The Yanchep Rail Extension (YRE) project is a 14.5 km extension of the Joondalup railway line, which includes new stations at three locations; Alkimos, Eglinton and Yanchep. It is located within the City of Wanneroo, which is situated approximately 26 km north of Perth's Central Business District (CBD).

The YRE project forms an integral component of Perth's long term public transport network and will provide essential transportation services to the rapidly expanding northern coastal suburbs. The delivery of the YRE project will foster the continued growth and development of activity centres in the North-west Subregion, stimulating new employment opportunities, vibrancy, higher density land use and better sustainability outcomes (RPS 2018).

The YRE project is being progressed in two parts:

- Part 1: Butler Station to Eglinton Station.
- Part 2: Eglinton Station to Yanchep Station.

Part 1: Butler Station to Eglinton Station (YRE Part 1), being the subject of this Preliminary Offsets Strategy, includes the southern portion of the YRE project area to the north of the Butler Station and generally follows the land reserved 'Railways' under the Metropolitan Region Scheme (MRS) before terminating to the north of the Eglinton Station. The Part 1 development envelope includes a contingency for a turnback facility to be constructed to the north of the Eglinton Station, to allow for the turning of two six car trains (if required), should Part 2 of the YRE project not proceed.

The entire 70.22 ha YRE Part 1 development envelope is proposed to be cleared with permanent infrastructure expected to occupy a final footprint of 45.42 ha.

## 1.2 Assessment and approvals processes

Part 1 of the YRE Project Butler Station to Eglinton Station was referred to the Environmental Protection Authority (EPA) under Section 38 of the EP Act. The referral included submission of a comprehensive Environmental Impact Assessment report (RPS 2018) that forms the basis for the impact assessment.

On 13 March 2018 the EPA determined to set the level of assessment as 'Referral Information – Additional Information Required'. The EPA has requested PTA provide details of the proposed offset strategy (or project) for significant residual impacts on the identified environmental factors and values for the proposal. The strategy is to be consistent with the WA Environmental Offsets Guidelines (Government of Western Australia 2014) and the WA Environmental Offsets Template (**Appendix A**).

### 1.3 Relationship to other planning and approvals processes

#### 1.3.1 Proposed Mitchell Freeway Transport Corridor (Environmental Review) through MRS Amendment 992/33

A rail line north of Hester Avenue, Butler was originally considered through MRS Amendment 992/33. This amendment included reservation of the Proposed Mitchell Freeway Transport Corridor (Environmental Review) and was subject to EPA assessment. It was formally assessed at the level of Environmental Review under the EP Act because the proposed land use changes may have potentially significant impacts on Flora and Vegetation and Terrestrial Fauna. The EPA considered the alignment of the Mitchell Freeway Transportation Corridor to be environmentally acceptable.

#### 1.3.2 Butler Jindree District Structure Plan / associated MRS amendment 1132/57

MRS Amendment - North West District Omnibus 7 was finalised in 2008. The amendment rationalised the zones and reservations of the MRS in the Butler and Ridgewood localities to correspond with the Butler-Jindalee District Structure Plan, and to facilitate the realignment of the passenger railway line north from the proposed Butler station. In this regard, the proposed amendment for the realignment of the railway reservation will connect into the realigned Railway reservation within the Butler locality abutting to the south.

#### 1.3.3 Alkimos Eglinton District Structure Plan / associated MRS 1029/33

The Western Australia Planning Commission (WAPC) initiated Amendment 1029/33 to the MRS to rationalise zones and reservations in the Alkimos and Eglinton localities to correspond with the Alkimos Eglinton District Structure Plan (DSP), the area for which the YRE rail reservation traverses. MRS Amendment 1029/33 was subject to formal assessment by the EPA at the level of Environmental Review. The Environmental Review was required as the proposed land use changes was recognised to potentially have significant impacts on a number of environmental factors.

The Alkimos Eglinton DSP encompasses approximately 2,600 ha of land. Key elements of the plan include:

- Preservation of over 500 ha of the coastal dunal system and environmentally significant landform.
- Two east-west green linkages between the coast and major regional open space systems.

In its assessment, the EPA recommended several modifications to the parks and recreation reservation to increase its area and its incorporation of several values including occurrences of Threatened Ecological Community (TEC) 26a and ecological linkage functions.

The EPA identified that it supported a realignment of the railway reservation as part of a future amendment to the MRS to avoid the fragmentation of the geoheritage and landform values (Alkimos dune system). It was agreed by all stakeholders that changes to the railway alignment would be the subject of a separate MRS Amendment.

#### 1.3.4 Northern Suburbs Railway Alignment Definition (Alkimos to Yanchep) (MRS 1192/57)

MRS Amendment 1192/57 provided for the realignment of the northern suburbs railway reservation further west, primarily between the Mitchell Freeway and Marmion Avenue, in Alkimos and Eglinton. MRS amendment 1192/57 provided for the realignment of the railway reservation following a railway alignment definition study to avoid the fragmentation of the geoheritage and landform values (Alkimos dune system).

MRS Amendment 1192/57 was referred to the EPA for assessment under Section 48a of the EP Act. In May 2010 the Chairman of the EPA considered that the likely environmental impacts of the scheme amendment were not so significant as to warrant formal environmental assessment.

The final gazetted 'Railways' reservation represents the general alignment of the YRE development envelope for Parts 1 and 2 of the YRE Project.

#### 1.4 Commonwealth approvals

The Part 1 YRE development envelope has been considered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) through formal assessment of several urban development referrals to the Commonwealth under the EPBC Act for the clearing of vegetation, including that within the rail corridor (**Table 1**). Matters of National Environmental Significance (MNES) dealt with in these referrals relevant to YRE Part 1 include Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) and the Banksia Woodlands of the Swan Coastal Plain TEC. These MNES have been dealt with in assessments and subsequent approvals.

The Commonwealth has approved and set conditions for each of these developments. The PTA has committed to adhering to all relevant management plans and/or conditions applied to the developments under the EPBC Act, when conducting the rail related works within the referred areas. Offsets such as land acquisition have either been provided, or are pending provision, to counterbalance the residual impacts for each of these separate actions on Carnaby's Black Cockatoo. The Commonwealth has signed off on the satisfaction of offset conditions for all approvals relevant to the development envelope.

The PTA will operate under these approvals, through agreement with the approval holder, for the purpose of consideration under the EPBC Act. The WA Environmental Offsets Guidelines (Government of Western Australia 2014) identifies where a proposal has already been assessed under the EPBC Act and offsets have been applied, the State will consider these offsets as contributing to the State requirements. The PTA considers these approvals and offsets, through agreement with the approval holder and the Commonwealth, address the majority of Part 1 requirements. This will be subject to further demonstration to DWER, which will be provided in the final Offsets Strategy.

**Figure 1** shows the extent of the EPBC Act referrals for urban development, which were assessed to be Controlled Actions and subsequently approved, in relation to YRE Part 1. The Commonwealth has individually set conditions for the various referrals with which future development must comply. Offsets such as land acquisition have either been provided, or are pending provision, to counterbalance the residual impacts for each of these separate actions on MNES. The Commonwealth has signed off on the satisfaction of offset conditions for all approvals apart from Urban Quarter at the time of preparation of this Strategy.

In relation to this Offsets Strategy, EPA (2014) identifies where a proposal has already been assessed under the EPBC Act and offsets have been applied, the State will consider these offsets as contributing to the State requirements.

**Table 1: Commonwealth assessments to relevant to YRE Part 1**

EPBC Act Referral No.	Local Structure Plan / Development	Developer / Approval Holder	Abbreviation
2008/4601	Lot 3 Romeo Road, Alkimos (approximate to Lot 1001 and 1002 Alkimos) Trinity Estate	LWP Property Group (formerly Northern Corridor Developments)	LWP
2015/7561	Alkimos City Centre and Central Alkimos	Lendlease Communities (Australia) Pty Ltd	Lend Lease
2008/4638	North Alkimos – Shorehaven Development Lots 1005 & 1006 Alkimos	PEET Limited	Peet
2017/7872	Western Precinct, Lot 6 Taronga Place	Urban Quarter (Prime Eglinton Pty Ltd)	Urban Quarter
2010/5777	Eglinton Estates Lot 1007 and Part Lot 1008 Pipidiny Road Eglinton	Eglinton Estates Pty Ltd	Eglinton
2011/6021	Eglinton/South Yanchep Residential Development – 45 km Northwest of Perth “Allara”	Landcorp	LandCorp

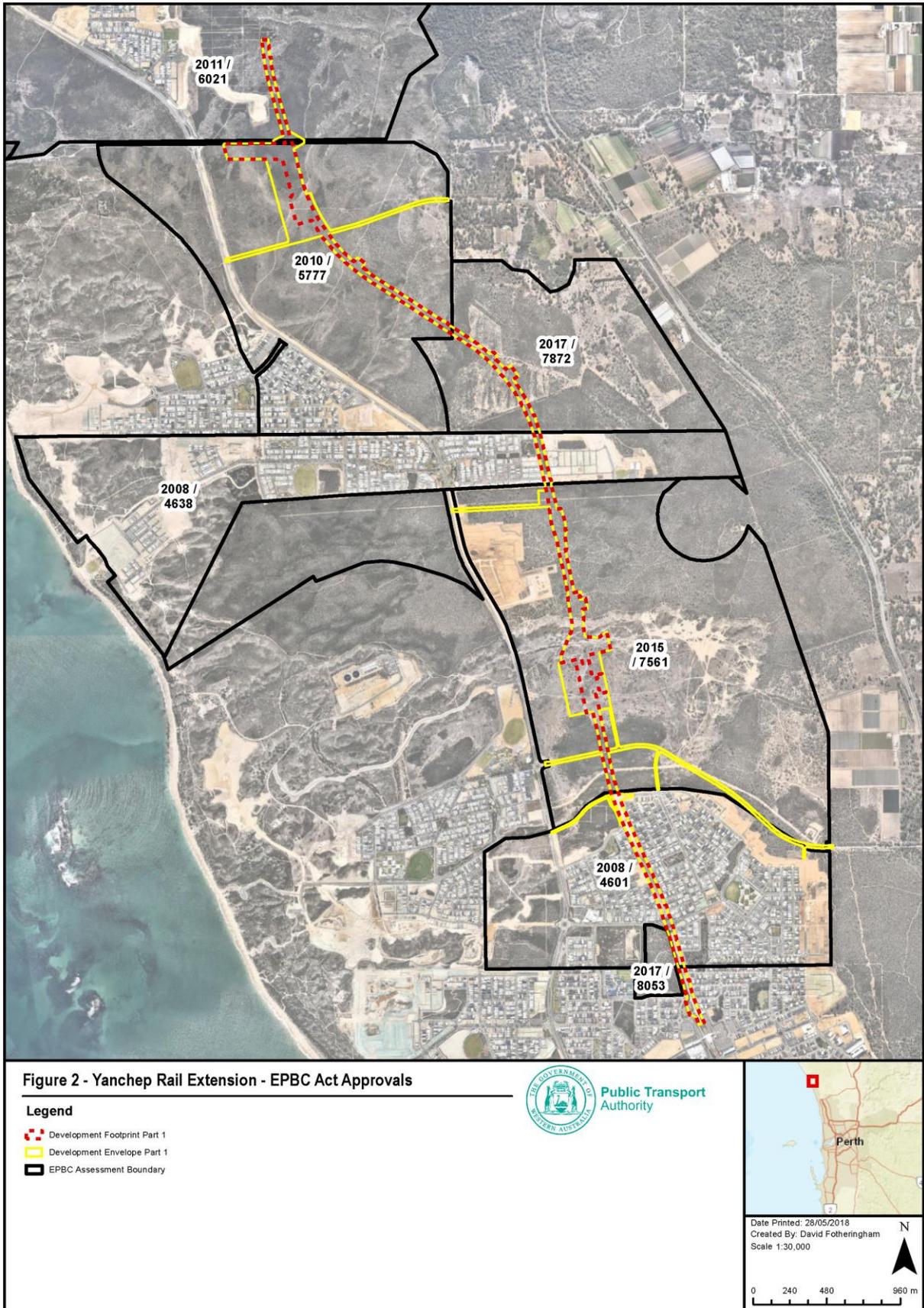


Figure 1: Commonwealth assessments relevant to YRE Part 1

## 2 Identification of significant residual impacts

Environmental offsets will only be applied where the residual impacts of a project are determined to be significant, after avoidance, minimisation and rehabilitation have been pursued (EPA 2014).

### 2.1 Development envelope

The entire 70.22 ha Part 1 development envelope is proposed to be cleared with permanent infrastructure expected to occupy a final footprint of 45.42ha. The area of direct impact includes one TEC, three Priority Ecological Communities (PECs) as listed by the Department of Water and Environmental Regulation (DWER)), a significant landform feature (Parabolic dunes), and a number of Scheduled species under the *Wildlife Conservation Act 1950* (including Carnaby's Black Cockatoo) and Priority fauna (listed by DWER).

### 2.2 Avoidance

MRS amendment 1192/57 provided for the realignment of the railway reservation following a railway alignment definition study. The EPA recognised that the new alignment has a reduced footprint on the remnant vegetation of the area. It did not formally assess the realignment after it was referred to the EPA or provide further recommendations. The final realignment of the railway is not located with a Bush Forever site and reduced the impact on the east-west parks and recreation reservation in Alkimos. **Figure 2** shows the change in alignments under MRS 1192/57 indicating the extinguishment of the eastern original reservation and creation of new western rail reservation. This change is resulted in an overall reduced impact to Carnaby's Black Cockatoo habitat within the parks and recreation reserve.

