We're working for Western Australia.

Anketell Road Upgrade Offset Strategy

Environmental Protection Act 1986

D25#42989
March 2025

Contents

Executive Summary 5
1. Introduction 6
1.1 Proposal Background 6
1.2 Environmental Approvals 6
1.3 Purpose of this Strategy 6
2. Residual Impacts 8
3. Offset Rationale 9
3.1 Habitat Quality Scoring (TEC and PEC) 9
3.2 Black Cockatoo Habitat Quality 11
3.3 Bush Forever 11
3.4 Class A Reserve 11
4. Summary of Offset Package 12
5. Gabbadah Offset Site 15
5.1 Site Description 15
5.2 Offset Security 16
5.3 Environmental Values 16
5.4 Net Gain 16
5.5 Management Actions 16
5.6 Targets 18
5.7 Offset Calculator Values 18
6. Lake Mealup Offset Site 20
6.1 Site Description 20
6.2 Offset Security 21
6.3 Environmental Values 21
6.4 Net Gain 21
6.5 Management Actions 21
6.6 Targets 23
6.7 Offset Calculator Values 24
7. St Ronans Offset Site 26
7.1 Site Description 26
7.2 Offset Security 26
7.3 Environmental Values 26
7.4 Net Gain 27
7.5 Management Actions 27

7.6 Targets 28
7.7 Offset Calculator Values 29
8. The Spectacles Offset Site 31
8.1 Site Description 31
8.2 Offset Security 31
8.3 Environmental Values 31
8.4 Net Gain 32
8.5 Management Actions 32
8.6 Targets 33
8.7 Offset Calculator Values 33
9. Adaptive Management and Corrective Actions 35
10. Consideration of WA Offsets Policy 36
11. Reporting and Accountability 37
11.1 Roles and Responsibilities 37
11.2 Reporting 37
12. References 39
13. Appendices 41
Appendix A – Gabbadah Offset Calculators 42
Appendix B – Lake Mealup Offset Calculators 43
Appendix C – St Ronans Offset Calculators 44
Appendix D – The Spectacles Offset Calculators 45

Figure 1 Anketell Road Upgrade (Leath Road to Kwinana Freeway) 7
Figure 2 Location of Offset Properties in Relation to the Proposal 14
Figure 3 Gabbadah Offset Site 19
Figure 4 Lake Mealup Revegetation and Restoration Offset Site 25
Figure 5 St Ronans Offset Site 30
Figure 6 The Spectacles Offset Site 34

Table 1 - Summary of Residual Impacts 8
Table 2 - Quality score using Keighery vegetation condition scale 10
Table 3 - Tuart Woodlands quality score using Approved Conservation Advice condition scale 10
Table 4 - Summary of Offset Package Anketell Road Upgrade 13
Table 5 - Schedule of Monitoring and Management Activities and Targets for Gabbadah Offset Site 18
Table 6 - Offset Calculator Values Gabbadah Offset Site 18
Table 7 - Schedule of Monitoring and Management Activities and Targets for Lake Mealup Offset Site 23
Table 8 - Offset Calculator Values for Lake Mealup Offset Site 24
Table 9 - Schedule of Monitoring and Management Activities and Targets for St Ronans Offset Site 28
Table 10 - Offset Calculator Values for St Ronans Offset Site 29
Table 11 - Schedule of Management Activities and Targets for The Spectacles Offset Site 33
Table 12 - Offset Calculator Values for The Spectacles Offset Site 33
Table 13 - Consideration of the WA Environmental Offset Policy Principles 36
Table 14 - Indicative Format of Annual Monitoring Report for each Offset Site 38

Executive Summary

Main Roads Western Australia (Main Roads) is proposing to upgrade Anketell Road to an Expressway Standard between Leath Road, Kwinana and Kwinana Freeway, Anketell (the Proposal). The Proposal also includes the upgrade of a short section of Anketell Road east of the Kwinana Freeway (to Treeby Road) to connect the Proposal to the existing Anketell Road.

The purpose of this Offset Strategy is to outline the offsets proposed for the upgrade of Anketell Road, in accordance with the Western Australian Environmental Offsets Guidelines (Government of Western Australia 2011), to mitigate the significant residual impacts of the Proposal remaining after the application of the mitigation hierarchy.

The significant residual impacts resulting from the Proposal include:

- 14.56 ha Banksia Woodlands of the Swan Coastal Plain (SCP) Priority 3 (P3) Priority Ecological Community (PEC)
- 40.99 ha Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the SCP P3 PEC
- 57.12 ha SCP 24 Northern Spearwood Shrublands and Woodlands P3 PEC
- 56.98 ha of Carnaby's Black-Cockatoo foraging habitat
- 38.34 ha of Forest Red-tailed Black-Cockatoo foraging habitat
- 4.00 ha of regionally significant vegetation within Bush Forever Sites 268, 269 and 270
- 0.55 ha of vegetated associated with Native Vegetation Class A Reserve.

Main Roads is proposing an offset package that includes four offset sites to offset the significant residual impact of the Proposal. Below is a brief summary of the offset sites and their potential offset values:

- Gabbadah
    - Acquisition and restoration of 8.10 ha of Banksia Woodland of the SCP P3 PEC
    - Acquisition and restoration of 5.01 ha of Tuart Woodlands and Forests of the SCP P3 PEC
    - Acquisition and restoration of 110.1 ha of SCP 24 – Northern Spearwood Shrublands and Woodlands P3 PEC
    - Acquisition and restoration of 87.7 ha of Carnaby's Black-Cockatoo non-breeding foraging habitat.
- Lake Mealup
    - Acquisition and restoration of 29.7 ha of Banksia Woodlands P3 PEC, 40 ha of Tuart Woodlands P3 PEC and 45 ha of Carnaby's and Forest Red-tailed Black-Cockatoo non-breeding foraging habitat.
    - Acquisition and revegetation of 5.2 ha of Tuart Woodlands P3 PEC, 16.7 ha of Carnaby's Black-Cockatoo and 16.7 ha of Forest Red-tailed Black-Cockatoo non-breeding foraging habitat.
- St Ronans
    - Acquisition and revegetation of 6 ha of Carnaby's Black-Cockatoo and Forest Red-tailed Black-Cockatoo non-breeding foraging habitat.
- The Spectacles
    - Management of 6 ha of Bush Forever and 1.65 ha of Class A Reserve.

The offset package proposed in this Offset Strategy has been developed in accordance with the Western Australian Offset Metric and the WA Offset Policy and will offset at least 100% of the significant residual impact of proposed upgrade of Anketell Road.

1. Introduction

1.1 Proposal Background

Main Roads Western Australia (Main Roads) is proposing to upgrade Anketell Road to an Expressway Standard between Leath Road, Kwinana and the Kwinana Freeway, Anketell within the City of Kwinana (the Proposal). The Proposal also includes the upgrade of a short section of Anketell Road east of the Kwinana Freeway (to Treeby Road) to connect the Proposal to the existing Anketell Road (**Figure 1**). The Proposal lies approximately 30 km south of the Perth Central Business District.

The Proposal includes:

- Approximately 7.5 km of urban expressway standard, dual carriageway
- Grade separated interchanges
- Drainage a Principal Shared Path and other associated infrastructure.

1.2 Environmental Approvals

The Proposal was referred to the Environmental Protection Authority (EPA) under the State *Environmental Protection Act 1986* (EP Act) on 29 February 2024 and is being assessed under a level of assessment of 'Referral Information with additional information and public review' (Assessment Number 2417, APP-0025116). It was also referred to the Department of Climate Change, Energy, Environment and Water (DCCEEW) under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 28 March 2024 (Assessment EPBC 2024/09841).

This Offset Strategy has been requested by the EPA as part of the additional information required for the assessment of the Proposal.

1.3 Purpose of this Strategy

The purpose of this Offset Strategy is to outline the offsets proposed for the Anketell Road Upgrade, in accordance with the Western Australian Environmental Offsets Guidelines (Government of Western Australia (GoWA 2011), to mitigate the significant residual impacts of the Proposal remaining after the application of the mitigation hierarchy.

Main Roads has had regard to the EPA's *Public Advice Considering Environmental Offsets at a Regional Scale* (EPA 2024) in developing this Offset Strategy.

Main Roads has consulted with the Department of Biodiversity, Conservation and Attractions (DBCA) regarding offsets that relate to significant residual impacts to matters relevant to the *Conservation and Land Management Act 1984* and the *Biodiversity Conservation Act 2016*.

Figure 1 - Anketell Road Upgrade (Leath Road to Kwinana Freeway)

FOCUSED VISION consulting

MRWA24012 17 December 2024

2. Residual Impacts

Table 1 provides a summary of the significant residual impacts for the Anketell Road Upgrade that Main Roads is proposing to offset.

Table 1 - Summary of Residual Impacts

Environmental Value	Conservation Significance of Environmental Value	Significant Impact	Habitat Quality Score (weighted average/10)
Banksia Woodland of the Swan Coastal Plain Priority Ecological Community (PEC)	Priority 3 (P3) PEC	14.56 ha	4.5
Tuart Woodlands and Forests of the Swan Coastal Plan PEC	P3 PEC	40.99 ha	3.3
SCP 24 – Northern Spearwood Shrublands and Woodlands PEC	P3 PEC	57.12 ha	3.5
Carnaby's Black-Cockatoo non-breeding foraging habitat	Threatened Species – Endangered	56.98 ha	4.8
Forest Red-tailed Black-Cockatoo non-breeding foraging habitat	Threatened Species – Vulnerable	38.34 ha	4.8
Class A Conservation Reserve	Class A Reserve	0.55 ha	'Very High'
Bush Forever Sites (268, 269 and 270)	Bush Forever	4.00 ha regionally significant vegetation	'High'

3. Offset Rationale

Main Roads has developed this offset package to counterbalance the significant residual impacts of the proposed Anketell Road Upgrade. The determination of offsets, either through land acquisition and restoration or revegetation/rehabilitation, or funding of research, is increasingly challenging for proponents. This section provides some rationale for the selection of the offsets proposed in this document, noting of the challenges often faced by proponents to identify offset sites in close proximity to their proposals in a highly developed area within the Swan Coastal Plain (SCP).

The principles of the WA Offsets Policy (GoWA 2011) allow for a flexible approach to offsets. This includes allowing for a like-for-similar approach to offsetting to acknowledge the practical challenges in finding exact replacements for specific environmental values. It also considers that offsets should focus on achieving long-term strategic outcomes.

WA Offsets Policy (GoWA 2011) states that there should be minimal duplication of between State and Commonwealth requirements for offsets. Where a significant residual impact under the EP Act is also a Matter of National Environmental Significance under the EPBC Act, Main Roads intends to apply the same offset under both acts.

Below is a brief description of how input scores used in the offset calculator for both impact sites and offset sites have been developed. Offsets will be assessed using the WA Offsets Metric (DWER 2021).

3.1 Habitat Quality Scoring (TEC and PEC)

Habitat quality scoring for TECs and PECs is linked to the Keighery (1994) vegetation condition scale. The Keighery (1994) vegetation condition scale is a commonly used and well understood methodology for assessing habitat quality for almost all flora and vegetation surveys in the south-west of Western Australia. Each Keighery condition class is assigned a value (**Table 2**) out of ten for input into the offset calculator.

Habitat quality scoring for Tuart Woodlands and Forests of the SCP PEC are linked to the vegetation ratings of the Approved Conservation Advice (Threatened Species Scientific Community (TSSC) 2018). Each TSSC condition class is assigned a value (**Table 3**) out of ten for input into the offset calculator.

In order to obtain a single quality value per site, the condition value was averaged using a weighted average. Under this approach, the area present of each vegetation condition class is multiplied by the quality score, and these are then summed and divided by the total area of the offset site to obtain the weighted average. This approach was applied for calculating condition values at both the impact site and offset sites.

Table 2 - Quality score using Keighery vegetation condition scale

Keighery (1994) Scale Vegetation Condition	Impact/Offset Quality Score
Pristine	10
Excellent-Pristine	9
Excellent	8
Very Good-Excellent	7
Very Good	6
Good-Very Good	5
Good	4
Degraded-Good	3
Degraded	2
Completely Degraded-Degraded	1
Completely Degraded	0

Table 3 - Tuart Woodlands quality score using Approved Conservation Advice condition scale

Approved Conservation Advice (TSSC 2019) condition	Impact/Offset Quality Score
Very high (≥80% of all understorey cover is native)	10
High-Very high	8
High (≥60% of all understorey cover is native)	6
High-Moderate	5
Moderate (≥50% of all understorey cover is native)	4
Poor-Moderate	3
Poor (<50% of all understorey cover is native)	2
Completely degraded	0

3.2 Black Cockatoo Habitat Quality

Black-Cockatoo habitat at the impact and offset sites was assessed using the Bamford Consulting Ecologists (2020) methodology (BCE - Black-Cockatoos (bamford.id.au)). The Bamford methodology assigns a habitat quality score out of ten for each parcel of habitat. In order to obtain a single quality value for the impact or offset site, the Bamford habitat quality score was averaged across the impact or offset site using a weighted average, as described in **Section 3.1**.

3.3 Bush Forever

State Planning Policy 2.8 – *Bushland policy for the Perth Metropolitan Region* (SPP 2.8) (State of Western Australia 2010) provides a policy and implementation framework to ensure bushland protection and management is properly addressed in the Perth Metropolitan Area. SPP 2.8 prioritises the protection and management of significant bushland, whilst not preventing development where the development is in line with SPP 2.8 and other planning considerations. Bush Forever is a part of the conservation system that aims to establish and maintain a comprehensive, adequate and representative system.