In addition, construction and access areas have been selected to coincide with proposed future urban development cells or roads either reserved by the MRS (**Figure 2**), or as detailed within approved and draft Local Structure Plan, to intentionally avoid direct impacts to native vegetation which may have otherwise been able to be retained within future Public Open Space (POS) reservations.

### 2.3 Minimisation

Within the constraints of the fixed rail reservation (following the aforementioned realignment), the development envelope has been iteratively modified by the PTA to further reduce and minimise environmental impacts. In this regard, the following amendments have been made:

- Modification of the development envelope within Lot 200 Alkimos Drive "Parks and Recreation" reservation (the Alkimos PRR) to avoid impacting Carnaby's Black Cockatoo foraging habitat retained as part of EPBC 2015/7561 decision.
- Modification of the development envelope to avoid the clearing of native vegetation and direct impacts to Bush Forever Site No. 130: Link between Yanchep and Neerabup National Parks within eastern corridor of an "Other Regional Road" reserved in the MRS to the north of Alkimos PRR. Construction traffic in this section will now use Marmion Avenue with only the western corridor of the reserved road being cleared to facilitate access.

In addition, further measures to minimise impacts are provided for through the construction environmental management approach. As per Ministerial Statement No. 722 for MRS Amendment 1029/33 that was approved by the Minister for the Environment on 24 April 2006, an Environmental Management Plan (EMP) may be required to be prepared as follows:

*2.1 Prior to approving subdivision or development applications (whichever is sooner) for Infrastructure proposals, the WAPC or local government, as the case requires, may require an Environmental Management Plan to be prepared and implemented to achieve the objective of managing the potential impacts of the proposed subdivision, development or infrastructure on the following:*

- 1. land which is reserved as Regional Open Space; and*
- 2. bushland or land that may be part of an ecological linkage.*

*2.2 An Environmental Management Plan pursuant to Condition 2-1 shall be prepared to the satisfaction of the WAPC or the local authority as required, having due regard for advice from relevant government agencies and shall be implemented in accordance with a program defined in the Environmental Management Plan.*

The preparation of a Construction Environmental Management Plan (CEMP) was triggered by the latest EPA Notice of Request for Additional Information, and was a commitment made in the YRE Part 1 referral to be prepared consistent with the requirements of Condition 2 of Ministerial Statement No. 722. The construction and access areas are located in areas that will be cleared by future subdivision and development in accordance with the approved Local Structure Plans and EPBC Act approvals. These requirements are also being reflected in the CEMP.

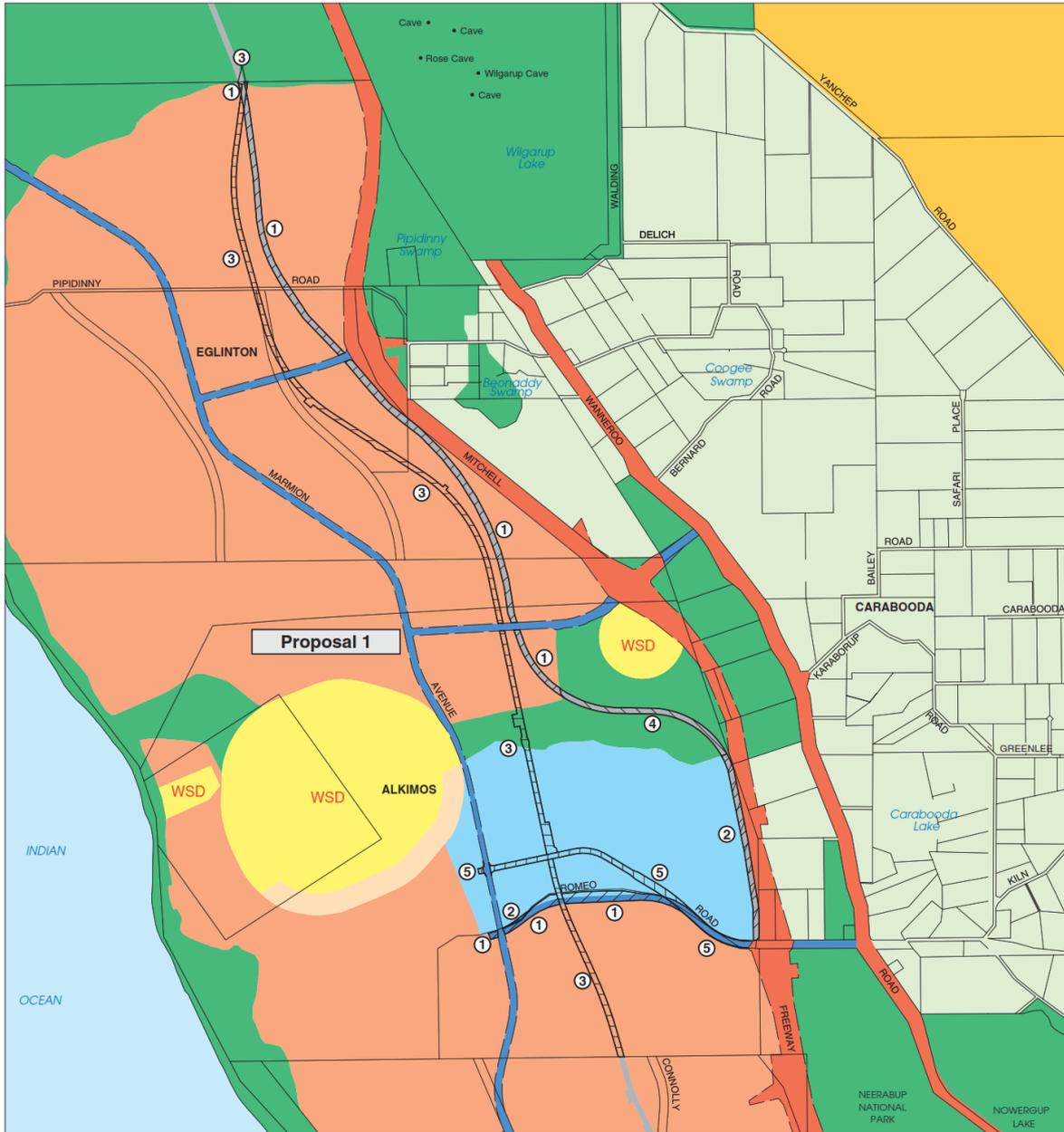
The CEMP includes measures to:

- Restrict clearing to the Part 1 development envelope.
- Prevent the distribution of Declared Pests and other weed species offsite.
- Prevent introduction of *Phytophthora* dieback to the surrounding vegetation.
- Manage indirect impacts to surrounding vegetation.
- Manage impacts to Conservation significant terrestrial fauna species as a result of native vegetation clearing.
- Minimise impacts on larger species of highly mobile fauna, such as Western Brush Wallaby and Emu, to avoid isolation or entrapment in temporary construction infrastructure.
- Minimise indirect impacts to surrounding native fauna habitat.
- Manage cleared construction and access areas during and post construction to prevent weed establishment until such time as the areas are handed back to the landowner for development.
- Manage impacts to sensitive premises and surrounding vegetation from dust and unauthorised vehicle access until such time as the areas are handed back to the landowner for development.

A fauna underpass is being constructed providing a linkage across the rail reservation between the east and western portions of the Alkimos PRR that the rail bisects.

Cleared construction and access areas will be managed by the PTA during and post construction to prevent weed establishment and impacts to sensitive premises and surrounding vegetation from dust and unauthorised vehicle access. The PTA will manage these areas post construction until such time as the areas are handed back to the landowner for development.

These measures function to further minimise the impact of Part 1 of the YRE Project on the relevant environmental factors.



Northern Suburbs Railway and Romeo Road Realignment proposed minor amendment as advertised

23 March 2010

Figure 1

Proposed:		Existing:		Legend	
	urban zone		urban zone		railways reservation
	central city area zone		urban deferred zone		state forests reservation
	railways reservation		central city area zone		public purposes (WSD) reservation
	parks and recreation reservation		rural zone		parks and recreation reservation
	other regional roads reservation		waterways reservation		primary regional roads reservation
					other regional roads reservation

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28 Apr 2010  
Produced by Mapping & Geospatial Data Branch, Department of Planning, Perth WA  
On behalf of the Western Australian Planning Commission.  
Base information supplied by Western Australian Land Information Authority LJ 430-2009-2

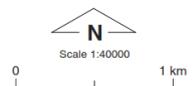


Figure 2: MRS amendment 1192 for change in the rail alignment to avoid impacts to Alkimos dune system showing reduction in impact to Alkimos PRR

## 2.4 Rehabilitation

There is an opportunity for rehabilitation of areas not required following construction to be implemented or completed. The CEMP addresses revegetation of areas not required for permanent infrastructure including new embankments. It is recognised whilst rehabilitation is an important component of the mitigation hierarchy, not all environmental values can be effectively restored. In this case, there are limitations to the level of revegetation possible along embankments immediately adjacent to the rail and its primary purpose in these areas will be stabilisation. Revegetation is the preferred method of stabilisation. Where slopes are too steep or the material is not suitable for revegetation (e.g. cuttings through limestone) other stabilisation methods may be employed.

A summary of the application of the mitigation hierarchy is provided in **Table 2**.

**Table 2: Summary of mitigation strategy for each environmental factor**

Factor	Avoid	Minimise	Rehabilitation
Flora and vegetation	Rail reservation realignment to reduce impact to Alkimos PRR  Construction and access areas selected to coincide with proposed future urban development cells or roads, the impacts for clearing of which have already been considered by the EPA.	Modification of development envelope within Alkimos PRR.  Modification of the development envelope to avoid the clearing of native vegetation and direct impacts to Bush Forever Site No. 130.  A CEMP will be developed and implemented to: <ul style="list-style-type: none"> <li>• Restrict clearing to the Part 1 development envelope.</li> <li>• Prevent the distribution of declared Pests and other weed species offsite.</li> <li>• Prevent introduction of <i>Phytophthora dieback</i> to the surrounding vegetation.</li> <li>• Manage indirect impacts to surrounding vegetation.</li> </ul>	Revegetation on stabilised embankments where suitable.
Landform	Nil.	Modification of development envelope within Alkimos PRR, reducing overall impact to Alkimos dune system.  CEMP objectives with associated measures to minimise impact.	Landform stabilisation and revegetation of embankments to be sympathetic to surrounding landform.
Subterranean fauna	Avoided significant subterranean habitat (karstic features, such as sinkholes or caverns).	Advisian's geotechnical investigation in 2017 validated the initial findings of the GHD 2012 subterranean fauna assessment and enable detailed design of key structural elements such that there is a low risk of impact.	Landform stabilisation following construction.

Factor	Avoid	Minimise	Rehabilitation
		<p>Should any significant unidentified karst or cave formations be identified within the Part 1 development envelope during construction, the DWER will be notified and appropriate actions undertaken to the satisfaction of the DWER.</p> <p>Any groundwater abstracted from the Superficial aquifer will be regulated under the Rights in Water and Irrigation Act 1914 to avoid significant reduction in regional or local groundwater levels.</p> <p>Low risk of groundwater contamination occurring during construction will be mitigated through the implementation of a CEMP.</p>	
Terrestrial fauna	Rail reservation realignment to reduce impact to Alkimos PRR.	<p>Construction and access areas selected to coincide with proposed future urban development cells or roads, the impacts for clearing of which have already been considered by the EPA.</p> <p>Modification of development envelope within Alkimos PRR.</p> <p>CEMP objectives with associated measures to minimise impact.</p> <p>Provision of fauna underpass and interim fauna overpasses (non-operational road bridges).</p>	Revegetation on stabilised embankments where suitable.

## 2.5 Residual impacts

An estimate of residual impact has been made for key environmental values known or likely to occur associated with each environmental factor (**Table 3**). These are made up of direct impacts as potential indirect impacts are mitigated through the minimisation measures described (Section 2.3).

**Table 3: Extent of residual impact for environmental values associated with key factors (adapted from RPS 2018 and GHD 2018a)**

Value known or likely to occur	Residual impact	
FLORA AND VEGETATION	Assessed through evaluation of impact to:	Development Envelope (ha)
Northern Spearwood shrublands and woodlands Priority Ecological Community (PEC) (Priority 3)	<i>Banksia sessilis</i> and <i>Melaleuca systena</i> mid-shrubland	17.19
	<i>Banksia sessilis</i> and <i>Spyridium globulosum</i> tall shrubland	
Banksia dominated woodlands of the Swan	<i>Banksia attenuata</i> , <i>B. menziesii</i> low woodland	16.45

Value known or likely to occur	Residual impact	
Coastal Plain IBRA* Region PEC (Priority 3)	<i>Banksia attenuata</i> and <i>B.grandis</i> low woodland	
Tuart ( <i>Eucalyptus gomphocephala</i> ) woodlands of the Swan Coastal Plain PEC	<i>Eucalyptus gomphocephala</i> tall woodland	0.32
<i>Melaleuca huegelii</i> – <i>M. acerosa</i> [ <i>M. systema</i> ] shrublands on limestone ridges TEC 26a	<i>Melaleuca huegelii</i> and <i>M. systema</i> shrubland	1.12
SUBTERRANEAN FAUNA	Residual impact	
Stygofauna	Identified potential direct impacts are considered to pose a low risk to subterranean fauna (if present) as the development envelope has avoided significant subterranean habitat whilst the risk to subterranean fauna from indirect impacts to groundwater are also considered to be low. Implementation of a CEMP will also further reduce any residual risk of potential impacts occurring to any subterranean fauna inhabiting underlying habitat (if present).	
TERRESTRIAL FAUNA		
Jewelled Southwest Ctenotus ( <i>Ctenotus gemmula</i> ), Priority 3	Clearing of 16.45 ha of Mixed <i>Banksia</i> woodland of high habitat value. Clearing of 18.38 ha of Mixed tall shrubland of high habitat value. Clearing of 7.08 ha of <i>Lomandra</i> herbland on secondary dunes of medium habitat value.	
Black striped snake ( <i>Neelaps calonotos</i> ), Priority 3	Clearing of 16.45 ha of Mixed <i>Banksia</i> woodland of high habitat value. Clearing of 18.38 ha of Mixed tall shrubland of high habitat value. Clearing of 7.08 ha of <i>Lomandra</i> herbland on secondary dunes of medium habitat value.	
Carnaby's Black Cockatoo ( <i>Calyptorhynchus latirostris</i> ), Schedule 1	52.42 ha of habitat (52.11 ha of potential foraging habitat, 0.32 ha of potential breeding habitat). 21 potential breeding trees.	
Peregrine Falcon ( <i>Falco peregrinus</i> ), Schedule 7	Clearing of 61.44 ha of potential habitat. GHD (2018a) identifies that the peregrine falcon may opportunistically use all habitat types within the development envelope for foraging (if present).	
Quenda ( <i>Isoodon obesulus subsp. fusciventer</i> ), Priority 4	Clearing of 61.44 ha of potential habitat. GHD (2018a) identifies that the Quenda is able to use all habitat types within the development envelope either as a resident or for foraging.	

Value known or likely to occur	Residual impact
Western Brush Wallaby ( <i>Macropus irma</i> ), Priority 4	Clearing of 61.44 ha of potential habitat. GHD (2018a) identifies that the Western Brush Wallaby is able to use all habitat types within the development envelope either as a resident or for foraging, however the Mixed tall shrublands, <i>Banksia</i> woodlands and <i>Eucalyptus</i> woodlands are of higher value for seeking shelter and foraging.
Graceful Sunmoth, ( <i>Synemon gratiosa</i> ), Priority 4	Clearing of 7.08 ha of <i>Lomandra</i> herbland on secondary dunes of medium habitat value. GHD (2018) identified that this habitat is likely to be important to this species.
Ground cricket, ( <i>Pachysaga munggai / strobila</i> ), Priority 3/1	Clearing of 17.19 ha of <i>Banksia sessilis</i> over low mixed shrubland of high habitat value. GHD (2018a) identified that the ground cricket is a likely resident of this habitat type. Clearing of 16.45 ha of Mixed <i>Banksia</i> woodland of high habitat value. GHD (2018a) identified that this habitat type may also be suitable for the ground cricket.
Ecological linkage for threatened fauna	Provision of fauna underpass will assist in mitigation of impacts to threatened reptile and mammal species arising from fragmentation of habitat due to rail alignment through Alkimos PRR.

\* IBRA: Interim Biogeographic Regionalisation of Australia

## 2.6 Significant residual impacts to be offset

Offsets are only to be considered where it is determined that after avoidance, minimisation, and best-practicable rehabilitation a significant residual impact is still likely to occur.

The residual impact significance model as per EPA 2014 provides further guidance on significance of impacts, in the context of determining whether offsets are required:

- Unacceptable impacts – those impacts which are environmentally unacceptable or where no offset can be applied to reduce the impact. Offsets are not appropriate in all circumstances, as some environmental values cannot be offset.
- Significant impacts requiring an offset – any significant residual impact of this nature will require an offset. These generally relate to any impacts to species, ecosystems, or reserve areas protected by statute or where the cumulative impact is already determined to be at a critical level.
- Potentially significant impact which may require an offset – the residual impact may be significant depending on the context and extent of the impact. These relate to impacts that are likely to result in a species or ecosystem requiring protection under statute or increasing the cumulative impact to a critical level. Whether these impacts require an offset will be determined by the decision-maker based on information provided by the proponent or applicant and expert judgement; and
- Impacts that are not significant – impacts which do not trigger the above categories are not expected to have a significant impact on the environment and therefore do not require an offset.

The following is a summary of the evaluation of significant residual impact. Detailed evaluation is contained in the ERD (ELA 2018).

**Table 4: Summary of application of Residual Impact Significance model (from EPA 2014)**

Environmental factor	Outcome (ELA 2018)	Unacceptable impacts	Significant impacts	Potential significant impacts	Insignificant impacts
Flora and vegetation	<p>The proposal has the potential to cause the following impacts to flora and vegetation:</p> <ul style="list-style-type: none"> <li>• Permanent loss of 43.14 ha of native vegetation in Pristine to Degraded condition;</li> <li>• Permanent removal of vegetation located near the edge of the north-south regional ecological linkage (1.80 ha);</li> <li>• Disruption of the local east-west ecological linkage by the permanent removal of 2.50 ha of vegetation;</li> <li>• Permanent loss of Threatened and Priority Ecological Communities, including:               <ul style="list-style-type: none"> <li>○ A total of 1.12 ha of <i>Melaleuca huegelii</i> – <i>M. systema</i> shrublands on limestone ridges (Gibson et al. 1994 type 26a) TEC;</li> <li>○ A total of 16.45 ha of Banksia dominated woodlands of the Swan Coastal Plain IBRA Region PEC;</li> <li>○ A total of 17.18 ha of Northern Spearwood shrublands and woodlands ('community type 24') PEC; and</li> <li>○ A total of 0.32 ha of Tuart (<i>Eucalyptus gomphocephala</i>) woodlands of the Swan Coastal Plain PEC.</li> </ul> </li> <li>• Introduction and/or spread of weeds within the development envelope and/or into vegetation adjacent to the development envelope; and</li> <li>• Introduction and spread of <i>Phytophthora</i> dieback into vegetation adjacent to the development envelope.</li> </ul> <p>Through the implementation of the EPA's mitigation hierarchy, the residual impacts of the proposal to flora and vegetation are as low</p>	None	1.12 ha of TEC 26a as cumulative impacts to this TEC as considered to already be at a critical level	None	The remaining residual impacts are considered insignificant due to associated values affected are not protected by statute and cumulative impacts have not been increased to a critical level as a result of development.

Environmental factor	Outcome (ELA 2018)	Unacceptable impacts	Significant impacts	Potential significant impacts	Insignificant impacts
	as reasonably practicable and not significant, with the exception of the impacts to the <i>M. huegelii</i> – <i>M. systema</i> shrublands on limestone ridges (Gibson et al. 1994 type 26a) TEC.				
Subterranean fauna	<p>Predicted direct residual impacts will involve minimal loss of low value troglofauna habitat and no loss of stygofauna habitat. At least 65% of the vertical extent of potential troglofauna habitat will be retained below the proposed excavation level therefore there will be no impact to the continuity of potential habitat across the alignment. In addition, of the anticipated bulk earthworks, 47 % is anticipated to be sand which is unlikely to provide habitat for subterranean fauna.</p> <p>Through the implementation of the EPA's mitigation hierarchy, the residual impacts of potential direct and indirect impacts of the proposal to subterranean fauna are as low as reasonably practicable.</p>	None	None	None	The remaining residual impacts are considered insignificant due to associated values affected are not protected by statute and cumulative impacts have not been increased to a critical level as a result of development.
Terrestrial fauna	<p>The proposal has the potential to cause the following impacts to terrestrial fauna:</p> <ul style="list-style-type: none"> <li>• Loss of fauna habitat: <ul style="list-style-type: none"> <li>○ A total of 61.44 ha of terrestrial fauna habitat, consisting of 52.33 ha of high value and 9.11 ha of medium value habitat;</li> <li>○ A total of 68.00 ha of potential Short Range Endemic (SRE) fauna habitat, consisting of 43.00 ha of medium suitability and 25.00 ha of low suitability habitat;</li> <li>○ A total of 52.42 ha of Carnaby's Black Cockatoo habitat, including 52.11 ha of potential foraging habitat, 0.32 ha of potential breeding habitat (including 21</li> </ul> </li> </ul>	None	Loss of 52.42 ha of habitat and 21 potential breeding trees considered critical habitat for Carnaby's Black Cockatoo	None	The remaining residual impacts are considered insignificant due to associated values affected are not protected by statute and cumulative impacts have not been increased to a critical level as a

Environmental factor	Outcome (ELA 2018)	Unacceptable impacts	Significant impacts	Potential significant impacts	Insignificant impacts
	<p>potential breeding trees) and 13.36 ha of potential roosting habitat (intersects with both foraging and breeding habitat).</p> <ul style="list-style-type: none"> <li>• Fragmentation of fauna habitat, including:                             <ul style="list-style-type: none"> <li>○ Partial removal of the edge of the north-south regional linkage, resulting in the loss of 1.80 ha of this linkage; and</li> <li>○ Disruption of the local east-west ecological linkage, resulting in the loss of 2.50 ha of this linkage.</li> </ul> </li> <li>• Injury and/or mortality during clearing activities and construction and operation of the railway;</li> <li>• Disturbance of local fauna populations adjacent to the development envelope during construction (clearing activities and noise) and operation of the railway (noise and vibration); and</li> <li>• Habitat degradation through hydrocarbon spills, the alteration of surface hydrology, increased sedimentation and weed incursions in habitat adjacent to the development envelope.</li> </ul> <p>Through the implementation of the EPA's mitigation hierarchy, the residual impacts of the proposal to terrestrial fauna and their habitats are as low as reasonably practicable and not significant, with the exception of the impacts to Carnaby's Black Cockatoo.</p>				<p>result of development.</p>

### 2.6.1 Flora and vegetation

For flora and vegetation, the impact to 1.12 ha of TEC 26a is of such significance that it will require an offset.

The residual extent of impacts to the three PECs (**Table 4**) after application of the mitigation hierarchy are not considered significant. The PECs are not protected under statute and the extent of impacts proposed is not likely to result in the conservation status of them being elevated or increasing the cumulative impact to a critical level. The local and regional extent of these PECs have not been determined due to wider data deficiency and a lack of mapping of the PEC's extent however regionally mapped vegetation associations can be used as a proxy to infer the potential regional extent of the PEC in the absence of other data sources. Not all of the area of these vegetation associations would be representative of the PECs but they give an indication of its potential remaining extent and representation in conservation reserves,

#### ***Banksia dominated woodlands of the Swan Coastal Plain IBRA Region PEC***

The proposal will result in the permanent loss of 16.5 ha of Banksia dominated woodlands of the Swan Coastal Plain IBRA Region PEC, which ranges from Excellent to Completely Degraded condition. Within the development envelope, this PEC is mapped to vegetation types VT04 and VT15, which align to Beard vegetation association 949. The PEC comprises just under half (48.6%) of the area within the development envelope mapped as vegetation association 949. Using a similar proportion, less than 7% of the PEC is expected to be removed at a local level, while at the subregional and regional scales the impacts from the proposal are less than 0.2% of their remaining (inferred) extents. This compares to the potential current extent of the PEC within conservation areas (based on the portion of vegetation association 949 located in DBCA managed lands and Bush Forever Sites) range from 8.4% at the local scale to 87.4% at the subregional scale (GHD 2018b).

The PEC is not an ecological community protected by statute (i.e. not formally recognised as being threatened). No rare or endangered plants have been recorded in the mapped occurrences of the PEC within the development envelope, and the occurrences of the PEC impacted by the proposal are not within the formal conservation reserve system. The impact from the proposal is considered small and incremental and is not considered to cause the PEC or flora or fauna taxa to become rare or endangered. Therefore, in accordance with the considerations of significance set out in the WA Environmental Offsets Guidelines (Government of Western Australia 2014), the residual impact to the PEC from the proposal is not considered significant.

#### ***Northern Spearwood shrublands and woodlands PEC***

The proposal will result in the permanent loss of 17.2 ha of Northern Spearwood shrublands and woodlands ('community type 24') PEC, primarily in Excellent condition. Approximately 1,009 ha of this PEC was identified in with the DBCA (2018) TEC/PEC dataset at a regional scale; occurrences of this PEC range from Nowergup to Binningup, a distance of approximately 170 km. The occurrence of the PEC within the development envelope was not previously identified in the DBCA (2018) TEC/PEC dataset. At a subregional level, the total known extent of the PEC is 333 ha (DBCA 2018). The proposal will impact 5.2% of the known extent of this PEC at a subregional scale, and 1.7% of the known extent of the PEC at a regional level.

The proposal's impact to the PEC is small and incremental; with 1.7% of the PEC's extent cleared at a regional level. The majority of the known occurrences of this PEC outside the proposal have some level of protection and are unlikely to be lost, with 99% at the subregional scale and 91% at the regional scale in conservation areas (DBCA 2018). This PEC is listed as Priority 3(i) by DBCA (2017), classified as a

poorly known community that is known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation. In the absence of threats to many of these occurrences, it is unlikely the proposal will cause an increase in conservation status in the PEC or associated flora or fauna species.

The PEC is not an ecological community protected by statute (i.e. not formally recognised as being threatened), and no rare or endangered plants have been recorded in the mapped occurrences of the PEC within the development envelope. The occurrences of the PEC impacted by the proposal are outside the formal conservation reserve system. Therefore, in accordance with the considerations of significance set out in the WA Environmental Offsets Guidelines (Government of Western Australia 2014), the residual impact to the PEC from the proposal is not significant.

### ***Tuart woodlands of the Swan Coastal Plain PEC***

The proposal will result in the permanent loss of 0.3 ha of Tuart (*Eucalyptus gomphocephala*) woodlands of the Swan Coastal Plain PEC. This occurrence of the PEC is in Degraded condition.