SPP 2.8 provides offset criteria where impacts on Bush Forever are permitted. The offset criteria are dependent on the conservation significance of the vegetation. Main Roads has conservatively rated the impacts on Bush Forever within the Proposal as 'High' and applied the 1.5:1 offset ratio (, as the vegetation condition within the Bush Forever areas potentially impacted is largely (69%) in 'Good' condition or poorer.

3.4 Class A Reserve

For a conservation area, the conservation significance score does not apply and an offset ratio is used (DWER 2022). Main Roads has conservatively rated the impacts on Class A Reserve within the Proposal as 'Very High' and applied a 3:1 offset ratio, as 95% of the Class A Reserve area impacted is in 'Very Good' or 'Very Good-Excellent' condition.

4. Summary of Offset Package

Four offset sites are proposed for the Anketell Road Upgrade offset package, and these are summarised below in **Table 4**. This Offset Strategy has determined the starting and predicted future quality score for each of these offsets for each environmental value, referencing surveys to quantify the residual impacts and predicted offset gains, and ongoing measurable management.

The location of each offset site in relation to the Proposal is shown in **Figure 2**.

Where feasible, a buffer has been incorporated into the spatial data for each offset area, making the mapped area larger than the required offset specified in **Table 4**. This adjustment accounts for access tracks, potential challenges in successful restoration of revegetation, and other unforeseen factors that could lead to non-compliance. Each site is described in more detail in the sections that follow.

Table 4 - Summary of Offset Package Anketell Road Upgrade

Offset	Offset Type	Distance from Anketell Road Upgrade	Offset Property Area (ha)	Banksia Woodland PEC (14.56 ha x Quality 4.5)	Tuart Woodlands PEC (40.99 ha x Quality 3.3)	SCP 24 PEC (57.12 ha x Quality 3.5)	CBC Habitat (56.98 ha x Quality 4.8)	FRTBC Habitat (38.34 ha x Quality 3.2)	Bush Forever (4 ha @ 1.5:1)	Class A Reserve (0.55 ha @ 3:1)
				ha (%)	ha (%)	ha (%)	ha (%)	ha (%)	ha (%)	ha (%)
Gabbadah	Restoration	107 km north	404.44	8.1 (22.4%)	5.01 (6.7%)	110.1 (100%)	87.7 (40.4%)			
Lake Mealup	Restoration	51 km south south-west	85.16	29.7 (77.8%)	40.0 (73.2%)		45.0 (20.7%)	45 (33.2%)		
	Revegetation				5.2 (20.2%)		16.7 (28.6%)	16.7 (49.3%)		
St Ronans	Revegetation	84 km north-east	120.75				6.0 (10.3%)	6.0 (17.7%)		
The Spectacles	Management	Adjacent	331.12						6.0 (100%)	1.65 (100%)
Total				**37.8 (100.2%)**	**50.21 (100.1%)**	**110.1 (100%)**	**155.4 (100%)**	**67.7 (100.2%)**	**6.0 (100%)**	**1.65 (100%)**

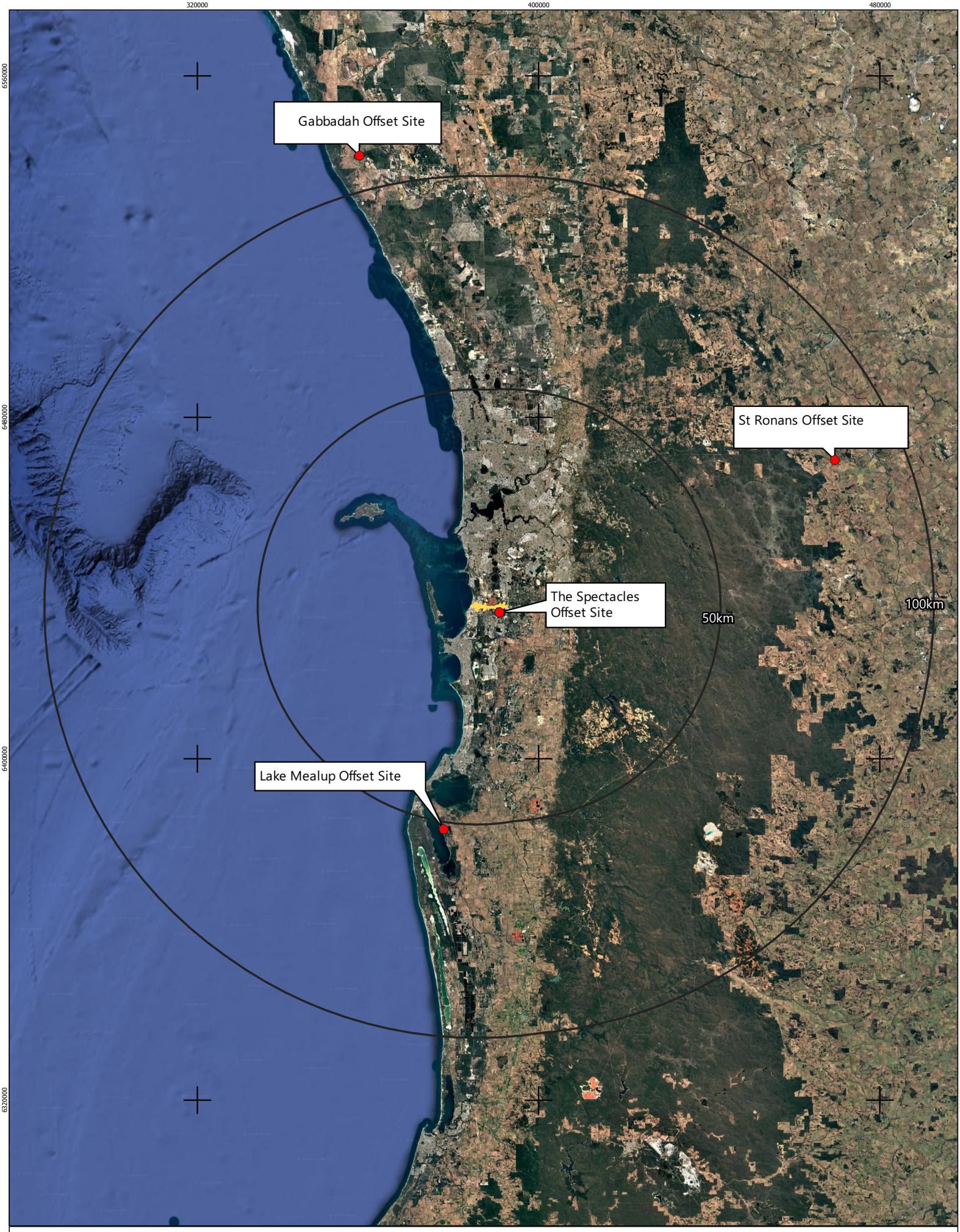


Figure 2 - Location of Offset Properties in Relation to the Proposal

FOCUSED VISION consulting

MRWA24012 17 December 2024

5. Gabbadah Offset Site

5.1 Site Description

Lot 1 Tamarisk Drive, Gabbadah, encompasses a total area of 404.44 ha and is located approximately 5 km east of Seabird, within the Shire of Gingin (**Figure 3**). A portion of the property will be used as an environmental offset for Banksia Woodlands of the SCP PEC, Tuart Woodlands and Forests of the SCP PEC and SCP 24 PEC. The offset site lies approximately 107 km north of the Proposal and occurs within the same Interim Biogeographical Regionalisation for Australia (IBRA) Region, i.e. Swan Coastal Plain.

The offset site is a low-lying coastal plain, mainly covered with Banksia and Tuart woodlands on sandy soils. Swampy areas are dominated by paperbark, and outwash plains by *Casuarina obesa*. *Melaleuca* shrublands and *C. obesa*-Marri woodlands are located extensively in the south, while Jarrah woodland dominates duri-crusted Mesozoic sediments to the east (Mitchell *et al.* 2002).

One pre-European Beard (1990) vegetation association is mapped within the Gabbadah offset site. Vegetation Association 949 has 56.42% of its pre-European extent remaining (Government of Western Australia 2019a) and is described as a Low woodland or Open low woodland of *Acacia* spp., *Banksia* spp., *Casuarina* spp., *Agonis flexuosa*, *Callitris* spp., *Allocasuarina* spp. and *Eucalyptus loxophleba*.

One Heddle *et al.* (1980) vegetation complex is mapped as occurring within the offset site, the Cottesloe Complex - North. This complex is described as predominantly low open forest and low woodland of *Banksia attenuata* (Slender Banksia) - *Banksia menziesii* (Firewood Banksia) - *Eucalyptus todtiana* (Pricklybark); closed heath on the Limestone outcrops. A total of 37.81% of the pre-European extent of the Cottesloe Complex - North remains on the Swan Coastal Plain, which is not considered poorly represented (Government of Western Australia 2019b).

The Gnangara – Moore River State Forest (a Class A Reserve) abuts the eastern boundary of Lot 1 Tamarisk Drive.

A vegetation assessment conducted in September 2024 identified the presence of three P3 PECs (Banksia Woodland of the SCP, Tuart Woodland and Forests of the SCP and SCP 24 – Northern Spearwood Shrublands and Woodlands). Overall, the vegetation within the offset site is in 'Very Good' condition, with poorer quality vegetation occurring adjacent to areas subject to previous disturbance (PGV Environmental 2024).

The offset site is located within the known range of Carnaby's Black-Cockatoo (*Zanda latirostris*), which extends as far north as Kalbarri (DAWE 2022). Over 100 confirmed DBCA records of the species occur within 10 km of the offset site. No confirmed breeding or roosting sites occur within the offset site. The buffer of one confirmed breeding site occurs approximately 5.5 km south-east of the offset, with numerous roosting sites also occurring within 10 km of the site. Vegetation representative of the Banksia Woodland of the Swan Coastal Plain PEC provides suitable foraging habitat for Carnaby's Black-Cockatoo.

The Gabbadah offset site is zoned 'Rural uncoded' in the Shire of Gingin – Local Planning Strategy (Shire of Gingin 2012) and 'General Rural' in the Shire of Gingin Local Planning Scheme No. 9 (DPLH 2024).

5.2 Offset Security

Main Roads is in the process of acquiring Lot 1 Tamarisk Drive. The vegetated portion of the property containing the offset site will be transferred to and managed by DBCA. Main Roads will fund the acquisition and management for 20 years by DBCA as an environmental offset. The property will become part of DBCA's conservation estate and protected in perpetuity.

Main Roads and DBCA will develop a Memorandum of Understanding (MoU) to finalise the land management agreement, including funding and actions required by both parties. The MoU will be developed and finalised by the end of 2026.

5.3 Environmental Values

The existing environmental values within the offset site pertaining to this Offset Strategy are:

- 8.1 ha of Banksia Woodlands of the SCP P3 PEC[1]
- 5.01 ha of Tuart Woodlands and Forests of the SCP P3 PEC
- 110.1 ha of SCP 24 P3 PEC
- 87.7 ha of vegetation suitable for restoration as Carnaby's Black-Cockatoo habitat.

5.4 Net Gain

The net gain from the implementation of this offset will be:

- Preventing decline of vegetation condition across the site from 'Very Good' condition (6) to 'Good-Very Good' condition (5)
- Enhancing vegetation condition across the site from 'Very Good' condition (6) to 'Very Good-Excellent' condition (7)
- Restoration of 87.7 ha of Carnaby's Black-Cockatoo habitat from quality score '6' to '7'.

5.5 Management Actions

Main Roads proposes to undertake the following restoration activities in conjunction with DBCA within the offset site.

5.5.1 Management Plan

- Main Roads, in consultation with the DBCA, will develop a management plan for the offset site that incorporates the actions and activities listed below
- Main Roads will fund the implementation of the management plan within the offset site.

5.5.2 Fencing

- Install fencing to restrict and control unauthorised access, and protect existing native vegetation, e.g. from illegal dumping to reduce the potential spread of weeds
- Specification of fences will be determined prior to installation and will depend on the size, location and topography of the offset site.

[1] A biological survey will be conducted in spring 2025 to confirm the presence of Banksia Woodlands of the SCP PEC.

5.5.3 Pest Animal Control

- Carry out pest animal control within the offset site
- Pest management will be carried out using best practices in accordance with Department of Primary Industry and Resource Development (DPIRD) advice and governed by the *Biosecurity and Agricultural Management Act 2007* (BAM Act).

5.5.4 Weed Control

- Develop and implement a weed control program, including monitoring
- Weed control will continue annually throughout the first five years of implementation of the Offset Strategy, after which, the frequency will be reduced to that required based on observations during monitoring inspections of impacts on vegetation condition recovery.

5.5.5 Fire Management

- Develop a fire management plan as part of the offset site management plan and implement within the offset site for the duration of this Strategy.

5.5.6 Phytophthora Dieback Management

- Develop a dieback management plan and implement this plan within the offset site for the duration of this Strategy
- The dieback management plan may include measures such as: frequency of dieback monitoring, requirement for hygiene stations, signage, Phosphite treatment or limestone sheeting of particular tracks.

5.5.7 Surveys and Monitoring

- Conduct biological surveys for flora and fauna to establish current baseline vegetation condition and confirm any unconfirmed vegetation values present
- Conduct vegetation monitoring at regular intervals throughout the offset duration to gauge progress towards achievement of vegetation condition classes specified in **Section 5.4**.

5.6 Targets

Monitoring, management activities and targets for the offset site are outlined in **Table 5**.