Within the development envelope, this PEC is mapped to vegetation type VT06, which falls within Beard vegetation association 998. Using vegetation association 998 as a proxy and extrapolating to a local, subregional and regional extent, approximately 0.3% of the PEC will be removed at a local scale. This is reduced to 0.01% or lower at subregional and regional scales.

This PEC is well represented in conservation areas, with 79.5% of the current extent of the PEC conserved at the subregional scale (GHD 2018b). The occurrences of the PEC impacted by the proposal are not within the formal conservation reserve system.

The PEC is not an ecological community protected by statute (i.e. not formally recognised as being threatened). The impact from the proposal is considered very small (0.3 ha) and incremental, and the occurrence of the PEC is in Degraded condition. No rare or endangered plants have been recorded in the mapped occurrences of the PEC within the development envelope, and the proposal is not considered to cause the PEC or flora or fauna taxa to become rare or endangered. Therefore, in accordance with the considerations of significance set out in the WA Environmental Offsets Guidelines (Government of Western Australia 2014), the residual impact to the PEC from the proposal is not considered to be significant.

### **2.6.2 Terrestrial fauna**

For fauna, the residual impact to Carnaby's Black Cockatoo is significant. The residual impacts to other conservation significant terrestrial fauna and existing ecological linkages is not considered significant after application of the mitigation hierarchy. Impacts to other threatened fauna have little potential to result in their conservation status being elevated or increasing the cumulative impact to a critical level hence they should not warrant offsetting.

### **2.6.3 Other factors**

There is no significant residual impact on landform or subterranean fauna after application of the mitigation hierarchy.

In summary, offsets are proposed for the mitigation of significant residual impact to TEC 26a and Carnaby's Black Cockatoo.

## 2.7 Adjustment of significant residual impacts to Carnaby's Black Cockatoo habitat to account for clearing permit CPS 7843/1

To facilitate preliminary geotechnical investigations for the YRE Project, the PTA applied for a clearing permit under Part V of the EP Act. Clearing permit CPS 7843/1 was issued by the DWER on 31 August 2018 for the clearing of 6.56 ha of native vegetation for the purposes of geotechnical and unexploded ordnance investigations only. The clearing permit is valid until 2029, and some clearing has already commenced. The clearing permit contained a condition requiring the PTA to provide an offset separate to this strategy.

The 6.56 ha of clearing authorised by the clearing permit is for the YRE Project as a whole and has not been resolved into components for each of YRE Parts 1 and 2. The significant residual impacts identified in **Table 4** therefore do not account for impacts already accounted for under the clearing permit. To avoid double counting of impacts already authorised under that permit and avoid providing duplicate offsets, this proposal's significant residual impacts to Carnaby's Black Cockatoo habitat will be adjusted to account for clearing conducted under the clearing permit. The adjustment will be undertaken as part of the Final Offsets Strategy based on actual clearing undertaken within the YRE Part 1 development envelope in accordance with the clearing permit.

## 3 Offsetting of significant residual impacts

### 3.1 Approach

The determination of offsets for the significant residual impacts has been undertaken by assessing the extent to which offsets provided under previous environmental approvals have provided for the mitigation of the impact and proposing new offsets only for those impacts not adequately addressed. These new offsets are presented as individual offset proposals in the subsequent sections of the Offset Strategy.

### 3.2 Determining new offsets

EPA (2014) requires that environmental offsets are cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted. They should be proportionate to the significance of the environmental value being impacted. In this case, the EPA has indicated it wishes the Commonwealth Offsets Assessment Guide (Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) 2012) to be applied in determining offsets appropriate and proportionate to the extent of impact. This has been done by using the Guide to estimate the area of offset required to mitigate the calculated quantum of impact using different types of offset based on assumptions of quality with and without offset, risk of loss with and without offset, and certainty in the outcome (**Appendix B**).

As per EPA (2014), in identifying candidate sites/proposals that would meet the offset requirements, the following values have and will be considered:

- It provides better condition / less disturbance compared with the impacted environmental value.
- It contains habitat structure as similar as possible to undisturbed examples of the vegetation type to be impacted.
- It has a better area to perimeter ratio than the impacted site.
- It contains additional numbers of rare or otherwise significant species and threatened species or community compared with the impact site.
- It is contiguous with an existing conservation area.
- It enhances biological corridors or ecological linkages between conservation areas.
- It includes actions to address threatening processes; and/or
- It allows for secure management arrangements in place that will provide for long term conservation.

Environmental offsets are also to be based on sound environmental information and knowledge. In this case, the Commonwealth Offsets Assessment Guide has been used to demonstrate how the proposed offset will counterbalance the significant residual impact of its project. This will deliver long term environmental benefits.

### 3.3 Types of offsets considered

There are generally three types of environmental offsets under EPA (2014):

- Land acquisition - involves the protection of environmental values through improved security of tenure or restricting the use of the land. This can be achieved through ceding freehold land to the Crown for conservation purposes or perpetual covenants for conservation. The upfront costs of establishing the offset site and the ongoing management costs of maintaining the offset for the

long term must be considered whether the land is to be managed by the proponent/applicant, a third party or the Department of Biodiversity, Conservation and Attractions (DBCA).

- On ground management – involves tangible improvement to environmental values in the offset area through revegetation (re-establishment of native vegetation in degraded areas) and rehabilitation (repair of ecosystem processes and management of weeds, disease or feral animals).
- Research – involves investigations that add significant value to the outcomes of on ground management and the understanding of the environmental value being impacted. The research must be designed to result in positive conservation outcomes, and may be targeted at improving the management and protection of existing conservation estate. Research that may include field surveys should be designed to address priority knowledge gaps with the outcomes publicly available to improve management of the environment generally, and provide information that will improve environmental assessment of future projects.

Land acquisition and on ground management are considered direct offsets in the Commonwealth Offsets Assessment Guide and must account for at least 90% of the offset provisions. Direct offsets are those actions that provide a measurable conservation gain for the value being offset.

Research is considered as other compensatory measure and cannot account for more than 10% of the offset provision and represent at least 10% of the financial value of the direct offsets.

### 3.4 TEC 26a

#### 3.4.1 Description

TEC 26a, or Floristic Community Type 26a, is subgroup of Type 26 as described by Gibson et al. 1994) found on shallow soils over limestone or massive limestone ridges of Tamala Limestone. It occurs on skeletal soil on ridge slopes and tops of ridges, and is dominated by *M. huegelii*, *M. systema* and *M. aff. systema* often over scattered limestone heath species such as *Dryandra sessilis* and *G. preissii* (Luu and English 2005).

TEC 26a is highly restricted and known from massive limestone ridges around Yanchep north of Perth, and south of Perth near Lake Clifton.

The ‘*Melaleuca huegelii* – *Melaleuca systema* shrublands of limestone ridges (Swan Coastal Plain Community type 26a - Gibson et al. 1994) Interim Recovery Plan 2004-2009’ (Luu and English 2005) states that the most significant threat to TEC 26a is clearing for mining, housing and road building. Too frequent fire is another major threat to the community. With many of the occurrences surrounded by highly urbanised areas, the frequency of fires, impact of recreational uses and incidence of illegal rubbish dumping are generally increased. These factors can all lead to degradation of plant communities through increasing weed invasion and alteration of structure, species composition or loss of component taxa (Luu and English 2005).

The success criteria for the Recovery Plan are:

- An increase in the area of this community under conservation management.
- Maintenance in terms of diversity and basic composition of native species (as described in Gibson et al. 1994) as well as biological processes, taking account of natural change of the community over time, as identified through monitoring.
- Improvement in terms of reduction of numbers of exotic species and of other threatening processes as identified through monitoring.

### 3.4.2 Required offset/s

The clearing of 1.12 ha of TEC 26a will require one or more direct offsets that involve the maintenance of or improvement in quality of an existing area of TEC and/or reduction in the risk of loss over time. The quantum of impact to be offset is 0.9 ha adjusted for an existing quality of 8 based on TEC in area impacted being in good to excellent condition.

The preferred direct offset is the acquisition and/or securing of land that has no existing conservation tenure and transfer to the conservation estate. This would be supported by funding of conservation works to maintain or enhance the quality (as a measure of quality) of the area of TEC.

If it is not practicable to acquire sufficient area of a high habitat quality, then PTA will look at funding rehabilitation works in existing, more degraded, areas of TEC 26a within secured conservation land already under DBCA management to improve its quality. Alternatively, it will fund acquisition and transfer to conservation estate of poorer quality areas of TEC 26a in unsecured land and undertaking of rehabilitation works to improve its quality.

Section 4 provides the detail of the aforementioned offset proposals. The Final Offsets Strategy will involve one or a combination of these.

If in the event, sufficient areas of TEC 26a are not able to be identified for the described offsets, then PTA will examine the potential to find areas of similar environmental value to acquire and/or undertake conservation measures (such as areas representative of other Floristic Community Type 26 sub-types).

### 3.4.3 Relevant previous approval offsets

Offsets for the clearing of TEC 26a have not been directly provided in any of the preceding environmental approvals for land development in which the development envelope is situated. In addition, there are no known areas of TEC 26a located within the offsets provided for the mitigation of other values under these approvals including for Carnaby's Black Cockatoo.

## 3.5 Carnaby's Black Cockatoo

### 3.5.1 Description (adapted from Species Profile and Threats Database (SPRAT) DEE 2018)

Carnaby's Black Cockatoo is a large cockatoo mostly brownish-black or greyish-black in colour with narrow off-white margins on the feathers and a large bill that is black or greyish-black in males and off-white to greyish white with a black tip in females. It occurs from the wheatbelt, in areas that receive between 300 and 750 mm of rainfall annually, across to wetter regions in the extreme south-west, including the Swan Coastal Plain and the southern coast (DEE 2018)

Its foraging habitat is that used by the species for feeding (during or outside of the breeding season). During the breeding season, Carnaby's Black Cockatoo forages in native vegetation that surrounds woodlands used for breeding. During the non-breeding season, Carnaby's Black Cockatoo forages extensively on banksia woodlands on the Swan Coastal Plain, including the Perth metropolitan area, as well as in banksia heath on the southern coast. Carnaby's Black Cockatoo also feeds on seeding marri and jarrah. The species also forages seasonally in pine plantations in areas that receive high rainfall, such as that on the Swan Coastal Plain and around the Perth metropolitan area on both native and non-native plants, such as liquid amber (DEE 2018).

Breeding habitat (or sites) encompasses those areas that contain suitable nest trees within the range of the species, and associated foraging habitat. Carnaby's Black Cockatoo nests in large hollows in tall, living or dead eucalypts. Breeding activity was typically restricted to eucalypt woodlands mainly in the semiarid and subhumid interior known as the Wheatbelt but records indicate the species has expanded

its breeding range westward and south into the jarrah-marri forests of the Darling Scarp and into the tuart forests of the Swan Coastal Plain, including the Yanchep area, Lake Clifton and near Bunbury (DEE (2018))

The range of Carnaby's Black Cockatoo is thought to have contracted by more than 30% since the late 1940s. The species is also believed to have disappeared from more than a third of its former breeding range between 1968 and 1990. It has been subject to widespread habitat loss, habitat degradation, competition for nest hollows, illegal trade, conflict with humans, disease, and effects of climate change. The long term survival of Carnaby's Black Cockatoo depends primarily upon the conservation and maintenance of existing foraging and breeding habitat, the establishment of new foraging and breeding habitat, and the maintenance and development of corridors of native vegetation between foraging and breeding habitats (DEE 2018).

### **3.5.2 Required offset(s)**

The clearing of 52.42 ha of habitat and 21 potential breeding trees requires one or more direct offsets that involve the maintenance of or improvement in quality of an existing area of Carnaby's Black Cockatoo habitat and/or reduction in the risk of loss over time.

The quantum of impact to foraging habitat to be offset is 36.7 ha adjusted for an existing quality of 7 based on an average of the quality (as assessed by vegetation condition and vegetation type) in area impacted. The preferred direct offset is the acquisition and/or securing of land that has no existing conservation tenure and transfer to the conservation estate.

A further direct offset is required for offsetting the impact to the 21 breeding trees (Section 9).

### **3.5.3 Carnaby's Black Cockatoo relevant previous approval offsets**

The clearing of approximately 52.26 ha of Carnaby's Black Cockatoo foraging habitat and 18 potential habitat (breeding) trees has been approved for the six previous EPBC referrals which comprise the majority of the Part 1 development envelope. The Commonwealth Offsets Assessment Guide was used for each of these approvals to evaluate and finalise the offsets provided.

The primary offsets provided under these approvals is the acquisition of large areas of Carnaby's Black Cockatoo habitat north and north-east of the area of impact (**Table 17**). PTA will operate under these approvals, through agreement with the approval holder, for the purpose of consideration under the EPBC Act.

## 4 TEC 26a offset 1 – Acquisition and maintenance

### 4.1 Overview of offset

Acquisition of land containing an area of TEC for transfer to conservation estate with a corresponding monetary contribution for conservation management measures to be implemented for purpose of maintaining condition (quality) and averting the risk of loss over time. The implementation of this offset will address threatening processes and provide for secure management arrangements to be in place that will provide for long term conservation. The area to be acquired is to be appropriate and proportionate to the quantum of impact (0.9 ha) such that there is a net environmental gain for TEC 26a arising from the offset in the long term. Ideally it would also be in proximity to the area of impact (i.e. Wanneroo area).