Table 5 - Schedule of Monitoring and Management Activities and Targets for Gabbadah Offset Site

Action/Aspect	Description of Methodology	Timing	Target
Offset Security	Offset site will be owned and managed by DBCA. MoU between Main Roads and DBCA	MoU complete by end of 2026	MoU complete by end of 2026
Develop and implement site Restoration Management Plan (RMP)	In consultation with DBCA, develop RMP to improve existing vegetation values and undertake restoration within the offset site	Complete RMP by end of 2026 Planting to commence in 2027	RMP developed by the end 2026 Planting to commence in 2027
Develop and implement offset site management plan	In consultation with DBCA, develop a management plan to protect and enhance the site offset values	Complete by end of 2026	Complete by end of 2026
Management of: Banksia Woodlands of the SCP PEC Tuart Woodlands and Forests of the SCP PEC SCP 24 PEC Carnaby's Black-Cockatoo Foraging Habitat	Implement management plan Undertake monitoring of vegetation condition	Implement management plan for 20 years from approval of this Strategy, with monitoring to be conducted every five years commencing 2026	Improve to achieve, then maintain, overall vegetation condition of 'Very Good - Excellent' (7) or better Improve Carnaby's Black-Cockatoo habitat from quality score '6' to '7'

5.7 Offset Calculator Values

Offset calculators for the Gabbadah offset site are provided in **Appendix A** and the values summarised in **Table 6**.

Table 6 - Offset Calculator Values Gabbadah Offset Site

Environmental Value	Offset Size (ha)	Start Quality	Future Quality without Offset	Future Quality with Offset	Offset Value (%)
Banksia Woodland of the SCP PEC	8.10	6	5	7	22.4
Tuart Woodland and Forest of the SCP PEC	5.01	6	5	7	6.7
SCP 24 PEC	110.1	6	5	7	100.0
CBC foraging habitat	87.7	6	6	7	40.4

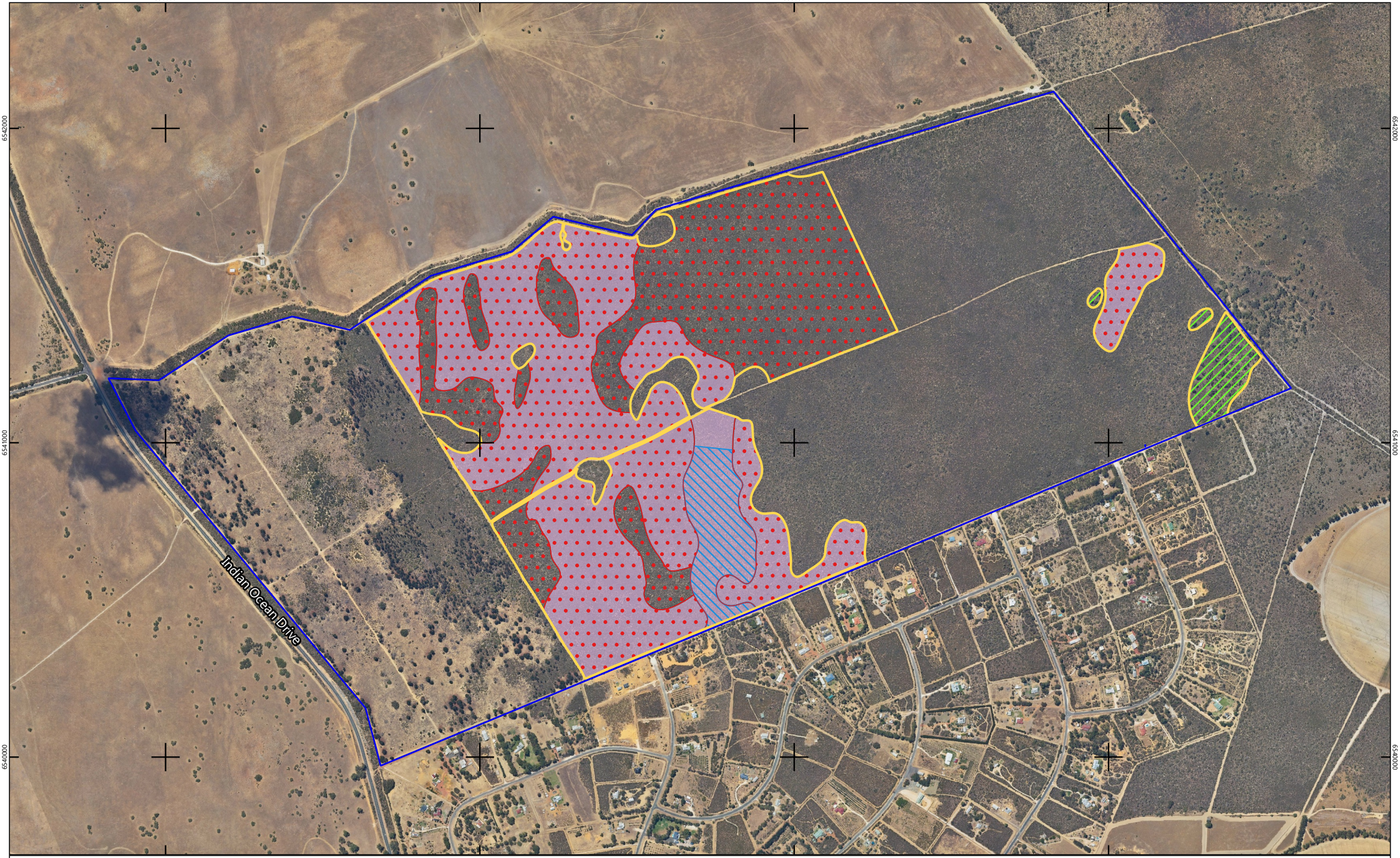


Figure 3 - Gabbadah Offset Site

FOCUSED VISION consulting

MRWA24012 06 January 2024

6. Lake Mealup Offset Site

6.1 Site Description

The 'Lake Mealup' offset site encompasses revegetation and restoration within Lot 277 Lake Mealup Road North, Birchmont, Shire of Murray (**Figure 4**). It occurs on the eastern shore of the Peel Inlet, which is part of the Peel-Yalgorup Ramsar System, and is adjacent to the McLarty Nature Reserve (R24739) and Mealup Point Nature Reserve (R2738), both Class A Reserves for the conservation of flora and fauna. The offset site is located approximately 50 km south of the Proposal and occurs within the same IBRA Region, i.e. Swan Coastal Plain. The Lake Mealup offset site is zoned part (48.1%) 'Rural' and part (51.9%) 'Regional Open Space' under the Peel Regional Scheme.

Main Roads is proposing to restore 45ha and revegetate 16.7 ha of the site as an offset for Banksia Woodland of the SCP PEC, Tuart Woodland and Forests of the SCP PEC, Carnaby's Black-Cockatoo and Forest Red-tailed Black-Cockatoo. Restoration is the process of returning degraded ecosystems to an improved condition and will occur in areas that contain existing vegetation. Revegetation is the process of establishing vegetation in an area that has been cleared and as such, will occur in areas devoid of native vegetation. Within the property, 29.7 ha of existing disturbed Banksia Woodlands, 40 ha of disturbed Tuart Woodlands and 45 ha of disturbed Carnaby's and Forest Red-tailed Black-Cockatoos foraging habitat will be restored. An additional 16.7 ha, will be revegetated as part of the environmental offset, comprising of 5.2 ha of Tuart Woodlands, 16.7 ha of Black-Cockatoo habitat.

Three Beard (1990) pre-European vegetation associations (126, 968 and 998) are mapped as occurring within the offset site. Vegetation association 126 is described as Bare areas; freshwater lakes, vegetation association 968 is described as Medium woodlands; Jarrah, Marri and Wandoo, and vegetation association 998 is described as Medium woodlands; Tuart. All three vegetation associations have more than 30% of their pre-European extent remaining (Government of Western Australia 2019a).

One Heddle *et al.* (1980) vegetation complex is mapped as occurring within the offset site, the Cottesloe Complex – Central and South. The Cottesloe Complex – Central and South, supports a mosaic of woodland of Tuart and open forest of Tuart - Jarrah - Marri and closed heath on the Limestone outcrops. The Cottesloe Complex – Central and South has 32.16% of its pre-European extent remaining (Government of Western Australia 2019b).

DBCA's Threatened and Priority Ecological Community database identifies the occurrence or predicted occurrence of three P3 PECs, or their buffers within the Lake Mealup offset site. They are as follows:

- Coastal Saltmarsh – Subtropical and Temperate Coastal Saltmarsh
- Tuart Woodlands – Tuart (*Eucalyptus gomphocephala*) woodlands and forest of the SCP (predicted occurrence)
- SCP 25 – Southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands.

The offset site is within the known range for both Carnaby's and Forest Red-tailed Black-Cockatoos (DAWE 2022). No known Black-Cockatoo breeding or roosting sites or their buffers occur within the offset site. Numerous confirmed roost sites occur on the western side of the Peel inlet, 4 km west of the offset site. One confirmed breeding site occurs 7.6 km south-west of the offset site. Both species of Black-Cockatoo have been recorded regularly within close proximity to the offset site.

6.2 Offset Security

The Lake Mealup offset site will be acquired and managed by DBCA. Main Roads will fund the acquisition, revegetation and management for 20 years as an environmental offset. The property will become part of DBCA's conservation estate and be protected in perpetuity.

Main Roads and DBCA will develop a MoU to finalise the land management agreement, including funding and actions required by both parties. The MoU will be developed and finalised by the end of 2026.

6.3 Environmental Values

The environmental values and extents (based on Main Roads' site inspection, undertaken on 14 October 2024) within the Lake Mealup offset site pertaining to this Offset Strategy are:

- 29.7 ha of Banksia Woodlands of the SCP P3 PEC 'Good-Very Good' condition (5)
- 40 ha of Tuart Woodlands and Forests of the SCP P3 PEC 'High' condition (6)
- 45 ha of vegetation suitable for restoration as Carnaby's Black-Cockatoo habitat and Forest Red-tailed Black-Cockatoo habitat (offset start score of 6).

The areas of Banksia and Tuart Woodland PECs overlap at this offset site, hence the sum of their parts is greater than the area of the offset site.

A biological survey will be conducted in spring 2025 to confirm the environmental values present onsite.

6.4 Net Gain

The net gain from the implementation of this offset will be:

- Restoration of 29.7 ha of Banksia Woodlands of the SCP P3 PEC from 'Good -Very Good' (5) condition to 'Very Good' (6) condition
- Restoration of 40 ha of Tuart Woodlands and Forests of the SCP P3 PEC from 'High' (6) condition to 'High-Very High' (8) condition
- Restoration of 45 ha of Carnaby's Black-Cockatoo habitat and Forest Red-tailed Black-Cockatoo habitat from habitat score '6' to '7'
- Revegetation of 5.2 ha of Tuart Woodland and Forests of the SCP P3 PEC from 'Completely Degraded' (0) to 'High' (6) condition
- Revegetation of 16.7 ha of Black-Cockatoo habitat from habitat score '1' to '8'.

6.5 Management Actions

Main Roads proposes to undertake the following activities in conjunction with DBCA within the offset site.

6.5.1 Revegetation and Restoration Management Plan

- Main Roads, in consultation with the DBCA, will develop and implement the Lake Mealup Restoration and Revegetation Management Plan (LMRRMP) that incorporates the actions and activities listed below
- Main Roads will fund the implementation of the management plan within the offset site.

6.5.2 Revegetation

- Revegetation works will consist of site preparation (fencing, weed control, ripping / furrow-lining (if required) and pest control), seeding / planting and ongoing management
- Revegetation will be undertaken with a suite of species developed in consultation with DBCA to replicate Tuart Woodlands and Forests of the SCP P3 PEC.

6.5.3 Fencing

- Install fencing to restrict and control unauthorised access, and protect existing native vegetation
- Specification of fences will be determined prior to installation and will depend on the size, location and topography of the offset site. A fauna fence should mitigate herbivore grazing impacts.

6.5.4 Pest Animal Control

- Carry out pest animal control (including kangaroo control) as required where impacts to the recovery of existing vegetation or establishment of revegetation are observed or considered likely to occur.
- Pest management will be carried out using best practices in accordance with DPIRD advice and governed by the BAM Act.

6.5.5 Weed Control

- Develop and implement a weed control program, including monitoring
- Weed control will continue annually throughout the first five years of implementation of the Offset Strategy, after which, the frequency will be reduced to that required based on observations during monitoring inspections of impacts on vegetation condition recovery and revegetation establishment.

6.5.6 Fire Management

- Develop and implement a fire management plan as part of the LMRRMP and implement within the offset site for the duration of this Strategy.

6.5.7 Phytophthora Dieback Management

- Develop a dieback management plan and implement this plan within the offset site for the duration of this Strategy.
- The dieback management plan may include measures such as: frequency of dieback monitoring, requirement for hygiene stations, signage, Phosphite treatment or limestone sheeting of particular tracks.

6.5.8 Surveys and Monitoring

- Undertake baseline flora and vegetation surveys to confirm condition and extent of PECs
- Conduct revegetation monitoring at regular intervals throughout the offset duration to gauge progress towards achievement of 'High' condition Tuart Woodlands and Forests of the SCP PEC vegetation
- Conduct ongoing monitoring within existing vegetation to assess vegetation condition.

6.6 Targets

Monitoring, management activities and targets for the offset site are outlined in **Table 7**.