### 4.2 Criteria for site selection

**Table 5** indicates the key criteria that will be used for site selection for this offset proposal. An assessment against these criteria for suitability as an offset will be undertaken for each candidate site identified by desktop review. The criteria allow for a number of different scenarios in regards to the current tenure and the existing condition of the TEC (as a measure of quality), which influence the area required to be subject to the offset. In this case, the maximum area to be subject to this offset is between 5.1 and 7.4 ha based on 100% of the TEC 26a offset being addressed by 'TEC 26a Offset 1 – Acquisition and maintenance' (**Appendix B**). The areas involved with this offset would be decreased proportionally if other TEC 26a offsets are pursued (Sections 6, 5 and 7).

The associated calculations of % loss and % change in quality as per DSEWPC 2012 are indicated in the criteria table in italics. The time till ecological benefit has been set at one year as the protected effect of the acquisition is immediate on transfer of land. There is a high degree of confidence in the predictions for these values based on DBCA involvement in conservation management and the known security of conservation tenure being placed on currently developable land.

**Table 5: Essential criteria for TEC 26a offset land (area, quality and % risk of loss values derived from DSEWPC 2012).**

Criteria	Requirement			
Landform/soils	Very shallow soils on limestone ridge			
Vegetation	<i>Melaleuca huegelii</i> – <i>Melaleuca systema</i> shrublands of limestone ridges inferred or confirmed as Floristic Community Type 26a			
Ownership	Private landholder		Crown	
Tenure	State, Freehold or Unallocated Crown Land (UCL) (not currently managed for conservation)		State agency or UCL (not currently managed for conservation)	
Zoning	Rural, industrial, or unzoned (no conservation zoning)		Parks and Recreation, Special Purpose	
Max. area (ha) (assuming 100% offset for this offset option)	5.1	5.5	7.0	7.4

Criteria	Requirement			
	Excellent	Very Good Excellent	– Excellent	Very good Excellent
Vegetation condition	Excellent	Very Good Excellent	– Excellent	Very good Excellent
<i>Current % risk of loss*</i>	25%	25%	15%	15%
<i>Future % risk of loss*</i>	5%	5%	5%	5%
<i>Current quality*</i>	8	7	8	7
<i>Future quality without offset*</i>	7	6	7	6
<i>Potential future quality*</i>	8	7	8	7

\* These criteria have been derived using the Commonwealth Offset Assessment Guide (DSEWPC 2012) with the 'time until ecological benefit' set at 1 year with confidence in predictions for % risk of loss and change in quality and set at 90% and 85% respectively.

#### 4.2.1 Desirable characteristics

The following are desired characteristics, in addition to the selection criteria, based on consideration of values to be considered for offsets as per EPA (2014):

- In proximity to the area of impact (i.e. in proximity of City of Wanneroo).
- Similar or better vegetation condition than area impacted.
- High perimeter to area ratio.
- Supports additional rare or otherwise significant species and threatened species or community compared other than TEC 26a.
- Close to or contiguous with an existing conservation area (e.g. Bush Forever).
- Likely to enhance ecological linkages.

#### 4.3 Objectives and intended outcomes

The objectives of this offset proposals are to:

1. Acquire or secure area of TEC 26a appropriately proportionate to the area of impact and transfer to conservation tenure.
2. Provide for conservation management of the area of TEC 26a to maintain its condition/quality.

The intended outcome is to increase the area of this community under conservation management and maintain the diversity and basic composition of native species and address threatening processes consistent with the Interim Recovery Plan (Luu and English 2005).

#### 4.4 Actions to be undertaken

The following actions are to be undertaken for implementation of this offset:

1. Desktop review of potential candidate sites meeting essential criteria.
2. Select candidate sites to undertake site assessment prioritising those that meet one or more of the desired characteristics.
3. Undertake site assessment to:
  - a. confirm presence and map area of TEC 26a
  - b. assess vegetation condition across site
  - c. identify other environmental values that the site supports

- d. identify existing threatening processes including weed infestation (map weeds), feral animal damage, likely frequency of fires, and uncontrolled access.
4. Determine in consultation with DBCA the final site to be used for offset.
5. Update Offset Strategy in consultation with DBCA and DWER.
6. Prepare and execute a Memorandum of Understanding (MOU) between PTA and DBCA in regards to the funding and delivery by DBCA of this offset.
7. Acquire or secure site.
8. Undertake upfront on ground conservation works, including:
  - a. rubbish removal
  - b. fencing
  - c. weed control
  - d. signage
  - e. fire control measures.
9. Make arrangements for transfer to conservation estate.
10. Undertake periodic conservation measures for maintenance of TEC quality over ten years including:
  - a. weed control
  - b. vegetation condition inspections.

#### 4.5 Success criteria

Table 6 indicates the success criteria for this offset proposal.

**Table 6: TEC 26a offset success criteria**

Objective	Success criteria
Acquire or secure area of TEC 26a appropriately proportionate to the area of impact and transfer to conservation tenure	Site meeting essential criteria (as per <b>Table 5</b> ) transferred to conservation estate
Provide for conservation management of the area of TEC 26a to maintain its condition/quality	Management regime implemented that will maintain condition/quality of area of TEC 26a over ten years

#### 4.6 Timelines and milestones

Key milestones and timing for implementation of this offset will be agreed with DBCA as part of the development of the MOU in regards to the funding and delivery of this offset.

#### 4.7 Monitoring to assess offset implementation

PTA will monitor the progress of the implementation of the management actions through its liaison with DBCA and reporting through the MOU to be developed. This would include reporting back on condition of TEC 26a vegetation in offset land.

#### 4.8 Reporting details and timing

PTA will provide an annual compliance assessment report to DWER regarding:

- The activities undertaken in the previous 12 months for this offset.
- The activities proposed in the next 12 months for this offset.
- A summary of compliance with the Final Offsets Strategy in regards to this offset.

- An evaluation of the results of site assessments and monitoring to identify progress on meeting the success criteria.

The MOU between DBCA and PTA will indicate the form and timing of corresponding reporting from DBCA on site works and monitoring. Monitoring would be supported for the first five years and only extended if monitoring indicates that success criteria have not or are unlikely to be met at ten years.

#### 4.9 Financial arrangements

PTA will fully fund the actions proposed under this offset proposal including the acquisition and/or securing of the offset land and the conservation management measures to maintain the condition of the vegetation.

#### 4.10 Risks and contingency measures

There are several key risks associated with not achieving the success criteria for which contingency measures would be enacted should they be realised (**Table 7**).

**Table 7: Key risks and contingency measures for TEC 26a offset**

Risk/Trigger	Potential contingency measures
Insufficient area of TEC 26a meeting essential criteria (as per <b>Table 5</b> ) able to be practicably acquired/ secured within required timeframe	<ul style="list-style-type: none"> <li>• If still shortfall, seek advice from DBCA in regards to potential to:                             <ul style="list-style-type: none"> <li>○ fund rehabilitation of degraded areas of TEC 26a in existing conservation areas (TEC 26a Offset 2 – Section 5)</li> <li>○ acquire areas in more degraded condition and fund rehabilitation (TEC 26a Offset 3 – Section 6)</li> <li>○ find areas of similar environmental value to acquire and/or undertake conservation measures (such as areas representative of other Floristic Community Type 26 sub-types).</li> </ul> </li> <li>• Implement TEC 26a Research offset (see Section 7) to reduce area required for direct offset.</li> </ul>
Condition/quality of area of TEC 26a degrades over time despite conservation measures to maintain	<ul style="list-style-type: none"> <li>• Investigate cause.</li> <li>• Restrict access to affected areas.</li> <li>• Investigate cause and extent of vegetation decline (disturbance, pest, weed, pathogen, climate).</li> <li>• Review vegetation management measures.</li> <li>• Implement control and remedial measures in consultation with regulators, including weed spraying, rabbit control, access management as required.</li> <li>• Monitor success of control and remedial measures.</li> </ul>

#### 4.11 Governance arrangements

Governance arrangements to be determined during preparation of MOU. Stakeholder consultation regarding this offset is to be undertaken.

## 5 TEC 26a offset 2 – Rehabilitation

### 5.1 Overview of offset

Monetary contribution for rehabilitation measures to be implemented in existing conservation land for purpose of improving condition (quality). The implementation of this offset will address threatening processes and increase the quality of an area of habitat in an area currently managed by DBCA or another responsible authority for purpose of conservation. The area to be rehabilitated is to be appropriate and proportionate to the quantum of impact (0.9 ha) such that there is a net environmental gain for TEC 26a arising from the offset in the long term. Ideally it would also be in proximity to the area of impact (i.e. Wanneroo area).

### 5.2 Criteria for site selection

**Table 8** indicates the key criteria that will be used for site selection for this offset proposal. An assessment against these criteria for suitability as an offset will be undertaken for each candidate site identified by desktop review. The criteria allow for a number of different scenarios based on the existing condition of the TEC (as a measure of quality), which do not affect the area required to be subject to the offset, which is 15.2 ha based on 100% of the TEC 26a offset being addressed by 'TEC 26a Offset 2 – Rehabilitation' (**Appendix B**). The areas involved with this offset would be decreased proportionally if other TEC 26a offsets are pursued (Sections 4, 6 and 7).

The associated calculations of % loss and % change in quality as per DSEWPC 2012 are indicated in the criteria table in italics. The time until ecological benefit has been set at 10 years based on a reasonable assumption of when benefit of rehabilitation efforts will be realised. There is a high degree of confidence in the predictions for % loss given the known security of existing conservation tenure, which does not alter under this offset proposal. A 70% confidence level has been given for the % change in quality as a result of rehabilitation, which represents a reasonable high degree of confidence for a revegetation project, in this case, justified based on DBCA or an equivalent responsible authority for conservation implementing the rehabilitation on its own land

**Table 8: Essential criteria for TEC 26a offset 2 land (area, quality and % risk of loss values derived from DSEWPC 2012).**

Criteria	Requirement		
Landform/soils	Very shallow soils on limestone ridge		
Vegetation	<i>Melaleuca huegelii</i> – <i>Melaleuca systema</i> shrublands of limestone ridges inferred or confirmed as Floristic Community Type 26a		
Ownership	Crown		
Tenure	Managed by DBCA or other responsible authority for purpose of conservation		
Zoning	Parks and Recreation, Conservation		
Max. area (ha) (assuming 100% offset for this offset option)	15.2	15.2	15.2
Vegetation condition	Good – Very good	Good	Degraded - Good
<i>Current % risk of loss*</i>	5%	5%	5%

Criteria	Requirement		
<i>Future % risk of loss*</i>	5%	5%	5%
<i>Current quality*</i>	6	5	4
<i>Future quality without offset*</i>	6	5	4
<i>Future quality with offset*</i>	7	6	5

\* These criteria have been derived using the Commonwealth Offset Assessment Guide (DSEWPC 2012) with the 'time until ecological benefit' set at 10 years with confidence in predictions for change in quality and % risk of loss set at 70% and 90% respectively.

### 5.2.1 Desirable characteristics

The following are desired characteristics, in addition to the selection criteria, based on consideration of values to be considered for offsets as per EPA (2014):

- In proximity to the area of impact (i.e. in proximity of City of Wanneroo).
- Vegetation condition good to degraded.
- High perimeter to area ratio.
- Supports additional rare or otherwise significant species and threatened species or community compared other than TEC 26a.
- Within an existing conservation area (eg Regional Park, Nature Reserve, National Park, Bush Forever).
- Likely to enhance ecological linkages.

### 5.3 Objectives and intended outcomes

The objectives of this offset proposals are to:

1. Rehabilitate area of TEC 26a in secure conservation tenure to improve its condition/quality.

The intended outcome is to increase the quality of an area of TEC 26a and increase the total area of the community under conservation management and maintain the diversity and basic composition of native species and address threatening processes consistent with the Interim Recovery Plan (Luu and English 2005).

### 5.4 Actions to be undertaken

The following actions are to be undertaken for implementation of this offset:

1. Consult with DBCA to determine the area of TEC 26a under existing conservation tenure and management to be subject to rehabilitation measures.
2. Update Offset Strategy in consultation with DBCA.
3. Prepare and execute a MOU between PTA and DBCA, or other responsible authority, in regards to the funding and delivery by DBCA of this offset.
4. Prepare rehabilitation plan for site.
5. Undertake rehabilitation works for improve TEC quality including:
  - a. targeted weed removal
  - b. feral animal control (if required)
  - c. selective seedling planting to restore structure, cover, composition and species diversity characteristic of TEC 26a
  - d. monitor annually up to five years (extending further if desired quality not achieved).

## 5.5 Success criteria

**Table 9** indicates the success criteria for this offset proposal.

**Table 9: TEC 26a offset 2 success criteria**

Objective	Success criteria
Provide for rehabilitation of TEC 26a to increase its condition/quality	Rehabilitation regime implemented that will increase condition/quality of area of TEC 26a is increased and maintained at this level by ten years

## 5.6 Timelines and milestones

Key milestones and timing for implementation of this offset will be agreed with DBCA or other responsible authority as part of the development of the MOU in regards to the funding and delivery of this offset.

## 5.7 Monitoring to assess offset implementation

PTA will monitor the progress of the implementation of the management actions through its liaison with DBCA and reporting through the MOU to be developed. This would include reporting back on condition of TEC 26a vegetation in offset land.

At least five years of monitoring of the rehabilitation would be provided for under the MOU with ability to extend this should monitoring indicate that success criteria have not or will not be met.

## 5.8 Reporting details and timing

PTA will provide an annual compliance assessment report to DWER regarding:

- The activities undertaken in the previous 12 months for this offset.
- The activities proposed in the next 12 months for this offset.
- A summary of compliance with the Final Offsets Strategy in regards to this offset.
- An evaluation of the results of site assessments and monitoring to identify progress on meeting the success criteria.

The MOU between DBCA, or other responsible authority, and PTA will indicate the form and timing of corresponding reporting on site works and monitoring. Monitoring would be supported for the first five years and only extended if monitoring indicates that success criteria have not or are unlikely to be met at ten years.

## 5.9 Financial arrangements

PTA will fully fund the actions proposed under this offset proposal including the acquisition and/or securing of the offset land and the rehabilitation and conservation management measures to increase the condition of the vegetation.

## 5.10 Risks and contingency measures

There are several key risks associated with not achieving the success criteria for which contingency measures would be enacted should they be realised (**Table 10**).

**Table 10: Key risks and contingency measures for TEC 26a offset 2**

Risk/Trigger	Potential contingency measures
<p>Insufficient area of TEC 26a meeting essential criteria (as per <b>Table 5</b>) able to be practicably acquired/secured within required timeframe</p>	<ul style="list-style-type: none"> <li>• If still shortfall, seek advice from DBCA in regards to potential to:                             <ul style="list-style-type: none"> <li>○ acquire areas in more degraded condition and fund rehabilitation (TEC 26a Offset 3 – Section 6)</li> <li>○ find areas of similar environmental value to acquire and/or undertake conservation measures (such as areas representative of other Floristic Community Type 26 sub-types).</li> </ul> </li> <li>• Implement TEC 26a Research offset (see Section 7) to reduce area required for direct offset.</li> </ul>
<p>Condition/quality of area of TEC 26a not improved or degrades over time despite rehabilitation and conservation measures</p>	<ul style="list-style-type: none"> <li>• Investigate cause.</li> <li>• Restrict access to affected areas.</li> <li>• Investigate cause and extent of vegetation decline (fire disturbance, pest, weed, pathogen, climate).</li> <li>• Review vegetation management measures.</li> <li>• Implement control and remedial measures in consultation with regulators, including supplementary planting, weed spraying, rabbit control, access management as required.</li> <li>• Monitor success of control and remedial measures.</li> </ul>

**5.11 Governance arrangements**

Governance arrangements to be determined during preparation of MOU. Stakeholder consultation regarding this offset is to be undertaken.

## 6 TEC 26a offset 3 – Acquisition and rehabilitation

### 6.1 Overview of offset

Acquisition of land containing area of TEC for transfer to conservation estate with a corresponding monetary contribution for rehabilitation measures to be implemented for purpose of improving condition (quality) and averting the risk of loss over time. The implementation of this offset will address threatening processes and provide for secure management arrangements to be in place that will provide for long term conservation. The area to be acquired and rehabilitated is to be appropriate and proportionate to the quantum of impact (0.9 ha) such that there is a net environmental gain for TEC 26a arising from the offset in the long term. Ideally it would also be in proximity to the area of impact (i.e. Wanneroo area).

### 6.2 Criteria for site selection

**Table 11** indicates the key criteria that will be used for site selection for this offset proposal. An assessment against these criteria for suitability as an offset will be undertaken for each candidate site identified by desktop review. The criteria allow for a number of different scenarios in regards to the current tenure and the existing condition of the TEC (as a measure of quality), which influence the area required to be subject to the offset. In this case, the maximum area to be subject to this offset is between 4.7 and 5.1 ha based on 100% of the TEC 26a offset being addressed by 'TEC 26a Offset 3 – Acquisition and rehabilitation' (**Appendix B**). The areas involved with this offset would be decreased proportionally if other TEC 26a offsets are pursued (Sections 4, 5 and 7).

The associated calculations of % loss and % change in quality as per DSEWPC 2012 are indicated in the criteria table in italics. There is a high degree of confidence in the predictions for % loss given the known security of conservation tenure being placed on currently developable land. A 70% confidence level has been given for the % change in quality as a result of acquisition and outcome of rehabilitation, which represents a reasonable high degree of confidence for a revegetation project, in this case, justified based on DBCA implementing the rehabilitation.

**Table 11: Essential criteria for TEC 26a offset 3 land (area, quality and %risk of loss values derived from DSEWPC 2012).**

Criteria	Requirement	
Landform/soils	Very shallow soils on limestone ridge	
Vegetation	<i>Melaleuca huegelii</i> – <i>Melaleuca systema</i> shrublands of limestone ridges inferred or confirmed as Floristic Community Type 26a	
Ownership	Private landholder	Crown
Tenure	State, Freehold or Unallocated Crown Land (UCL) (not currently managed for conservation)	State agency or UCL (not currently managed for conservation)
Zoning	Rural, industrial, or unzoned (no conservation zoning)	Parks and Recreation, Special Purpose

Criteria	Requirement			
Max. area (ha) (assuming 100% offset for this offset option)	4.7	5.0	5.8	6.1
Vegetation condition	Good – Very good	Good	Good – Very good	Good
Current % risk of loss*	25%	25%	15%	15%
Future % risk of loss*	5%	5%	5%	5%
Current quality*	6	5	6	5
Future quality without offset*	5	4	5	4
Future quality with offset*	7	6	7	6

\* These criteria have been derived using the Commonwealth Offset Assessment Guide (DSEWPC 2012) with the ‘time until ecological benefit’ set at 10 years with confidence in predictions for % risk of loss and change in quality set at 90% and 70% respectively.

### 6.2.1 Desirable characteristics

The following are desired characteristics, in addition to the selection criteria, based on consideration of values to be considered for offsets as per EPA (2014):

- In proximity to the area of impact (i.e. in proximity of City of Wanneroo).
- Vegetation condition good to degraded.
- High perimeter to area ratio.
- Supports additional rare or otherwise significant species and threatened species or community compared other than TEC 26a.
- Close to or contiguous with an existing conservation area (e.g. Bush Forever).
- Likely to enhance ecological linkages.

### 6.3 Objectives and intended outcomes

The objectives of this offset proposals are to:

1. Acquire or secure area of TEC 26a appropriately proportionate to the area of impact and transfer to conservation tenure.
2. Rehabilitate area of TEC 26a to improve its condition/quality.

The intended outcome is to increase the quality of an area of TEC 26a and increase the total area of the community under conservation management and maintain the diversity and basic composition of native species and address threatening processes consistent with the Interim Recovery Plan (Luu and English 2005).

### 6.4 Actions to be undertaken

The following actions are to be undertaken for implementation of this offset:

1. Desktop review of potential candidate sites meeting essential criteria.
2. Select candidate sites to undertake site assessment prioritising those that meet one or more of the desired characteristics.
3. Undertake site assessment to:

- a. confirm presence and map area of TEC 26a
- b. assess vegetation condition across site
- c. identify other environmental values that the site supports
- d. identify existing threatening processes including weed infestation (map weeds), feral animal damage, likely frequency of fires, and uncontrolled access.
4. Determine in consultation with DBCA the final site to be used for offset.
5. Update Offset Strategy in consultation with DBCA and DWER.
6. Prepare and execute a MOU between PTA and DBCA in regards to the funding and delivery by DBCA of this offset.
7. Acquire or secure site.
8. Prepare rehabilitation plan for site.
9. Undertake upfront on ground conservation works, including:
  - a. rubbish removal
  - b. fencing
  - c. weed control
  - d. signage
  - e. fire control measures.
10. Make arrangements for transfer to conservation estate.
11. Undertake rehabilitation works for improve TEC quality including:
  - a. targeted weed removal
  - b. feral animal control
  - c. selective seedling planting to restore structure, cover, composition and species diversity characteristic of TEC 26a
  - d. monitor annually up to five years (extending only if desired quality not achieved).
12. Beyond five years undertake conservation works to maintain quality at desired level by ten years including:
  - a. weed control
  - b. vegetation condition inspections.

## 6.5 Success criteria

**Table 12** indicates the success criteria for this offset proposal.

**Table 12: TEC 26a offset 2 success criteria**

Objective	Success criteria
Acquire or secure area of TEC 26a appropriately proportionate to the area of impact and transfer to conservation tenure	Site meeting essential criteria (as per <b>Table 5</b> ) transferred to conservation estate
Provide for rehabilitation and conservation management of the area of TEC 26a to increase and then maintain its condition/quality	Condition/quality of area of TEC 26a is increased and maintained at this level by ten years

## 6.6 Timelines and milestones

Key milestones and timing for implementation of this offset will be agreed with DBCA as part of the development of the MOU in regards to the funding and delivery of this offset.

## 6.7 Monitoring to assess offset implementation

PTA will monitor the progress of the implementation of the management actions through its liaison with DBCA and reporting through the MOU to be developed. This would include reporting back on condition of TEC 26a vegetation in offset land.

## 6.8 Reporting details and timing

PTA will provide an annual compliance assessment report to DWER regarding:

- The activities undertaken in the previous 12 months for this offset.
- The activities proposed in the next 12 months for this offset.
- A summary of compliance with the Final Offsets Strategy in regards to this offset.
- An evaluation of the results of site assessments and monitoring to identify progress on meeting the success criteria.

The MOU between DBCA and PTA will indicate the form and timing of corresponding reporting from DBCA on site works and monitoring. Monitoring would be supported for the first five years and only extended if monitoring indicates that success criteria have not or are unlikely to be met at ten years.

## 6.9 Financial arrangements

PTA will fully fund the actions proposed under this offset proposal including the acquisition and/or securing of the offset land and the rehabilitation and conservation management measures to increase the condition of the vegetation.

## 6.10 Risks and contingency measures

There are several key risks associated with not achieving the success criteria for which contingency measures would be enacted should they be realised (**Table 13**).

**Table 13: Key risks and contingency measures for TEC 26a offset 3**

Risk/Trigger	Potential contingency measures
Insufficient area of TEC 26a meeting essential criteria (as per <b>Table 5</b> ) able to be practicably acquired/secured within required timeframe	<ul style="list-style-type: none"> <li>• If still shortfall, seek advice from DBCA in regards to potential to:               <ul style="list-style-type: none"> <li>◦ find areas of similar environmental value to acquire and/or undertake conservation measures (such as areas representative of other Floristic Community Type 26 sub-types).</li> </ul> </li> <li>• Implement TEC 26a Research offset (see Section 7) to reduce area required for direct offset.</li> </ul>
Condition/quality of area of TEC 26a not improved or degrades over time despite rehabilitation and conservation measures	<ul style="list-style-type: none"> <li>• Investigate cause.</li> <li>• Restrict access to affected areas.</li> <li>• Investigate cause and extent of vegetation decline (fire disturbance, pest, weed, pathogen, climate).</li> <li>• Review vegetation management measures.</li> <li>• Implement control and remedial measures in consultation with regulators, including supplementary planting, weed spraying, rabbit control, access management as required.</li> <li>• Monitor success of control and remedial measures.</li> </ul>

### **6.11 Governance arrangements**

Governance arrangements to be determined during preparation of MOU. Stakeholder consultation regarding this offset is to be undertaken.



## 7 TEC 26a offset 4 - Research

### 7.1 Overview of offset

Research to increase the understanding of characteristics of or threats to TEC 26a to assist inform future management decisions. This offset would be implemented to supplement the direct offset/s should they not 100% mitigate impacts (Sections 4, 6 and 5).

### 7.2 Key characteristics/criteria

This offset will involve a research program that examines a research priority for the TEC, such as those identified in the Interim Recovery Plan (Luu and English 2005) or otherwise identified by DBCA:

- The impact of weeds on TEC 26a.
- The role of disturbance in regeneration of TEC 26a.
- The recovery of TEC 26a following recent fires and burns.
- The development of an appropriate monitoring system.
- Important biological processes in the community, eg pollination biology, germination requirements, longevity and time taken for significant plant taxa in the community to reach maturity; or
- Updated research priorities since preparation of Interim Recovery Plan.

### 7.3 Objectives and intended outcomes

The objective of this offset proposal is to increase the understanding of one of more characteristics of or one of more threats to TEC 26a to assist inform future management decisions.

### 7.4 Actions to be undertaken

The following actions are to be undertaken for implementation of this offset:

1. Liaise with DBCA in regards to current research priorities.
2. Determine subject of research program and delivery method to be funded by PTA.
3. Prepare MOU between PTA and DBCA.
4. Secure research officer/student/post-doctorate to coordinate implement program.
5. Prepare research program plan and implement.
6. Report on findings of research.

### 7.5 Success criteria

Table 14 indicates the success criteria for this offset proposal.

**Table 14: TEC 26a research program offset success criteria**

Objective	Success criteria
To increase the understanding of characteristics of or threats to TEC 26a to assist inform future management decisions	Research report delivered following two year research program that addresses a research priority for the recovery of TEC 26a.

## 7.6 Timelines and milestones

Key milestones and timing for implementation of this offset will be agreed with DBCA as part of the development of the MOU in regards to the funding and delivery of this offset.

## 7.7 Reporting details and timing

PTA will provide an annual compliance assessment report to DWER regarding:

- The activities undertaken in the previous 12 months for this offset.
- The activities proposed in the next 12 months for this offset.
- A summary of compliance with the Final Offsets Strategy in regards to this offset.
- An evaluation of the outcomes of the research program to identify progress on meeting the success criteria.

The MOU between DBCA and PTA will indicate the timing of reporting on outcomes of the research which would be an interim report at end of year 1 and a final report at end of year 2.

## 7.8 Financial arrangements

PTA will fully fund the proposed research program under this offset.

## 7.9 Risks and contingency measures

Key risks associated with not achieving the success criteria have contingency measures triggered should they be realised (**Table 15**).