Table 7 - Schedule of Monitoring and Management Activities and Targets for Lake Mealup Offset Site

Action/Aspect	Description of Methodology	Timing	Target
Offset Security	Offset site will be owned and managed by DBCA. MoU between Main Roads and DBCA	MoU complete by end of 2026	MoU complete by end of 2026
Develop and implement site Revegetation and Restoration Management Plan	In consultation with DBCA, develop LMRRMP to improve existing vegetation values and undertake revegetation within the offset site.	Complete LMRRMP by end of 2026 Planting to commence in 2027	LMRRMP developed by the end 2026 Planting to commence in 2027
Banksia Woodlands of the SCP PEC Tuart Woodlands and Forests of the SCP PEC	Implement LMRRMP Undertake monitoring of vegetation condition	Implement LMRRMP for 20 years from the date of approval of this Strategy, with monitoring conducted every five years commencing 2026	Improve to achieve, then maintain overall vegetation condition of 'Very Good' (6) and 'High-Very High' (8) or better for Banksia Woodlands of the SCP and Tuart Woodlands and Forests of the SCP, respectively within restoration area Improve to achieve, then maintain overall vegetation condition of 'High' (6) or better for Tuart Woodlands and Forests of the SCP within revegetation area
Black-Cockatoo foraging habitat condition	Implement LMRRMP Undertake Black-Cockatoo foraging habitat assessment	Implement LMRRMP for 20 years from the date of approval of this Strategy, with monitoring conducted every five years commencing 2026	Black-Cockatoo habitat quality score of '7' within restoration area and '8' within revegetation area or better

6.7 Offset Calculator Values

Offset calculators for the Lake Mealup offset site are provided in **Appendix B** and the values are summarised in **Table 8**.

Table 8 - Offset Calculator Values for Lake Mealup Offset Site

Environmental Value	Offset Size (ha)	Start Quality	Future Quality without Offset	Future Quality with Offset	Offset Value (%)
Restoration					
Banksia Woodland of the SCP PEC	29.7	5	4	6	77.8
Tuart Woodland and Forests of the SCP PEC	40	6	5	8	73.2
CBC foraging habitat	45	6	6	7	20.7
FRTBC foraging habitat	45	6	6	7	33.2
Revegetation					
Tuart Woodland and Forests of the SCP PEC	5.2	0	0	6	20.2
CBC foraging habitat	16.7	1	1	8	28.6
FRTBC foraging habitat	16.7	1	1	8	49.3

Figure 4 - Lake Mealup Revegetation and Restoration Offset Site

FOCUSED VISION consulting

MRWA24012 06 January 2024

7. St Ronans Offset Site

7.1 Site Description

The 'St Ronans' offset site encompasses a 6.0 ha portion of Lots 58, 706 and 1437 Great Southern Highway, St Ronans, which totals 120.75 ha, located approximately 8.5 km west of York (**Figure 5**). The offset site occurs within the Avon Wheatbelt and the Jarrah Forest IBRA Regions and is located approximately 84 km east north-east of the Proposal. Main Roads is proposing to revegetate 6.0 ha within Lot 706 as an environmental offset for Carnaby's Black-Cockatoo and Forest Red-tailed Black-Cockatoo. The property has been cleared for agriculture, with some areas of existing revegetation.

The Jarrah Forest IBRA Region is characterised by Jarrah-Marri forests on lateritic soils in the west of the region and Wandoo-Marri woodlands on clay soils in the east (Williams and Mitchell 2001). The Avon Wheatbelt IBRA Region has been extensively cleared for agriculture, but where native vegetation exists, it consists of Proteaceous scrub-heaths on lateritic uplands and mixed eucalypt, she-oak and Jam-York Gum woodlands on alluvial and eluvial soils (Environment Australia 2000).

Two Beard (1990) pre-European vegetation associations are mapped within the offset site, being Vegetation Association 4, which is described as; Medium woodland; Marri and Wandoo, and Vegetation Association 352, which is described as Medium woodland; York Gum (Government of Western Australia 2019a).

Two Heddle *et al.* (1980) vegetation complexes are mapped as occurring within the offset site, the Coolakin Complex and the Yalanbee Complex. The Coolakin complex is described as Woodland of *Eucalyptus wandoo* with mixtures of *Eucalyptus patens, Eucalyptus marginata* subsp. *thalassica* and *Corymbia calophylla* on the valley slopes in arid and peri-arid zones, whilst the Yalanbee Complex consists of Woodland of *Eucalyptus wandoo-Eucalyptus accedens*, less consistently open forest of *Eucalyptus marginata* subsp. *thalassica-Corymbia calophylla* on lateritic uplands and breakaway landscapes in arid and perarid zones.

The offset site is located within the range of both Carnaby's Black-Cockatoo and Forest Red-tailed Black-Cockatoo (DAWE 2022). Both species have been observed within the offset site (MRWA 2024). No confirmed Black-Cockatoo breeding sites occur within close proximity of the offset site, however, one confirmed roost site occurs near York, approximately 8 km east north-east.

The St Ronans offset site is zoned 'Rural' under the Shire of York Local Planning Scheme No.3 (DPLH 2021).

7.2 Offset Security

Main Roads acquired the property in December 2024 and will own and manage the property as an environmental offset. Main Roads will create a new freehold lot with the designated purpose of "Environmental Offset". The land will be designated as an environmental offset prior to the revegetation reaching completion criteria to protect the site in perpetuity.

7.3 Environmental Values

The existing environmental values within the St Ronans offset site pertaining to this Offset Strategy include:

- 6.0 ha of cleared land suitable for the establishment of foraging and potential breeding habitat for Carnaby's Black-Cockatoo and Forest Red-tailed Black-Cockatoo.

7.4 Net Gain

The net gain from the implementation of this offset will be:

- Revegetation of 6.0 ha of Carnaby's Black-Cockatoo and Forest Red-tailed Black-Cockatoo foraging habitat from habitat quality score '1' to '8'.

7.5 Management Actions

Main Roads proposes to develop and implement a revegetation plan that that will include the following activities:

7.5.1 Revegetation Plan

- Main Roads will develop and implement a revegetation plan for St Ronans offset site
- Main Roads will fund the implementation of the St Ronans revegetation plan within the offset site.

7.5.2 Revegetation

- Revegetation works will consist of site preparation (fencing, weed control, ripping / furrow-lining (if required) and pest control), seeding / planting and ongoing management
- Revegetation will be undertaken with a suite of species that are consistent with the historical vegetation associations and complexes of the site, with a primary focus on proteaceous and other Black-Cockatoo foraging species.

7.5.3 Fencing

- Install fencing if required to restrict stock access from adjoining properties as well as restricting unauthorised access
- Specification of fences will be determined prior to installation and will depend on the size, location and topography of the offset site.

7.5.4 Pest Animal Control

- Pest management will be carried out using best practices in accordance with DPIRD advice and governed by the BAM Act
- Control measures for rabbits and other pest animals will be implemented if they are observed to be adversely impacting the quality of native vegetation.

7.5.5 Fire Management

- Develop and implement a fire management plan as part of the revegetation plan and implement within the offset site for the duration of this Strategy. The fire management plan will include:
    - location of firebreaks and vehicle access
    - firebreak maintenance
    - monitoring of fuel loads as required.

7.5.6 Weed Control

- Weed mapping will be undertaken in 2025/26 to identify locations of Weeds of national Significance (WoNS), Declared Pest (DP) plants and other weed species likely to impact on the successful establishment of the revegetation
- A weed control program will be developed based on the weed mapping results to ensure successful establishment of the revegetation
- Weed control will continue annually throughout the first five years of implementation of the Offset Strategy, after which, the frequency will be reduced to that required based on observations during monitoring inspections of impacts on vegetation condition recovery and revegetation establishment.

7.5.7 Phytophthora Dieback Management

- Develop a dieback management plan and implement this plan within the offset site for the duration of this Strategy
- The dieback management plan may include measures such as: frequency of dieback monitoring, requirement for hygiene stations, signage, Phosphite treatment or limestone sheeting of particular tracks.

7.5.8 Rubbish Removal

- On establishment of a site as an offset, any significant piles of rubbish will be removed

7.5.9 Surveys and Monitoring

- Conduct revegetation monitoring at regular intervals throughout the offset duration to gauge progress towards achievement of habitat quality of a score of '8'. Contingency measures, such as infill planting, will be considered if it appears a score of "8" is unlikely to be achieved.

7.6 Targets

Monitoring and management activities and targets for the St Ronans offset site are outlined in **Table 9**.

Table 9 - Schedule of Monitoring and Management Activities and Targets for St Ronans Offset Site

Action/Aspect	Description of Methodology	Timing	Target
Offset Security	Create new freehold lot for the purpose of "Environmental Offset"	Complete by end of 2035	Complete by end of 2035
Develop and implement a site revegetation plan	A revegetation plan will be developed to ensure achievement of habitat quality of a score of '8'	Plan developed by the end of 2026 Planting to commence in 2027	Plan developed by the end of 2026 Planting to commence in 2027
Black-Cockatoo foraging habitat condition	Implement revegetation plan Undertake Black-Cockatoo foraging habitat assessment	Implement management plan for 20 years from the date of approval of this Strategy, with monitoring to be conducted every five years commencing 2031 (Year 5)	Black-Cockatoo habitat quality '8' or better

7.7 Offset Calculator Values

Offset calculators for St Ronans offset site are provided in **Appendix C** and the values are summarised in **Table 10** below.

Table 10 - Offset Calculator Values for St Ronans Offset Site

Environmental Value	Offset Size (ha)	Start Quality	Future Quality without Offset	Future Quality with Offset	Offset Value (%)
CBC foraging habitat	6.0	1	1	8	10.3
FRTBC foraging habitat	6.0	1	1	8	17.7

Figure 5 - St Ronans Offset Site

FOCUSED VISION consulting

MRWA24012 06 January 2024

8. The Spectacles Offset Site

8.1 Site Description

The Spectacles offset site, which forms part of Bush Forever Site 269 and is managed by DBCA, is located immediately adjacent to the Proposal. The Spectacles offset site is situated within the Swan Coastal Plain IBRA Region and encompasses several adjacent properties (**Figure 6**). Within this site, 6 ha will serve as an environmental offset for the impacts the Proposal will have on a Bush Forever site, while 1.65 ha will be allocated as an environmental offset for impacts to a Class A Reserve.

One Geomorphic Wetland of the Swan Coastal Plain (DBCA 2022) occurs within The Spectacles offset site, being Spectacles North (UFI 6539), which is classified as a conservation category wetland.

Three Beard (1990) pre-European vegetation associations (6, 51 and 1001) are mapped within The Spectacles offset site. These are defined as:

- Vegetation Association 6 – Medium woodland; Tuart and Jarrah
- Vegetation Association 51 – Sedgeland; reed swamps, occasionally with heath
- Vegetation Association 1001 – Medium very sparse woodland; Jarrah, with low woodland; *Banksia* and *Casuarina*.

Three Heddle *et al.* (1980) vegetation complexes are mapped as occurring within the offset site, the Cottesloe Complex – Central and South, the Herdsman Complex and Karrakatta Complex – Central and South. These are defined as:

- Cottesloe Complex (Central and South) - Mosaic of woodland of Tuart and open forest of Tuart - Jarrah - Marri; closed heath on the Limestone outcrops
- Herdsman Complex - Sedgelands and fringing woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca* species
- Karrakatta Complex (Central and South) - Predominantly open forest of Tuart - Jarrah - Marri and woodland of Jarrah - *Banksia* species.

The Spectacles contains both the Tuart Woodlands and Forests of the SCP P3 PEC and the Banksia Woodlands of the SCP P3 PEC.

The Spectacles is located within the known range of both Carnaby's Black-Cockatoo and Forest Red-tailed Black-Cockatoo and provides non-breeding foraging habitat. No confirmed or unconfirmed Black-Cockatoo breeding or roost sites occur within the offset site.

The Spectacles are zoned 'Parks and Recreation' under the Metropolitan Regional Scheme.

8.2 Offset Security

The Spectacles offset site lies within land currently managed by DBCA. Main Roads will liaise with DBCA to fund management within the offset site for 20 years after approval of this Strategy, after which time management will revert back to DBCA.

8.3 Environmental Values

The existing environmental values within The Spectacles offset site pertaining to this Offset Strategy are:

- 6 ha of Bush Forever Site 269 (The Spectacles)
- 1.65 ha of Class A Reserve currently vested and managed by the DBCA.

8.4 Net Gain

The Spectacles contains a number of significant environmental values that can be protected and enhanced with active on-ground management actions. Land management actions to be implemented will be determined in consultation with DBCA, and may include fencing and access control, weed control, Phytophthora dieback management and fire management. Management actions undertaken at this offset site are intended to achieve one or more of the following outcomes, leading to a conservation gain for protected matters:

- minimise the impact of and reduce the potential spread of weeds, dieback and other diseases
- minimise the impact of pest animal grazing
- reduce occurrences of uncontrolled vehicle access.

These management actions will have a positive impact within the offset site by maintaining and improving the quality of regionally significant vegetation within a Bush Forever site and Class A Reserve.

8.5 Management Actions

To achieve the net gain stated in **Section 8.4**, Main Roads proposes to undertake the following activities in conjunction with DBCA.

8.5.1 Management Plan

- Main Roads is currently in consultation with DBCA to develop a 'The Spectacles Offset Management Plan' (SOMP). This plan will outline the management actions proposed to be undertaken within The Spectacles.
- Main Roads will fund the implementation of the SOMP within the offset site.

8.5.2 Fencing

- Install or upgrade fencing to restrict and control unauthorised access, and protect existing native vegetation
- Specification of fences will be determined prior to installation and will depend on the size, location and topography of the offset site.

8.5.3 Pest Animal Control

- Carry out pest animal control as required where conservation values are being adversely impacted
- Pest management will be carried out using best practices in accordance with DPIRD advice and governed by the BAM Act.

8.5.4 Weed Control

- Develop and implement a weed control program, including monitoring
- Weed control will continue annually throughout the first five years of implementation of the Offset Strategy, specifically targeting WoNs, DP plants and other significant environmental weeds, at which time frequency will be reduced to that required based on observations during monitoring inspections of impacts on vegetation and habitat.