**Table 15: Key risks and contingency measures for TEC 26a research offset**

Risk/Trigger	Potential contingency measures
Research reports not delivered within specified period	<ul style="list-style-type: none"> <li>• Investigate reason through communication lines indicated in MOU.</li> <li>• Provide support where appropriate.</li> </ul>
Research report does not adequately address research priority or provide useful information to inform future management	<ul style="list-style-type: none"> <li>• Investigate reason through communication lines indicated in MOU.</li> <li>• Consult with DWER and DBCA on need for further work.</li> <li>• Seek agreement with DBCA or academic institution undertaking research on supplementary work to provide useful outcomes.</li> <li>• Reach agreement on how this supplementary work would be supported/funded.</li> </ul>

## 7.10 Governance arrangements

Governance arrangements to be determined during preparation of MOU. Stakeholder consultation regarding this offset is to be undertaken.

## 8 Carnaby's Black Cockatoo offset 1 – Acquisition of foraging habitat

### 8.1 Overview of offset

Acquisition of land/s containing suitable area/s of Carnaby's Black Cockatoo foraging habitat for transfer to conservation estate for purpose of averting the risk of loss over time. The implementation of this offset will address threatening processes and provide for secure management arrangements to be in place that will provide for long term conservation. The area to be acquired is to be appropriate and proportionate to the quantum of impact (36.7 ha) such that there is a net environmental gain for the cockatoo species arising from the offset in the long term. It is to contain foraging habitat of adequate quality and to be in northern Swan Coastal Plain region (as is the proposal) such that it is appropriate location and correlates with the nature of the area impacted.

### 8.2 Criteria for site selection

**Table 16** indicates the key criteria that will be used for site selection for this offset proposal. An assessment against these criteria for suitability as an offset will be undertaken for each candidate site identified by desktop review. The criteria allow for a number of different scenarios in regards to the current tenure and the average existing quality of the habitat acquired, which influence the area required to be subject to the offset. In this case, the maximum area to be subject to this offset is 295 ha assuming an average quality of 8 and based on 100% of the Carnaby's Black Cockatoo offset being addressed by 'Carnaby's Black Cockatoo offset 1 – Acquisition of foraging habitat' (**Appendix B**).

The associated calculations of % loss and % change in quality as per DSEWPC 2012 are indicated in the criteria table in italics. There is a high degree of confidence in the predictions for % loss and change in quality given the known security of conservation tenure being placed on currently developable land and current threats likely to unmanaged rural land.

**Table 16: Essential criteria for Carnaby's Black Cockatoo offset 1 (area, quality and %risk of loss values derived from DSEWPC 2012).**

Criteria	Requirement
Landform/soils	Sandy soils on Northern Swan Coastal Plain
Vegetation	Woodland or heathland dominated by flora species used by Carnaby's Black Cockatoo for food (i.e. <i>Banksia</i> , Jarrah, Marri)
Ownership	Private landholder
Tenure	State, Freehold or Unallocated Crown Land (UCL) (not currently managed for conservation)
Zoning	Rural, industrial, or unzoned (no conservation zoning)
Max. area (ha) (assuming 100% offset for this offset option)	295
Habitat quality	8
<i>Current % risk of loss*</i>	<i>15%</i>
<i>Future % risk of loss*</i>	<i>5%</i>

Criteria	Requirement
<i>Current quality*</i>	8
<i>Future quality without offset*</i>	7
<i>Future quality with offset*</i>	8

\* These criteria have been derived using the Commonwealth Offset Assessment Guide (DSEWPC 2012) with the 'time until ecological benefit' set at 10 years with confidence in predictions for change in quality and % risk of loss both set at 90% and 90%.

### 8.2.1 Objectives and intended outcome

The objective of the offset for impact to foraging habitat is to prevent future loss of an area of high quality foraging habitat for Carnaby's Black Cockatoo. The intended outcome is to maintain or increase the quality of an area of habitat and increase the total area of the community under conservation management and address threatening processes consistent with the recovery plan for the species.

### 8.2.2 Role of previous offsets

The clearing of native vegetation within the majority of the development envelope has been considered under the EPBC Act through formal assessment and approval of several developments referred to the Commonwealth under the EPBC Act.

The Commonwealth has approved and set conditions for each of these developments. The PTA has committed to adhering to all relevant management plans and/or conditions applied to the developments under the EPBC Act, when conducting the rail related works within the referred areas. Offsets such as land acquisition have either been provided, or are pending provision, to counterbalance the residual impacts for each of these separate actions on Carnaby's Black Cockatoo (**Table 17**). The Commonwealth has signed off on the satisfaction of offset conditions for all approvals apart from Urban Quarter at the time of preparation of this preliminary scoping document.

There is 1.16 ha of potential Carnaby's Black Cockatoo foraging habitat and three potential breeding trees that were recorded by GHD (2018a) outside of the extent of the previous EPBC Act approvals (**Figure 1**). It is noted that 0.14 ha of the mapped foraging habitat is comprised of cleared access tracks. This impact was therefore not specifically addressed by the offsets under the approvals listed in **Table 17**.

### 8.2.3 Finalisation

The offsets provided under these previous approvals is expected to largely address the requirements for offsets for Carnaby's Black Cockatoo for YRE Part 1. In finalising the Offsets Strategy, PTA will demonstrate the extent to which impacts to foraging and breeding habitat has already been or is in the process of being mitigated. For residual impacts not adequately addressed by previous offsets (if any), the Final Offsets Strategy will detail a new offset proposal.

The Final Offsets Strategy will detail the actions to be taken to provide for any new offset for Carnaby's Black Cockatoo as well as indicators of success criteria, timing, milestones achieved/to be achieved, any related monitoring, reporting, contingencies, and financial and governance arrangements.

**Table 17: Carnaby's Black Cockatoo impacts of YRE Part 1 mitigated by offsets provided under previous EPBC Act approvals**

Proponent (from Table 1) & parcel (Figure 1)	Impact requiring offset	YRE Part 1 component	Offset
LWP (Lot 1001 & 1002 Marmion Avenue)	157 ha of Carnaby's Black Cockatoo foraging habitat	0.84 ha (2.3%)	\$614,111 to acquire 936 ha of Carnaby's Black Cockatoo foraging habitat  5.52 ha Black Cockatoo habitat retained in Public Open Space
		10 potential breeding trees	
Lend Lease (Draft Alkimos City Centre Activity Centre & Central Alkimos)	257 ha of potential Carnaby's Black Cockatoo foraging habitat	26.83 ha (10.4%) of potential Carnaby's Black Cockatoo foraging habitat	Preparation and implementation of a Parks and Recreation Reserve Management Plan (PRRMP) provides for retention of 66.64 ha of Carnaby's Black Cockatoo in Alkimos Parks and Recreation Reserve, conservation management measures for maintenance and revegetation habitat. It also provides for 12 artificial nest boxes or nesting hollows to be installed  1,138 ha of Carnaby's Black Cockatoo habitat and \$50,000 provided to Kaarakin Black Cockatoo Conservation Centre (Condition #4 of 2015/7561)
	87 potential habitat (breeding) trees	8 potential breeding trees	
Peet (North Alkimos)	83.6 ha of potential Carnaby's Black Cockatoo foraging habitat	0.54 ha (1.6%) of potential Carnaby's Black Cockatoo foraging habitat	\$350,000 provided to DBCA to acquire an offset property  1.41 ha Black Cockatoo habitat retained in Public Open Space  0.63 ha of Public Open Space to be rehabilitated to provide Black Cockatoo habitat
Urban Quarter (Draft Western Precinct)	92.25 ha of potential Carnaby's Black Cockatoo foraging habitat	4.02 ha of potential Carnaby's Black Cockatoo foraging habitat	A minimum of 8 ha of Black Cockatoo habitat retained in Public Open Space  Prepare, submit and implement a Vegetation and Conservation Area Management Plan for approval prior to commencement of the Action  Acquire and manage 380 ha of Black Cockatoo habitat in Boonaring and 117 ha in Cataby.

Proponent (from Table 1) & parcel (Figure 1)	Impact requiring offset	YRE Part 1 component	Offset
Eglinton Estates (Eglinton)	115 ha of potential Carnaby's Black Cockatoo foraging habitat	16.21 ha (14.1%) of potential Carnaby's Black Cockatoo foraging habitat	7.92 ha Black Cockatoo habitat retained in Public Open Space Revegetation of at least 12.7 ha of native vegetation (including primary feeding plants for Carnaby's Black Cockatoo) in the Yellagonga Regional Park 850 ha of good quality foraging habitat for Carnaby's Black Cockatoo or another approved parcel of land
LandCorp (North Eglinton)	176.7ha of potential Carnaby's Black Cockatoo foraging habitat	2.81 ha (1.6%) of potential Carnaby's Black Cockatoo foraging habitat	1,157 ha of good quality foraging habitat for Carnaby's Black Cockatoo habitat or another approved parcel of land (Condition #13 2011/6021))
<b>TOTAL PREVIOUSLY OFFSET</b>		<b>51.26 ha of potential Carnaby's Black Cockatoo foraging habitat</b> <b>18 potential breeding trees</b>	

## 9 Carnaby's Black Cockatoo offset 2 – Habitat trees

An offset for the significant residual impact of loss of 21 Carnaby's Black Cockatoo habitat trees is required. The offsets provided under the previous EPBC Act approvals is expected to largely address the requirements for offsets for Carnaby's Black Cockatoo habitat trees for YRE Part 1. Offsets provided under previous EPBC Act approvals include that to mitigate impacts to 18 habitat trees (**Table 17**). In finalising the Offsets Strategy, PTA will demonstrate the extent to which impacts to habitat trees has already been or is in the process of being mitigated. For residual impacts not adequately addressed by previous offsets (if any), the Final Offsets Strategy will detail a new offset proposal for habitat trees.

The objective for the offsets for habitat trees is to prevent future loss of existing habitat trees or establish new artificial hollows with the intended outcome for there to maintain or increase the extent of breeding habitat in the long term.

The Final Offsets Strategy will detail actions to be taken to provide for any new offset for impacts to habitat trees as well as indicators of success criteria, timing, milestones achieved/to be achieved, any related monitoring, reporting, contingencies, and financial and governance arrangements.

## 10 Stakeholder consultation

PTA has commenced consultation with the DBCA and existing EPBC Act approval holders for the developments that includes the Part 1 YRE development envelope in regards to the outcomes of previous offsets provided and the delivery of new offsets potentially required. This has included confirmation that the DBCA has identified preferred sites for acquisition for the purpose of conservation of TEC26a. These TEC26a sites are to be subject to updated inspections to confirm area and condition. The consultation with DBCA has also focussed on financial arrangements for acquisition and funding of conservation works.



## 11 Implementation, review and revision

This plan will be finalised following issue of condition of approval for YRE Part 1, which is likely to require the preparation or finalisation of an Offsets Strategy. The Strategy once approved by the DWER will continue to be implemented until directed otherwise by the CEO of the Department. PTA will review and revise this plan as and when directed, which may be specified by conditions.



# References

Department of Biodiversity, Conservation and Attractions (DBCA) (2018). Threatened and Priority Ecological Community Database Search for [search area] accessed on the [date of search]. Prepared by the Species and Communities Branch for Public Transport Authority for the Yanchep Rail Extension Project.

Department of Biodiversity, Conservation and Attractions (DBCA) (2017). Priority Ecological Communities for Western Australia. Version 27, 30 June 2017. Species and Communities Branch, Department of Biodiversity, Conservation and Attractions.

Department of the Environment and Energy (DEE) (2018). Species Profile and Threats Database Profile *Calyptorhynchus latirostris* — Carnaby's Cockatoo, Short-billed Black Cockatoo.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) (2012). Environmental Offsets Assessment Guide, Commonwealth of Australia Canberra.

Eco Logical Australia (ELA) (2018). Yanchep Rail Extension: Part 1 – Butler to Eglinton Environmental Review Document. Prepared for Public Transport Authority.

GHD (2018a). Yanchep Rail Extension Biological Assessment. Prepared for Public Transport Authority. Rev 1. 16 January 2018.

GHD (2018b). Public Transport Authority Yanchep Rail Extension Biological Factors - Additional Information. Prepared for Public Transport Authority. Perth, June 2018.

Gibson, N., Keighery, B., Keighery, G., Burbidge, A. & Lyons, M. (1994). A Floristic Survey of the Southern Swan Coastal Plain. Department of Conservation and Land Management, Perth.

Government of Western Australia (2014). WA Environmental Offsets Guidelines. Published August 2014.

Luu, R. and English, V. (2005). *Melaleuca huegelii* – *Melaleuca systema* shrublands of limestone ridges (Swan Coastal Plain Community type 26a - Gibson et al. 1994) Interim Recovery Plan 2004-2009. Perth WA.

Environmental Protection Authority (EPA) (2014). WA Environmental Offsets Guidelines. August 2014, Government of Western Australia Perth WA.

RPS (2018). Environmental Impact Assessment Yanchep Rail Extension: Part 1 – Butler Station to Eglinton Station. Prepared for Public Transport Authority, Perth 12 February 2018.