8.5.5 Phytophthora Dieback Management

- Develop and implement a dieback management plan for the duration of this strategy
- The dieback management plan may include measures such as: ongoing dieback monitoring, hygiene stations, signage, Phosphite treatment or limestone sheeting of particular tracks.

8.5.6 Surveys and Monitoring

- Conduct ongoing vegetation monitoring to assess vegetation condition.

8.6 Targets

Main Roads will develop a set of management activities and targets for the offset site as outlined in **Table 11**.

Table 11 - Schedule of Management Activities and Targets for The Spectacles Offset Site

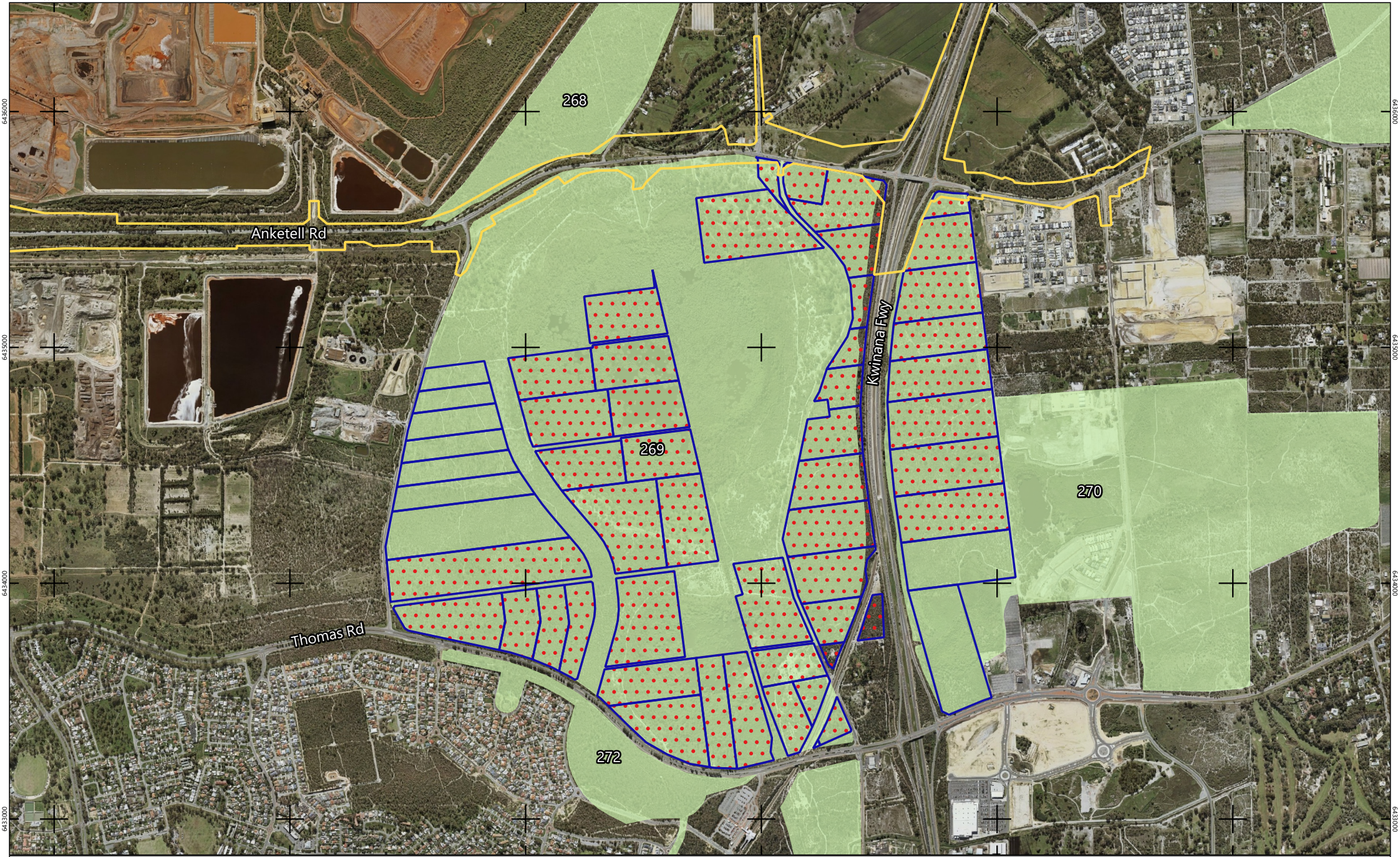
Action/Aspect	Description of Methodology	Timing	Target
Develop The Spectacles Offset Management Plan	In consultation with DBCA, develop the SOMP to protect and enhance the site.	Complete by end of 2026	Complete by end of 2026
Implement The Spectacles Offset Management Plan	In consultation with DBCA, fund the implementation of the SOMP within the offset site	20 years from the date of approval of this Strategy	Implementation for 20 years from the date of approval of this Strategy

8.7 Offset Calculator Values

Offset calculators for The Spectacles offset site are provided in **Appendix D** and the values are summarised in **Table 12**.

Table 12 - Offset Calculator Values for The Spectacles Offset Site

Environmental Value	Offset Size (ha)	Ratio	Offset Value (%)
Bush Forever	6.0	1.5:1	100.0
Class A Reserve	1.65	3:1	100.0



0 150 300 450 600 m

GDA 2020 MGA Zone 50

Figure 6 - The Spectacles Offset Site

Legend

- Anketell Rd Upgrade Development Envelope
- Potential Offset Site Location
- Class A Reserve
- Bush Forever

FOCUSED VISION consulting

MRWA24012 06 January 2024

9. Adaptive Management and Corrective Actions

This Offset Strategy has adopted an 'adaptive management' approach to ensure that the proposed outcomes of the strategy are met. Adaptive management allows for the implementation of management whilst monitoring what is most effective in achieving conservation outcomes. The implementation of adaptive management acknowledges the inherent risks associated with complex ecological systems and the implementation of this Offset Strategy. Where the management actions and/or targets at a particular offset site are not being met, adaptive management and corrective actions will be implemented to ensure the success of the offset.

Measures to detect the need to implement corrective actions will include monitoring as described for each offset. Where monitoring identifies a decline in vegetation/habitat condition or revegetation failure or other issues, the following will be carried out:

- Evaluate the cause of the decline, failures or issues
- Determine the appropriate corrective and adaptive management actions.

Corrective actions may include:

- Additional monitoring
- Supplementary planting and/or seeding
- Changes to species lists for planting and/or seeding
- Altered weed control timing and/or frequency
- Altered herbicides or weed management techniques
- Altered pest management timing and/or frequency and/or techniques
- Dieback management actions, including Phosphite treatment
- Additional or alternative access control, including fencing
- Engaging additional resources to ensure works are undertaken within required timeframes.

10. Consideration of WA Offsets Policy

This Offset Strategy has been developed to be consistent with the WA Offsets Policy (GoWA 2011). **Table 13** shows how each of the offset policy principles has been addressed in this Offset Strategy.

Table 13 - Consideration of the WA Environmental Offset Policy Principles

Offset Principle	Consideration
Environmental offsets will only be considered after avoidance and mitigation options have been pursued.	The potential impacts from the Anketell Road Upgrade Proposal have been reduced through the refinement of the proposal area. This reduction has been largely achieved through the additional avoidance and mitigation measures that have been developed for the Proposal. Main Roads will continue to refine the Proposal during design and construction in order to minimise the impacts as far as practicable. However, it is unlikely that any further significant avoidance or minimisation of the impacts will be able to be implemented without affecting the overall intent and objectives of the Proposal and therefore, an environmental offset for the significant residual impacts is warranted.
Environmental offsets are not appropriate for all projects.	Main Roads operates on a hierarchy of avoid, minimise, reduce, rehabilitate and (if necessary, where significant residual impacts will result) offset environmental impacts. This hierarchy is achieved primarily through changes in scope and design, development, and implementation of management measures and finally, an offset proposal. Application of the management hierarchy has been summarised in this Offset Strategy. Environmental offsets are considered appropriate for this Proposal.
Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted.	Main Roads has pursued a number of options in developing a package of offsets to counterbalance residual impacts that are relevant and appropriate for the locality and quantum of impact for each environmental value impacted. The options investigated have comprised of areas of restoration and / or revegetation and restoration of land representative of TECs, PECs, Carnaby's Black-Cockatoo and Forest Red-tailed Black-Cockatoo non-breeding foraging habitat, Bush Forever and Class A Reserve. The restoration offsets proposed will protect and enhance the same (or similar) environmental values being impacted by the Proposal. The area and condition of offsets within the proposed offset sites is proportionate to that being impacted.
Environmental offsets will be based on sound environmental information and knowledge.	All offset sites have either been surveyed or will be surveyed as part of the implementation of the offset. The quantum of impact has been calculated using data from field surveys or the most current publicly available information in the absence of field survey data.
Environmental offsets will be applied within a framework of adaptive management.	An offset management plan will be developed for each offset site to ensure offset objectives are met. Each of these plans will address monitoring requirements and corrective actions and will allow for adaptive management measures.
Environmental offsets will be focussed on longer term strategic outcomes.	All offsets will be implemented by Main Roads for 20 years from the date of approval of this Offset Strategy prior to being handed over to the ultimate land manager of the site, which is DBCA for all offset sites except the St Ronans offset site. Three of the five offsets included in this Strategy represent substantial additions to the Western Australian Conservation Estate On-ground management actions for each site will be formalised through a site-specific management plan, where applicable.

11. Reporting and Accountability

11.1 Roles and Responsibilities

This Offset Strategy outlines the environmental management activities to be undertaken by Main Roads, or its delegate, in association with the offset sites for the Proposal. Once it is approved, Main Roads acknowledges that the environmental management actions contained in this Offset Strategy are legal requirements to be met by Main Roads.

The Director Environment and Heritage at Main Roads will maintain responsibility for implementation of the management actions specified in this Offset Strategy on behalf of the Main Roads' Managing Director.

11.2 Reporting

Main Roads will report to DWER on the implementation of this Offset Strategy as part of annual compliance reporting required under the Ministerial Statement. The annual monitoring report for each offset site will be prepared in the format presented in **Table 14**. The annual compliance report will be made publicly available on Main Roads' website.

Table 14 - Indicative Format of Annual Monitoring Report for each Offset Site

Section	Potential Inclusions
Introduction	• Background • Objective • Scope of works • Summary of management activities for the period • Assumptions/limitations
Environmental Setting	• Climatic/weather conditions over the reporting period (rainfall, storms, dry periods) • Changes to topography, drainage or hydrology (surface water runoff, flow direction) • Environmental events such as flooding or fires • Wetlands (if applicable)
Management Activities	• Details of on-ground management works or other works undertaken as per the agreed management actions • Identification and justification for deviations from on-ground management works or other works specified in the operational works plan for the period • Identification and justification of any corrective actions (if required) implemented during the period • Result of any surveys, including monitoring surveys, undertaken (e.g. dieback mapping, weed mapping, flora and vegetation surveys) • Any observed or anecdotal results noted from the implementation of on-ground management works (i.e. observable reduction in feral animals or reduction in weeds)
Financial Arrangements	• Details of expenditure incurred during the management period • Identification of and justification for deviations in anticipated expenditure during the management period • Proposed re-allocation of funds from one management activity to another • Any proposed re-allocation of funds from one management period to another • Risk assessment for proposed funding changes for the upcoming management period
Stakeholder Consultation	• Details of any stakeholder consultation conducted
Figures	• Site layout • Locations of on-ground management activities (e.g. fencing, signage, weed control, track maintenance) • Locations of work areas (e.g. weed control, track maintenance) • Locations of observations (e.g. areas showing reduced feral animal activity) • Indications of proposed works areas for the upcoming management period • Provision of spatial data
Photographs	• Evidence of works implemented (e.g. fencing, signage, rubbish removal) • Evidence justifying deviations from operational works plan • Visible changes to the site and/or surrounds • Visible changes (improvement or degradation) to environmental values (e.g. vegetation condition, flora, fauna habitat, wetlands)
Conclusions	• Management activities completed to date • Comment on the effectiveness of management activities that have been implemented this far
Recommendations	• Recommendations for management activities for the upcoming management period • Recommendations for deviations to any management activities for the upcoming management period • Recommendations for funding allocation for management activities for the upcoming management period • Any other recommendations

12. References

Bamford Consulting Ecologists (BCE) (2020) *Scoring system for the assessment of foraging value of vegetation for Black-Cockatoos*. Revised 5th June 2020. https://ecologists.bamford.id.au/ecological-consulting/black-cockatoos

Beard, J.S. (1990) *Plant life of Western Australia*. (Kangaroo Press: Kenthurst, N.S.W)

Department of Agriculture, Water and the Environment (DAWE) (2022) *Referral guideline for 3 WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black-cockatoo*. (Department of Agriculture, Water and the Environment: Canberra, ACT)

Department of Biodiversity Conservation and Attractions (DBCA) (2022) Geomorphic Wetlands, Swan Coastal Plain (DBCA-019). Government of Western Australia.

Department of Planning, Lands and Heritage (DPLH) (2021). Shire of York Local Planning Scheme No.3. As gazetted on 13th January 2021. https://www.wa.gov.au/system/files/2021-10/LPSC-York-Scheme-Text.pdf.

Department of Planning, Lands and Heritage (DPLH) (2024). Shire of Gingin Local Planning Scheme No.9. Updated to include AMD 24 GG 25/10/2024. https://www.wa.gov.au/system/files/2024-11/lpsc-gingin9-scheme-text.pdf.pdf.

Department of Water and Environmental Regulation (DWER) (2021) *Environmental offsets metric: Quantifying environmental offsets in Western Australia*. DWER October 2021.