# Appendix A WA Environmental Offsets Template

**Yanchep Rail Extension: Part 1 – Butler to Eglinton Preliminary Offset Strategy**

Existing environment/ Impact	Mitigation			Significant Residual Impact	Offset Calculation Methodology				
	Avoid and minimise	Rehabilitation Type	Likely Rehab Success		Type	Risk	Likely offset success	Time Lag	Offset Quantification
<p>Clearing of 1.12 ha in Good to Excellent Condition of Threatened Ecological Community 26a (<i>Melaleuca huegelli</i> – <i>M. systena</i> shrublands on limestone ridges)</p>	<p>Development envelope (Part 1) was modified during the design phase to avoid the direct impacts to Bush Forever Site No. 130, Bush Forever No. 288 and nearby parks and reserves potentially containing this TEC.</p> <p>Disturbance areas for the Proposal have been selected to coincide with proposed future urban development cells or roads either reserved by the MRS, or as detailed within approved and draft LSPs, to avoid direct impacts to vegetation which may have otherwise been able to be retained within future POS reservations.</p> <p>The Development Envelope avoids fragmentation where possible to the north-south regional ecological linkage and reduced impacts on the east-west parks and recreation reservation in Alkimos.</p> <p>A Construction Environmental Management Plan will be implemented to ensure clearing is restricted to the approved Development Envelope to avoid overclearing into and to minimise other indirect impacts to adjacent remnant vegetation.</p>	<p>The entire development envelope will be cleared for the proposal, revegetation will occur to stabilise embankments.</p>	<p>Not applicable.</p>	<p><b>Extent</b> 1.12 ha if Threatened Ecological Community 26a <b>Quality</b> Excellent condition (0.60 ha), Very Good condition (0.47 ha), Good condition (0.02 ha), Degraded condition (0.04 ha) <b>Conservation Significance</b> High conservation significance as the vegetation comprises part of a TEC community listed as Endangered under the <i>Wildlife Conservation Act 1950</i> <b>Land Tenure</b> State, Freehold or Unallocated Crown Land (UCL) (not currently managed for conservation) <b>Time Scale</b> Permanent <b>According to the agreed significance framework, residual impact is considered to be significant because as cumulative impacts to this TEC is expected to be already at a critical level</b></p>	<p><b>Option 1: acquisition</b></p> <p>Acquisition and/or securing of land that has no existing conservation tenure and transfer to the conservation estate</p>	<p><b>Land acquisition:</b> Low – land to be ceded to DBCA or other responsible authority.</p>	<p>This is not applicable for land acquisition, see risk comments.</p>	<p>No time lag</p>	<p>Total offset varies between <b>7.1 - 7.4 ha</b> of land acquisition and protection. Area to offset is dependent on vegetation condition and tenure.  The area of land acquisition was determined using the DoEE offset calculator.</p>
					<p><b>Option 2: on-ground management</b></p> <p>Undertaking of revegetation works in degraded areas of TEC 26a in secured conservation land already under DBCA management.</p>	<p>Low - land on DBCA managed land</p>	<p><b>Can the values be defined and measured?</b> Yes - revegetation values can be measured through vegetation condition inspections from on ground works during: • weed management • dieback management • rubbish removal, fencing, signage, fire control works. A site assessment will be undertaken for baseline information including: a. presence and mapped extent of TEC 26a b. vegetation condition across site c. identification of other environmental values that the site supports d. identification of existing threatening processes including weed infestation (map weeds), feral animal damage, likely frequency of fires, and uncontrolled access. <b>Operator experience/Evidence?</b> • DBCA will manage the land within their ownership <b>What is the type of vegetation being revegetated?</b> Vegetation types/species associated with TEC 26a. <b>Is there evidence the environmental values can be re-created (evidence of demonstrated success)?</b> DBCA is responsible for biodiversity conservation in Western Australia and routinely carries out management and restoration activities.</p>	<p>Within 10 years to achieve no net loss.</p>	<p>Total offset is <b>15.2 ha</b> for revegetation.  The area of land acquisition/revegetation was determined using the DoEE offset calculator.</p>
					<p><b>Option 3: acquisition and on-ground management</b></p> <p>Acquisition of poorer quality areas of TEC 26a, and transfer to conservation estate, and undertaking of revegetation works to improve its quality</p>	<p><b>Land acquisition:</b> Low – land to be ceded to DBCA.  <b>Revegetation/on-ground management:</b> Possible sites on DBCA managed land (low risk) and others on freehold land (higher risk)</p>	<p><b>Can the values be defined and measured?</b> Yes - vegetation values can be measured through vegetation condition inspections from on ground works during: • weed management • dieback management • rubbish removal, fencing, signage, fire control works. A site assessment will be undertaken for baseline information including: a. presence and mapped extent of TEC 26a b. vegetation condition across site c. identification of other environmental values that the site supports d. identification of existing threatening processes including weed infestation (map weeds), feral animal damage, likely frequency of fires, and uncontrolled access. <b>Operator experience/Evidence?</b> • Varied - DBCA may undertake some of the offset, local land care groups may also be engaged under DBCA stewardship • PTA will also consider funding of research or monitoring that will go towards informing the conservation threatened communities, particularly if a sufficient area of TEC 26a is not able to be acquired. • DBCA will manage the land within their ownership <b>What is the type of vegetation being revegetated?</b> Vegetation types/species associated with TEC 26a. <b>Is there evidence the environmental values can be re-created (evidence of demonstrated success)?</b> PTA has demonstrated experience from their infrastructure projects that shows contributions towards conservation and mitigating project impacts. DBCA is responsible for biodiversity conservation in Western Australia and routinely carries out management and restoration activities.</p>	<p><b>Acquisition of land:</b> No time lag - secures land upon agreement.  <b>Revegetation of land:</b> Within 10 years to achieve no net loss.</p>	<p>Total offset varies between <b>4.7-6.1 ha</b> of land acquisition and protection.  Area to offset is dependent on vegetation condition and tenure.  The area of land acquisition/revegetation was determined using the DoEE offset calculator.</p>
					<p><b>Option 4: Research</b></p> <p>PTA will also consider the funding of research or monitoring that will go towards informing the conservation of this TEC, particularly if a sufficient area of TEC 26a is not able to be acquired.</p>	<p>Low risk - to be used as a contingency if Options 1 to 3 cannot be used to achieve 100% of the offset requirement.</p>	<p>Offset to be used as a contingency if Options 1 to 3 cannot be used to achieve 100% of the offset requirement.</p>	<p>Not applicable.</p>	<p>Quantum of funding to be determined in consultation with relevant agencies.</p>
<p>Clearing of 52.42 ha of habitat for Carnaby Cockatoo (<i>Calyptorhynchus latirostris</i>) and 21 potential breeding trees considered critical habitat for Carnaby's Cockatoo</p>	<p>The Development Envelope has been amended during the design phase to reduce impacts to Carnaby habitat through the removal of the original reservation and creation of new western rail reservation.</p> <p>Modification of the development footprint within Lot 200 Alkimos Drive "Parks and Recreation" reservation (the Alkimos PRR) to avoid impacting Carnaby's Black Cockatoo foraging habitat retained as part of EPBC 2015/7561 decision</p> <p>Development envelope (Part 1) was modified to avoid the direct impacts to Bush Forever Site No. 130, Bush Forever No. 288 and other nearby parks and reserves containing Carnaby Cockatoo habitat.</p> <p>Construction and access areas have been selected to coincide with proposed future urban development cells or roads either reserved by the MRS (Figure 2), or as detailed within approved and draft Local Structure Plan, to intentionally avoid direct impacts to native vegetation which may have otherwise been able to be retained within future Public Open Space (POS) reservations.</p> <p>A Construction Environmental Management Plan will</p>	<p>The entire development envelope will be cleared for the proposal and/or is required for permanent infrastructure. Revegetation will occur to stabilise embankments.</p>	<p>Not applicable.</p>	<p><b>Extent</b> 1.16 ha of foraging habitat (of which 0.14 comprising of existing cleared access tracks) <b>Quality</b> 3 potential breeding trees <b>Breeding habitat:</b> - 21 potential breeding trees <b>Foraging habitat:</b> - High and medium value: 1.02 ha - Low: 0.14 ha <b>Conservation Significance</b> High conservation significance as Carnaby's Cockatoo is listed as Endangered under the <i>Wildlife Conservation Act 1950</i> <b>Land Tenure</b> State, Freehold or Unallocated Crown Land (UCL) (not currently managed for conservation) <b>Time Scale</b> Permanent <b>According to the agreed significance framework, residual impact is considered to be significant because as cumulatively with surrounding projects for development there is a total of 52.42 ha and 21 potential breeding trees expected to be cleared in the</b></p>	<p><b>Land acquisition</b></p> <p>Acquisition of foraging habitat comprising woodland or heathland dominated by flora species used by Carnaby's Cockatoo for food (ie Banksia, Jarrah, Marri)</p>	<p>Low risk - to be used as a contingency if Options 1 to 3 cannot be used to achieve 100% of the offset requirement.</p>	<p><b>Can the values be defined and measured?</b> Yes - values can be measured. <b>Operator experience/Evidence?</b> DBCA will manage the land. <b>What is the type of vegetation being revegetated?</b> None proposed. <b>Is there evidence the environmental values can be re-created (evidence of demonstrated success)?</b> PTA has demonstrated experience from their infrastructure projects that shows contributions towards conservation and mitigating project impacts. DBCA is responsible for biodiversity conservation in Western Australia and routinely carries out management and restoration activities.</p>	<p>Acquisition of land: No time lag - secures land upon agreement.</p>	<p>Total offset is <b>295 ha</b> of land acquisition and protection.  The area of land acquisition was determined using the DoEE offset calculator.</p>

# Appendix B EPBC Act Offsets Assessment Guide









# Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*  
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Carnaby's Black Cockatoo
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	1.2%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
<i>Ecological communities</i>						
Area of community	Yes	Clearing of 1.12 ha of TEC 26a within the Development Envelope	Area	1.12	Hectares	Biological survey reports. Total clearing of 1.12 ha of TEC 26a comprises of 0.60ha in Excellent condition, 0.47ha in Very Good-Good condition, 0.02 ha in Good condition and 0.04ha in Degraded condition.
			Quality	8	Scale 0-10	
			Total quantum of impact	0.90	Adjusted hectares	
<i>Threatened species habitat</i>						
Area of habitat	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species</i>						
<b>Protected matter attributes</b>						
<b>Number of features</b> e.g. Nest hollows, habitat trees						
<b>Condition of habitat</b> Change in habitat condition, but no change in extent						
<b>Birth rate</b> e.g. Change in nest success						
<b>Mortality rate</b> e.g. Change in number of road kills per year						
<b>Number of individuals</b> e.g. Individual plants/animals						

Offset calculator																				
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source	
<i>Ecological Communities</i>																				
Area of community	Yes	0.90	Adjusted hectares	Monetary contribution for revegetation measures to be implemented in existing conservation land for purpose of improving condition (quality).	Risk-related time horizon (max. 20 years)	20	Start area (hectares)	15.2	Risk of loss (% without offset)	5%	Risk of loss (% with offset)	5%	0.00	90%	0.00	0.00	100.13%	Yes		
					Time until ecological benefit	10	Start quality (scale of 0-10)	6	Future area without offset (adjusted hectares)	14.4	Future area with offset (adjusted hectares)	14.4	0.00	70%	0.70	0.62				
<i>Threatened species habitat</i>																				
Area of habitat	Yes		Adjusted hectares		Time over which loss is averted (max. 20 years)		Start area (hectares)		Risk of loss (% without offset)		Risk of loss (% with offset)		0.00		0.00	0.00	#DIV/0!	#DIV/0!		
					Time until ecological benefit		Start quality (scale of 0-10)		Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0	0.00	0.00	0.00					
<i>Threatened species</i>																				
<b>Protected matter attributes</b>																				
<b>Number of features</b> e.g. Nest hollows, habitat trees																				
<b>Condition of habitat</b> Change in habitat condition, but no change in extent																				
<b>Birth rate</b> e.g. Change in nest success																				
<b>Mortality rate</b> e.g. Change in number of road kills per year																				
<b>Number of individuals</b> e.g. Individual plants/animals																				





# Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*  
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	Carnaby's Black Cockatoo
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	1.2%

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator						
Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
<i>Ecological communities</i>						
Area of community	Yes	Clearing of 1.12 ha of TEC 26a within the Development Envelope	Area	1.12	Hectares	Quality is unknown as land offset has not been decided
			Quality	8	Scale 0-10	
			Total quantum of impact	0.90	Adjusted hectares	
<i>Threatened species habitat</i>						
Area of habitat	No		Area			
			Quality			
			Total quantum of impact	0.00		
<i>Threatened species</i>						
<b>Threatened species</b>						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g. Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator																				
Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)	Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost (\$ total)	Information source	
<i>Ecological Communities</i>																				
Area of community	Yes	0.90	Adjusted hectares	Acquisition of land containing area of TEC for transfer to conservation estate with corresponding monetary contribution for revegetation measures to be implemented	Risk-related time horizon (max. 20 years)	20	Start area (hectares)	4.7	Risk of loss (% without offset)	25%	Risk of loss (% with offset)	5%	0.94	90%	0.85	0.67	100.95%	Yes		
					Time until ecological benefit	10	Start quality (scale of 0-10)	6	Future area without offset (adjusted hectares)	3.5	Future area with offset (adjusted hectares)	4.5	0.94	90%	0.85	0.67				
									Future quality without offset (scale of 0-10)	5	Future quality with offset (scale of 0-10)	7	2.00	70%	1.40	1.24				
<i>Threatened species habitat</i>																				
Area of habitat	Yes		Adjusted hectares		Time over which loss is averted (max. 20 years)		Start area (hectares)		Risk of loss (% without offset)		Risk of loss (% with offset)		0.00		0.00	0.00	#DIV/0!	#DIV/0!		
					Time until ecological benefit		Start quality (scale of 0-10)		Future area without offset (adjusted hectares)	0.0	Future area with offset (adjusted hectares)	0.0	0.00		0.00	0.00				
									Future quality without offset (scale of 0-10)		Future quality with offset (scale of 0-10)		0.00		0.00	0.00				
<i>Threatened species</i>																				
<b>Threatened species</b>																				
Birth rate e.g. Change in nest success	No															#DIV/0!	#DIV/0!			
Mortality rate e.g. Change in number of road kills per year	No															#DIV/0!	#DIV/0!			
Number of individuals e.g. Individual plants/animals	No															#DIV/0!	#DIV/0!			









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