Department of Water and Environmental Regulation (DWER) (2022) DRAFT Procedure for environmental offsets metric inputs. For use with the WA environmental offset metric.

Environment Australia (2000). Revision of the Interim Biogeographic Regionalisation for Australia (IBRA) and Development of Version 5.1. Summary Report. Department of Environment and Heritage, Canberra.

Environmental Protection Authority (EPA) (2024). Public Advice. Considering environmental offsets at a regional scale. WA Environmental Offsets Framework | EPA Western Australia

Government of Western Australia (GoWA) (2011) *WA Environmental Offset Policy* (September 2011). Government of Western Australia.

Government of Western Australia (GoWA) (2019a) *2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019*. WA Department of Biodiversity, Conservation and Attractions, Perth.

Government of Western Australia (GoWA) (2019b). *2018 South West Vegetation Complex Statistics. Current as of March 2019*. WA Department of Biodiversity, Conservation and Attractions, Perth, https://catalogue.data.wa.gov.au/dataset/dbca

Heddle, E., Loneragan, O. and Havel, J. (1980) Vegetation complexes of the Darling system, Western Australia. *Atlas of natural resources*, 33-74, Perth Western Australia. Department of Conservation and Environment.

Keighery B (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc.): Nedlands, W.A

MRWA (2024) *Desktop Assessment for Offset Revegetation Site*. Lots 58 (3529), 706 and 1437 (3433) Great Southern Hwy, St Ronans (Shire of York) – May 2024. Document Number D24#755775.

Mitchell D, Williams K, Desmond A (2002) Swan Coastal Plain 2 (SWA2 – Swan Coastal Plain subregion). *A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002*. pp. 606–623. Department of Conservation and Land Management.

PGV Environmental (2024) *Lot 1 Indian Ocean Drive, Gabbadah Vegetation Assessment Preliminary Findings*.

Shire of Gingin (2012). Local Planning Strategy. https://www.wa.gov.au/system/files/2021-11/LST-Gingin-local-planning-strategy.pdf.

State of Western Australia (2010) State Planning Policy 2.8: Bushland Policy for the Perth Metropolitan Region. *Western Australian Government Gazette* 2741–2764.

Threatened Species Scientific Community (TSSC) (2019) Approved Conservation Advice for the Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain. Canberra: Department of the Environment and Energy.

Williams, K., and Mitchell, D. (2001) Jarrah Forest 1 (JF1 - Northern Jarrah Forest subregion) in *A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002*. Collaboration between the Department of Conservation and Land Management and the Western Australian Museum.

13. Appendices

Appendix A – Gabbadah Offset Calculators

WA Environmental Offsets calculator

PLEASE ENABLE MACROS FOR THIS SPREADSHEET

Produced by:

The Department of Water and Environmental Regulation (DWER) in consultation with stakeholder working groups

Purpose:

Use the WA Envirionmental Offsets calculator in conjunction with the *Environmental offsets metric: Quantifying environmental offsets in Western Australia* guideline. Together, they form a supplement to section 4 of the *WA Environmental Offsets Guidelines* and provide information to help decision-makers, government officers, industry and the community to quantify environmental offsets.

Data currency:

The correct application of the WA Environmental Offsets Calculator relies on access to current datasets (such as vegetation extent and land tenure).

Process for using the WA Environmental Offsets Calculator		
Step	**Worksheet**	**Component**
Step 1: Determining conservation significance	**Step1_ConservationSignificance**	**Conservation significance determination**
		Combined *area* /*feature*
Step 2: Calculating significant residual impact	**Step2_SignificantResidualImpact**	**Part A: Significant impact calculation**
		Separate *area* or *feature* calculations
		Part B: Rehabilitation credit calculation
		Separate *area* or *feature* calculations
		Part C: Significant residual impact calculation
		Separate *area* or *feature* calculations
Step 3: Calculating offsets	**Step3_Offsets**	**Offsets calculation**
		Separate *area* or *feature* calculations
Rationale for scores used in the Offsets Calculator	**Rationale**	**All**

WA Environmental Offsets Calculator

Step 1: Determining conservation significance

Key:
Data to be entered
Drop-down selection
Automatically-generated scores
(Or, if appropriate, manual data entry permitted)

Area / feature **(Impact site)**

Conservation significance determination for the environmental value impacted		
Conservation significance	**Description**	Banksia Woodland of the Swan Coastal Plain Priority Ecological Community
	Type of environmental value	Ecological community
	Conservation significance of environmental value	Priority ecological community
	Conservation significance score	**0.1%**

Please select *area* or *feature* for the calculations	**Area**

Step 2: Calculating significant residual impact

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	Banksia Woodland of the Swan Coastal Plain Priority Ecological Community

***Area* (impact site)**

Part A: Significant impact calculation *Area*

Significant impact	Description	Quantum of impact	
	Clearing of 14.56 ha of Priority 3 Banksia Woodlands of the Swan Coastal Plain Ecological Community	Significant impact (hectares)	14.56
		Quality (scale)	4.50
		Total quantum of impact	6.55

Part B: Rehabilitation credit calculation *Area* (onsite)

Rehabilitation Credit	Description			Time until ecological benefit (years)	
		Proposed rehabilitation (area in hectares)		Confidence in rehabilitation result (%)	
		Current quality of rehabilitation site (scale)		Rehabilitation credit	0.00
		Future quality WITHOUT rehabilitation (scale)			
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*

Significant residual impact		
	Total quantum of impact	6.55
	Rehabilitation credit	0.00
	Significant residual impact	6.55

WA Environmental Offsets Calculator

Step 3: Calculating offsets

Key:	
	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Banksia Woodland of the Swan Coastal Plain Priority Ecological Community	Significant impact (step 2, part A)	14.56
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	6.55

Area **(offset site)**

Offset calculation *Area*							
Offsets calculation	Description	Proposed offset (area in hectares)	8.10	Duration of offset implementation (maximum 20 years)	20.00	Offset value	1.47
	Lot 1 Tamarisk Drive, Gabbadah	Current quality of offset site (scale)	6.00	Time until offset site secured (years)	1.00		22.4%
		Future quality WITHOUT offset (scale)	5.00	Risk of future loss WITHOUT offset (%)	15.0%		
		Future quality WITH offset (scale)	7.00	Risk of future loss WITH offset (%)	5.0%		
		Time until ecological benefit (years)	20.00				
		Confidence in offset result (%)	67.0%			OFFSET ADEQUATE?	NO

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	Banksia Woodland of the Swan Coastal Plain Priority Ecological Community		The proposed clearing will impact on 14.56 ha of Banksia Woodland of the Swan Coastal Plain PEC.
Type of environmental value	Ecological community		Banksia Woodland of the Swan Coastal Plain is listed a Priority 3 Ecological Community by the DBCA.
Conservation significance of environmental value	Priority ecological community		Banksia Woodland of the Swan Coastal Plain is listed a Priority 3 Ecological Community by the DBCA
Landscape-level value impacted	yes/no		NA
Significant impact			
Description	Clearing of 14.56 ha of Priority 3 Banksia Woodlands of the Swan Coastal Plain Ecological Community		The proposed clearing will impact on 14.56 ha of Banksia Woodland of the Swan Coastal Plain PEC.
Significant impact (hectares) / Type of feature	14.56		Clearing of 14.56 ha of native vegetation representative of Banksia Woodland of the Swan Coastal Plain PEC.
Quality (scale) / Number	4.50		Weighted score based on the vegetation condition of the impact site: - 1.20 ha x 'Very Good - Excellent' (7) - 4.27 ha x 'Very Good' (6) - 2.11 ha x 'Good - Very Good' (5) - 3.68 ha x 'Good' (4) - 0.22 ha x 'Degraded - Good' (3) - 3.08 ha x 'Degraded' (2)
Rehabilitation credit			
Description	0		
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	Lot 1 Tamarisk Drive, Gabbadah		Preliminary surveys indicate that Lot 1 Tamarisk Drive contains 89.34 ha of State Priority 3 Banksia Woodland of the Swan Coastal Plain Ecological Community (PGV 2024).
Proposed offset (area in hectares)	8.10		8.1 ha of Banksia Woodland within Lot 1 Tamarisk Drive is proposed as an offset site for the Anketell Road Upgrade.
Current quality of offset site / Start number (of type of feature)	6.00		Vegetation within the offset site is of 'Very Good' condition. A value of '6' has been assigned for current vegetation condition (PGV 2024).
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	5.00		Considering the existing threatening processes (weeds and kangaroo grazing and edge effects) and lack of active management, the vegetation quality within the offset site is expected to decline over time without suitable management.
Future quality WITH offset (scale) / Future number WITH offset	7.00		With active management, the vegetation condition can be improved from 'Very Good' (6) to 'Very Good-Excellent' (7).
Time until ecological benefit (years)	20.00		It is estimated that it will take 10-20 years to achieve the desired species diversity, vegetation cover and weed density.
Confidence in offset result (%)	0.67		Moderate-high level of confidence that management actions will achieve results within the predicted timeframe.
Duration of offset implementation (maximum 20 years)	20.00		Offset management will continue for 20 years.
Time until offset site secured (years)	1.00		The site will be secured as an offset within one year of implementation of the Proposal.

Risk of future loss WITHOUT offset (%)	15.0%		Risk of loss without offset has been set at 15% as the existing land use and zoning on the property (Rural) and potential for commercial/residential development in the future may lead to loss of the ecological value. Rural zoned land is used for agriculture and it is unlikely that vegetation on Rural-zoned land will be managed for conservation, thereby inherently the vegetation is at risk of loss. Accordingly, because of the zoning, there was a risk that the values on the offset could be lost. The offset will be managed by DBCA and added to the conservation estate.
Risk of future loss WITH offset (%)	5.0%		Risk of loss without offset has been set at 5%. A residual risk of loss remains due to disease, dieback and/or catastrophic fire.
Offset ratio (Conservation area only)	N/A		NA

WA Environmental Offsets calculator

PLEASE ENABLE MACROS FOR THIS SPREADSHEET

Produced by:

The Department of Water and Environmental Regulation (DWER) in consultation with stakeholder working groups

Purpose:

Use the WA Envirionmental Offsets calculator in conjunction with the *Environmental offsets metric: Quantifying environmental offsets in Western Australia* guideline. Together, they form a supplement to section 4 of the *WA Environmental Offsets Guidelines* and provide information to help decision-makers, government officers, industry and the community to quantify environmental offsets.

Data currency:

The correct application of the WA Environmental Offsets Calculator relies on access to current datasets (such as vegetation extent and land tenure).

Process for using the WA Environmental Offsets Calculator		
Step	**Worksheet**	**Component**
Step 1: Determining conservation significance	**Step1_ConservationSignificance**	**Conservation significance determination**
		Combined *area* /*feature*
Step 2: Calculating significant residual impact	**Step2_SignificantResidualImpact**	**Part A: Significant impact calculation**
		Separate *area* or *feature* calculations
		Part B: Rehabilitation credit calculation
		Separate *area* or *feature* calculations
		Part C: Significant residual impact calculation
		Separate *area* or *feature* calculations
Step 3: Calculating offsets	**Step3_Offsets**	**Offsets calculation**
		Separate *area* or *feature* calculations
Rationale for scores used in the Offsets Calculator	**Rationale**	**All**

Step 1: Determining conservation significance

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores (Or, if appropriate, manual data entry permitted)

Area / feature **(Impact site)**

Conservation significance determination for the environmental value impacted		
Conservation significance	**Description**	Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain Priority Ecological Community
	Type of environmental value	Ecological community
	Conservation significance of environmental value	Priority ecological community
	Conservation significance score	**0.1%**

Please select *area* or *feature* for the calculations	**Area**

Step 2: Calculating significant residual impact

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain Priority Ecological Community

***Area* (impact site)**

Part A: Significant impact calculation *Area*

	Description	Quantum of impact	
Significant impact	Clearing of 40.99 ha of Priority 3 Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain PEC	Significant impact (hectares)	40.99
		Quality (scale)	3.30
		Total quantum of impact	13.53

Part B: Rehabilitation credit calculation *Area* (onsite)

	Description				
Rehabilitation Credit		Proposed rehabilitation (area in hectares)		Time until ecological benefit (years)	
		Current quality of rehabilitation site (scale)		Confidence in rehabilitation result (%)	
		Future quality WITHOUT rehabilitation (scale)		Rehabilitation credit	0.00
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*

Significant residual impact	Total quantum of impact	13.53
	Rehabilitation credit	0.00
	Significant residual impact	13.53

WA Environmental Offsets Calculator

Step 3: Calculating offsets

Key:	
	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain Priority Ecological Community	Significant impact (step 2, part A)	40.99
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	13.53

***Area* (offset site)**

Offset calculation
Area

Offsets calculation							
	Description	**Proposed offset (area in hectares)**	5.01	**Duration of offset implementation (maximum 20 years)**	20.00	**Offset value**	**0.91**
	Lot 1 Tamarisk Drive, Gabbadah	**Current quality of offset site (scale)**	6.00	**Time until offset site secured (years)**	1.00		**6.7%**
		Future quality WITHOUT offset (scale)	5.00	**Risk of future loss WITHOUT offset (%)**	15.0%		
		Future quality WITH offset (scale)	7.00	**Risk of future loss WITH offset (%)**	5.0%		
		Time until ecological benefit (years)	20.00				
		Confidence in offset result (%)	67.0%			**OFFSET ADEQUATE?**	**NO**

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain Priority Ecological Community		The proposed clearing will impact on 40.99 ha of Tuart Woodland and Forest of the Swan Coastal Plain PEC.
Type of environmental value	Ecological community		Tuart Woodland is listed a Priority 3 Ecological Community by the DBCA.
Conservation significance of environmental value	Priority ecological community		Tuart Woddland is listed a Priority 3 Ecological Community by the DBCA.
Landscape-level value impacted	yes/no		NA
Significant impact			
Description	Clearing of 40.99 ha of Priority 3 Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain PEC		The proposed clearing will impact on 40.99 ha of Tuart Woodlands and Forests of the Swan Coastal Plain PEC.
Significant impact (hectares) / Type of feature	40.99		Clearing of 40.99 ha of native vegetation representative of Tuart Woodlands and Forests of the Swan Coastal Plain PEC.
Quality (scale) / Number	3.30		Weighted score based on the vegetation condition of the impact site: - 5.52 ha x 'Very Good' (6) - 0.05 ha x 'Good - Very Good' (5) - 15.19 ha x 'Good' (4) - 1.11 ha x 'Degraded - Good' (3) - 10.31 ha x 'Degraded' (2) - 3.77 ha x 'Completely Degraded' (0) - 5.05 ha x 'NA' buffered Areas
Rehabilitation credit			
Description	0		
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	Lot 1 Tamarisk Drive, Gabbadah		Preliminary surveys indicate that Lot 1 Tamarisk Drive contains 5.01 ha of State Priority 3 Ecological Community Tuart Woodlands and Forests PEC (PGV 2024).
Proposed offset (area in hectares)	5.01		5.01 ha of Tuart Woodlands and Forests of the Swan Coastal Plain PEC within Lot 1 Tamarisk Drive is proposed as an offset site for Anketell Road Upgrade
Current quality of offset site / Start number (of type of feature)	6.00		Vegetation within the offset site is of 'Very Good' condition. A value of '6' has been assigned for current vegetation condition (PGV 2024).
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	5.00		Considering the existing threatening processes (weeds and kangaroo grazing and edge effects) and lack of active management, the vegetation quality within the offset site is expected to decline over time without suitable management.
Future quality WITH offset (scale) / Future number WITH offset	7.00		With active management, the vegetation condition can be improved from 'Very Good' (6) to 'Very Good-Excellent' (7).
Time until ecological benefit (years)	20.00		It is estimated that it will take 10-20 years to achieve the desired species diversity, vegetation cover and weed density.
Confidence in offset result (%)	0.67		Moderate-high level of confidence that management actions will achieve results within the predicted timeframe.
Duration of offset implementation (maximum 20 years)	20.00		Offset management will continue for 20 years.

Time until offset site secured (years)	1.00		The site will be secured as an offset within one year of implementation of the Proposal.
Risk of future loss WITHOUT offset (%)	15.0%		Risk of loss without offset has been set at 15% as the existing land use and zoning on the property (Rural) and potential for commercial/residential development in the future may lead to loss of the ecological value. Rural zoned land is used for agriculture and it is unlikely that vegetation on Rural-zoned land will be managed for conservation, thereby inherently the vegetation is at risk of loss. Accordingly, because of the zoning, there was a risk that the values on the offset could be lost. The offset will be managed by DBCA and added to the conservation estate.
Risk of future loss WITH offset (%)	5.0%		Risk of loss without offset has been set at 5%. A residual risk of loss remains due to disease, dieback and/or catastrophic fire.
Offset ratio (Conservation area only)	N/A		

WA Environmental Offsets calculator

PLEASE ENABLE MACROS FOR THIS SPREADSHEET

Produced by:

The Department of Water and Environmental Regulation (DWER) in consultation with stakeholder working groups

Purpose:

Use the WA Envirionmental Offsets calculator in conjunction with the *Environmental offsets metric: Quantifying environmental offsets in Western Australia* guideline. Together, they form a supplement to section 4 of the *WA Environmental Offsets Guidelines* and provide information to help decision-makers, government officers, industry and the community to quantify environmental offsets.

Data currency:

The correct application of the WA Environmental Offsets Calculator relies on access to current datasets (such as vegetation extent and land tenure).

Process for using the WA Environmental Offsets Calculator		
Step	**Worksheet**	**Component**
Step 1: Determining conservation significance	**Step1_ConservationSignificance**	**Conservation significance determination**
		Combined *area* /*feature*
Step 2: Calculating significant residual impact	**Step2_SignificantResidualImpact**	**Part A: Significant impact calculation**
		Separate *area* or *feature* calculations
		Part B: Rehabilitation credit calculation
		Separate *area* or *feature* calculations
		Part C: Significant residual impact calculation
		Separate *area* or *feature* calculations
Step 3: Calculating offsets	**Step3_Offsets**	**Offsets calculation**
		Separate *area* or *feature* calculations
Rationale for scores used in the Offsets Calculator	**Rationale**	**All**

WA Environmental Offsets Calculator

Step 1: Determining conservation significance

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

(Or, if appropriate, manual data entry permitted)

Area / feature **(Impact site)**

Conservation significance determination for the environmental value impacted		
Conservation significance	**Description**	SCP 24 - Northern Spearwood Shrublands and Woodlands PEC
	Type of environmental value	Ecological community
	Conservation significance of environmental value	Priority ecological community
	Conservation significance score	**0.1%**

Please select *area* or *feature* for the calculations	**Area**

Step 2: Calculating significant residual impact

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	SCP 24 - Northern Spearwood Shrublands and Woodlands PEC

***Area* (impact site)**

Part A: Significant impact calculation *Area*

Significant impact	Description	Quantum of impact	
	Clearing of 57.12 ha of Priority 3 Ecological Community SCP 24 - Northern Spearwood Shrublands and Woodlands PEC	Significant impact (hectares)	57.12
		Quality (scale)	3.50
		Total quantum of impact	19.99

Part B: Rehabilitation credit calculation *Area* (onsite)

Rehabilitation Credit	Description	Proposed rehabilitation (area in hectares)		Time until ecological benefit (years)	
		Current quality of rehabilitation site (scale)		Confidence in rehabilitation result (%)	
		Future quality WITHOUT rehabilitation (scale)		Rehabilitation credit	0.00
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*

Significant residual impact		
	Total quantum of impact	19.99
	Rehabilitation credit	0.00
	Significant residual impact	19.99

WA Environmental Offsets Calculator

Step 3: Calculating offsets

Key:	
	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	SCP 24 - Northern Spearwood Shrublands and Woodlands PEC	Significant impact (step 2, part A)	57.12
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	19.99

***Area* (offset site)**

Offset calculation *Area*							
Offsets calculation	**Description**	**Proposed offset (area in hectares)**	110.10	**Duration of offset implementation (maximum 20 years)**	20.00	**Offset value**	**19.99**
	Lot 1 Tamarisk Drive, Gabbadah	**Current quality of offset site (scale)**	6.00	**Time until offset site secured (years)**	1.00		**100.0%**
		Future quality WITHOUT offset (scale)	5.00	**Risk of future loss WITHOUT offset (%)**	15.0%		
		Future quality WITH offset (scale)	7.00	**Risk of future loss WITH offset (%)**	5.0%		
		Time until ecological benefit (years)	20.00				
		Confidence in offset result (%)	67.0%			**OFFSET ADEQUATE?**	**NO**

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	SCP 24 - Northern Spearwood Shrublands and Woodlands PEC		The proposed clearing will impact on 57.12 ha of SCP 24 - Northern Spearwood Shrublands and Woodlands PEC.
Type of environmental value	Ecological community		SCP 24 is listed as Priority 3 Ecological Community by DBCA.
Conservation significance of environmental value	Priority ecological community		SCP 24 is listed as Priority 3 Ecological Community by DBCA.
Landscape-level value impacted	yes/no		NA
Significant impact			
Description	Clearing of 57.12 ha of Priority 3 Ecological Community SCP 24 - Northern Spearwood Shrublands and Woodlands PEC		The proposed clearing will impact on 57.12 ha of SCP 24 - Northern Spearwood Shrublands and Woodlands PEC.
Significant impact (hectares) / Type of feature	57.12		Clearing of 57.12 ha of native vegetation representative of SCP 24 as defined by Biota (2024).
Quality (scale) / Number	3.50		Weighted score based on the vegetation condition of the impact site: - 10.31 ha x 'Very Good' (6) - 5.79 ha x 'Good - Very Good' (5) - 19.64 ha x 'Good' (4) - 1.90 ha x 'Degraded - Good' (3) - 13.52 ha x 'Degraded' (2) - 5.97 ha x 'Completely Degraded (0)
Rehabilitation credit			
Description	0		
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	Lot 1 Tamarisk Drive, Gabbadah		Lot 1 Tamarisk Drive contains 110.10 ha of State Priority 3 Ecological Community SCP 24 - Northern Spearwood Shrublands and Woodlands PEC (PGV 2024).
Proposed offset (area in hectares)	110.10		110.1 ha of SCP 24 - Northern Spearwood Shrublands and Woodlands Priority 3 Ecological Community within Lot 1 Tamarisk Drive is proposed as an offset site for Anketell Road Upgrade
Current quality of offset site / Start number (of type of feature)	6.00		Vegetation within the offset site is of 'Very Good' condition (PGV 2024). A value of '6' has been assigned for vegetation condition.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	5.00		Considering the existing threatening processes (encroachment of urban development, unauthorised access, weeds and kangaroo grazing and edge effects) and lack of active management, the vegetation quality within the offset site is expected to decline over time without suitable management.
Future quality WITH offset (scale) / Future number WITH offset	7.00		With active management, the vegetation condition can be improved from 'Very Good' (6) to 'Very Good-Excellent' (7).
Time until ecological benefit (years)	20.00		It is estimated that it will take 10-20 years to achieve the desired species diversity, vegetation cover and weed density.
Confidence in offset result (%)	0.67		Moderate-high level of confidence that management actions will achieve results within the predicted timeframe.
Duration of offset implementation (maximum 20 years)	20.00		Offset management will continue for 20 years.
Time until offset site secured (years)	1.00		The site will be secured as an offset within one year of implementation of the Proposal.

Risk of future loss WITHOUT offset (%)	15.0%		Risk of loss without offset has been set at 15% as the existing land use and zoning on the property (Rural) and potential for commercial/residential development in the future may lead to loss of the ecological value. Rural zoned land is used for agriculture and it is unlikely that vegetation on Rural-zoned land will be managed for conservation, thereby inherently the vegetation is at risk of loss. Accordingly, because of the zoning, there was a risk that the values on the offset could be lost. The offset will be managed by DBCA and added to the conservation estate.
Risk of future loss WITH offset (%)	5.0%		Risk of loss without offset has been set at 5%. A residual risk of loss remains due to disease, dieback and/or catastrophic fire.
Offset ratio (Conservation area only)	N/A		

WA Environmental Offsets calculator

PLEASE ENABLE MACROS FOR THIS SPREADSHEET

Produced by:

The Department of Water and Environmental Regulation (DWER) in consultation with stakeholder working groups

Purpose:

Use the WA Envirionmental Offsets calculator in conjunction with the *Environmental offsets metric: Quantifying environmental offsets in Western Australia* guideline. Together, they form a supplement to section 4 of the *WA Environmental Offsets Guidelines* and provide information to help decision-makers, government officers, industry and the community to quantify environmental offsets.

Data currency:

The correct application of the WA Environmental Offsets Calculator relies on access to current datasets (such as vegetation extent and land tenure).

Process for using the WA Environmental Offsets Calculator		
Step	**Worksheet**	**Component**
Step 1: Determining conservation significance	**Step1_ConservationSignificance**	**Conservation significance determination**
		Combined *area* /*feature*
Step 2: Calculating significant residual impact	**Step2_SignificantResidualImpact**	**Part A: Significant impact calculation**
		Separate *area* or *feature* calculations
		Part B: Rehabilitation credit calculation
		Separate *area* or *feature* calculations
		Part C: Significant residual impact calculation
		Separate *area* or *feature* calculations
Step 3: Calculating offsets	**Step3_Offsets**	**Offsets calculation**
		Separate *area* or *feature* calculations
Rationale for scores used in the Offsets Calculator	**Rationale**	**All**

WA Environmental Offsets Calculator

Step 1: Determining conservation significance

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

(Or, if appropriate, manual data entry permitted)

Area / feature **(Impact site)**

Conservation significance determination for the environmental value impacted		
Conservation significance	**Description**	Carnaby's Black Cockatoo (Zanda latirostris)
	Type of environmental value	Species (flora/fauna)
	Conservation significance of environmental value	Rare/threatened species - endangered
	Conservation significance score	**1.2%**

Please select *area* or *feature* for the calculations	**Area**

Step 2: Calculating significant residual impact

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	Carnaby's Black Cockatoo (Zanda latirostris)

***Area* (impact site)**

Part A: Significant impact calculation *Area*

Significant impact	Description	Quantum of impact	
	Clearing of 56.98 ha of Carnaby's Black-Cockatoo foraging habitat	Significant impact (hectares)	56.98
		Quality (scale)	4.80
		Total quantum of impact	27.35

Part B: Rehabilitation credit calculation *Area* (onsite)

Rehabilitation Credit	Description	Proposed rehabilitation (area in hectares)		Time until ecological benefit (years)	
		Current quality of rehabilitation site (scale)		Confidence in rehabilitation result (%)	
		Future quality WITHOUT rehabilitation (scale)		Rehabilitation credit	0.00
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*

Significant residual impact		
	Total quantum of impact	27.35
	Rehabilitation credit	0.00
	Significant residual impact	27.35

WA Environmental Offsets Calculator

Step 3: Calculating offsets

Key:	
	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Carnaby's Black Cockatoo (Zanda latirostris)	Significant impact (step 2, part A)	56.98
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	27.35

Area **(offset site)**

Offset calculation *Area*							
Offsets calculation	**Description**	**Proposed offset (area in hectares)**	87.70	**Duration of offset implementation (maximum 20 years)**	20.00	**Offset value**	**11.05**
	Lot 1 Tamarisk Drive, Gabbadah	**Current quality of offset site (scale)**	6.00	**Time until offset site secured (years)**	1.00		**40.4%**
		Future quality WITHOUT offset (scale)	6.00	**Risk of future loss WITHOUT offset (%)**	15.0%		
		Future quality WITH offset (scale)	7.00	**Risk of future loss WITH offset (%)**	5.0%		
		Time until ecological benefit (years)	15.00				
		Confidence in offset result (%)	80.0%			**OFFSET ADEQUATE?**	**NO**

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	Carnaby's Black Cockatoo (Zanda		The proposed clearing will impact on 56.98 ha of foraging habitat for CBC.
Type of environmental value	Species (flora/fauna)		CBC is listed as Endangered under the state BC Act.
Conservation significance of environmental value	Rare/threatened species - endangered		CBC is listed as Endangered under the state BC Act and the Commonwealth EPBC Act.
Landscape-level value impacted	yes/no		NA
Significant impact			
Description	Clearing of 56.98 ha of Carnaby's Black-Cockatoo foraging habitat		Native vegetation comprising of suitable foraging habitat for CBC is proposed to be cleared for the Anketell Road upgrade.
Significant impact (hectares) / Type of feature	56.98		Clearing of 56.98 ha of CBC foraging habitat.
Quality (scale) / Number	4.80		Weighted score based on the foraging habitat quality of the impact site: - 7.57 ha x HQS 8 - 7.36 ha x HQS 6 - 1.65 ha x HQS 5 - 40.40 ha x HQS 4
Rehabilitation credit			
Description	0		
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	Lot 1 Tamarisk Drive, Gabbadah		Offset involves restoration of 87.7 ha of Carnaby's Black-Cocaktoo foraging habitat with the Gabbadah offset site.
Proposed offset (area in hectares)	87.70		Offset contains a 87.7 ha area of cleared land that will be restored to provide Carnaby's Black-Cockatoo habitat.
Current quality of offset site / Start number (of type of feature)	6.00		The site is within the known distribution range for CBC and it is considered likely to regularly utilise the offset site for foraging. The offset site contains vegetation dominated by suitable foraging species for Carnaby's Black-Cockatoo and was determined to have a score of 6 made up of 4 for habitat quality, 1 for site context and 1 for presence. (Moderate foraging value. Examples: - Woodland/low forest with tree banksias (of key species B. attenuata and B. menziesii) 20-40% projected foliage cover. - Kwongan/Shrubland containing species of foraging value, such as shrubby banksias, have 20-40% projected foliage cover, - Eucalypt Woodland/Forest with marri 20-40% projected foliage cover (BCE 2020).) There are known or potential breeding sites for Black-Cockatoos within 6 km of this area. One known Black-Cockatoo breeding site is located approximately 5 km south-east of the offset area . Numerous known Black-Cockatoo roosting sites occur within 10 km of the of the offset area.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	6.00		The foraging habitat is unlikely to become further degraded over time and therefore the HQS for CBC are unlikely to change for future quality without offset.
Future quality WITH offset (scale) / Future number WITH offset	7.00		With active management as part of the conservation estate, the foraging quality can be improved on this site. Securing the offset will also maintain an ecological linkage with Gnangara-Moore River State Forest to the east.
Time until ecological benefit (years)	15.00		It is estimated that it will take 15 years for the revegetation to achieve the desired ecological benefit.
Confidence in offset result (%)	0.8		A high level of confidence in the offset result has been assigned as Main Roads has a significant amount of experience in Black-Cockatoo habitat restoration from previous offset projects.

Duration of offset implementation (maximum 20 years)	20.00		The maximum offset implementation time of 20 years has been applied.
Time until offset site secured (years)	1.00		The site will be secured as an offset within one year of implementation of the Proposal.
Risk of future loss WITHOUT offset (%)	15.0%		Risk of loss without offset has been set at 15% as the existing land use and zoning on the property (Rural) and potential for commercial/residential development in the future may lead to loss of the ecological value. Rural zoned land is used for agriculture and it is unlikely that vegetation on Rural-zoned land will be managed for conservation, thereby inherently the vegetation is at risk of loss. Accordingly, because of the zoning, there was a risk that the values on the offset could be lost. The offset will be managed by DBCA and added to the conservation estate.
Risk of future loss WITH offset (%)	5.0%		Risk of loss without offset has been set at 5%. A residual risk of loss remains due to disease, dieback and/or catastrophic fire.
Offset ratio (Conservation area only)	N/A		

Appendix B – Lake Mealup Offset Calculators

WA Environmental Offsets calculator

PLEASE ENABLE MACROS FOR THIS SPREADSHEET

Produced by:

The Department of Water and Environmental Regulation (DWER) in consultation with stakeholder working groups

Purpose:

Use the WA Envirionmental Offsets calculator in conjunction with the *Environmental offsets metric: Quantifying environmental offsets in Western Australia* guideline. Together, they form a supplement to section 4 of the *WA Environmental Offsets Guidelines* and provide information to help decision-makers, government officers, industry and the community to quantify environmental offsets.

Data currency:

The correct application of the WA Environmental Offsets Calculator relies on access to current datasets (such as vegetation extent and land tenure).

Process for using the WA Environmental Offsets Calculator		
Step	**Worksheet**	**Component**
Step 1: Determining conservation significance	**Step1_ConservationSignificance**	**Conservation significance determination**
		Combined *area* /*feature*
Step 2: Calculating significant residual impact	**Step2_SignificantResidualImpact**	**Part A: Significant impact calculation**
		Separate *area* or *feature* calculations
		Part B: Rehabilitation credit calculation
		Separate *area* or *feature* calculations
		Part C: Significant residual impact calculation
		Separate *area* or *feature* calculations
Step 3: Calculating offsets	**Step3_Offsets**	**Offsets calculation**
		Separate *area* or *feature* calculations
Rationale for scores used in the Offsets Calculator	**Rationale**	**All**

WA Environmental Offsets Calculator

Step 1: Determining conservation significance

Key:
Data to be entered
Drop-down selection
Automatically-generated scores
(Or, if appropriate, manual data entry permitted)

Area / feature **(Impact site)**

Conservation significance determination for the environmental value impacted		
Conservation significance	**Description**	Banksia Woodland of the Swan Coastal Plain Priority Ecological Community
	Type of environmental value	Ecological community
	Conservation significance of environmental value	Priority ecological community
	Conservation significance score	**0.1%**

Please select *area* or *feature* for the calculations	**Area**

Step 2: Calculating significant residual impact

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	Banksia Woodland of the Swan Coastal Plain Priority Ecological Community

***Area* (impact site)**

Part A: Significant impact calculation *Area*

Significant impact	Description	Quantum of impact	
	Clearing of 14.56 ha of Priority 3 Banksia Woodlands of the Swan Coastal Plain Ecological Community	Significant impact (hectares)	14.56
		Quality (scale)	4.50
		Total quantum of impact	6.55

Part B: Rehabilitation credit calculation *Area* (onsite)

Rehabilitation Credit	Description			Time until ecological benefit (years)	
		Proposed rehabilitation (area in hectares)		Confidence in rehabilitation result (%)	
		Current quality of rehabilitation site (scale)		Rehabilitation credit	0.00
		Future quality WITHOUT rehabilitation (scale)			
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*

Significant residual impact		
	Total quantum of impact	6.55
	Rehabilitation credit	0.00
	Significant residual impact	6.55

WA Environmental Offsets Calculator

Step 3: Calculating offsets

Key:	
	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Banksia Woodland of the Swan Coastal Plain Priority Ecological Community	Significant impact (step 2, part A)	14.56
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	6.55

***Area* (offset site)**

Offset calculation *Area*							
Offsets calculation	**Description**	**Proposed offset (area in hectares)**	29.70	**Duration of offset implementation (maximum 20 years)**	20.00	**Offset value**	**5.10**
	Restoration of Banksia Woodland PEC at Lot 277 Lake Mealup Drive, Birchmont	**Current quality of offset site (scale)**	5.00	**Time until offset site secured (years)**	1.00		**77.8%**
		Future quality WITHOUT offset (scale)	4.00	**Risk of future loss WITHOUT offset (%)**	15.0%		
		Future quality WITH offset (scale)	6.00	**Risk of future loss WITH offset (%)**	5.0%		
		Time until ecological benefit (years)	20.00				
		Confidence in offset result (%)	67.0%			**OFFSET ADEQUATE?**	**NO**

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	Banksia Woodland of the Swan Coastal Plain Priority Ecological Community		The proposed clearing will impact on 14.56 ha of Banksia Woodland of the Swan Coastal Plain PEC.
Type of environmental value	Ecological community		Banksia Woodland of the Swan Coastal Plain is listed a Priority 3 Ecological Community by the DBCA.
Conservation significance of environmental value	Priority ecological community		Banksia Woodland of the Swan Coastal Plain is listed a Priority 3 Ecological Community by the DBCA
Landscape-level value impacted	yes/no		NA
Significant impact			
Description	Clearing of 14.56 ha of Priority 3 Banksia Woodlands of the Swan Coastal Plain Ecological Community		The proposed clearing will impact on 14.56 ha of Banksia Woodland of the Swan Coastal Plain PEC.
Significant impact (hectares) / Type of feature	14.56		Clearing of 14.56 ha of native vegetation representative of Banksia Woodland of the Swan Coastal Plain PEC.
Quality (scale) / Number	4.50		Weighted score based on the vegetation condition of the impact site: - 1.20 ha x 'Very Good - Excellent' (7) - 4.27 ha x 'Very Good' (6) - 2.11 ha x 'Good - Very Good' (5) - 3.68 ha x 'Good' (4) - 0.22 ha x 'Degraded - Good' (3) - 3.08 ha x 'Degraded' (2)
Rehabilitation credit			
Description	0		
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	Restoration of Banksia Woodland PEC at Lot 277 Lake Mealup Drive, Birchmont		Offset involves restoration of 29.70 ha of Banksia Woodland of the Swan Coastal Plain PEC within Lot 277 Lake Mealup Drive.
Proposed offset (area in hectares)	29.70		Based on information from DBCA and site inspection conducted by a Main Roads senior botanist, the offset contains an area of 45 ha of Banksia Woodland of the Swan Coastal Plain that will be restored. 29.70 ha of this will be used for this offset.
Current quality of offset site / Start number (of type of feature)	5.00		Quality score is proportionate to vegetation condition. A conservative quality of 'Good - Very Good' (5) has been applied based on a site inspection conducted by a Main Roads senior botanist.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	4.00		Considering the existing threatening processes (weeds and kangaroo grazing) and lack of active management, the vegetation quality within the offset site is expected to decline over time without suitable management.
Future quality WITH offset (scale) / Future number WITH offset	6.00		With active management, the vegetation condition can be improved from 'Good - Very Good' (5) to 'Very Good' (6).
Time until ecological benefit (years)	20.00		It is estimated that it will take 10-20 years to achieve the desired species diversity, vegetation cover and weed density.
Confidence in offset result (%)	0.67		The offset will be managed by DBCA and will provide an overall benefit for long term conservation. A moderate to high degree of confidence has been assigned as DBCA is an experienced land manager. The site occurs adjacent to existing DBCA managed land and will provide an ecological linkage between these lands and remnant vegetation surrounding the offset site.

Duration of offset implementation (maximum 20 years)	20.00		Main Roads will fund DBCA's management of the offset site for 20 years. The maximum offset implementation time has been applied.
Time until offset site secured (years)	1.00		The site will be secured as an offset within 1 year of the impact.
Risk of future loss WITHOUT offset (%)	15.0%		Risk of loss without offset has been set at 15% due to the current zoning (Regional Open Space / Rural), the existing land use (agricultural) and potential for commercial/residential development in the future that may lead to a loss of the ecological value. About a third of the land is zoned Regional Open Space, with the remainder Rural, but the property in its entirety is an active rural property and values present onsite are therefore at risk until the land use of the property changes. As a result the offset site is at risk until land use is formally secured for conservation.
Risk of future loss WITH offset (%)	5.0%		Risk of loss without the offset has been set at 5%. A residual risk of loss remains due to disease, sea level rise and/or catastrophic fire.
Offset ratio (Conservation area only)	N/A		

WA Environmental Offsets calculator

PLEASE ENABLE MACROS FOR THIS SPREADSHEET

Produced by:

The Department of Water and Environmental Regulation (DWER) in consultation with stakeholder working groups

Purpose:

Use the WA Envirionmental Offsets calculator in conjunction with the *Environmental offsets metric: Quantifying environmental offsets in Western Australia* guideline. Together, they form a supplement to section 4 of the *WA Environmental Offsets Guidelines* and provide information to help decision-makers, government officers, industry and the community to quantify environmental offsets.

Data currency:

The correct application of the WA Environmental Offsets Calculator relies on access to current datasets (such as vegetation extent and land tenure).

Process for using the WA Environmental Offsets Calculator		
Step	**Worksheet**	**Component**
Step 1: Determining conservation significance	**Step1_ConservationSignificance**	**Conservation significance determination**
		Combined *area* /*feature*
Step 2: Calculating significant residual impact	**Step2_SignificantResidualImpact**	**Part A: Significant impact calculation**
		Separate *area* or *feature* calculations
		Part B: Rehabilitation credit calculation
		Separate *area* or *feature* calculations
		Part C: Significant residual impact calculation
		Separate *area* or *feature* calculations
Step 3: Calculating offsets	**Step3_Offsets**	**Offsets calculation**
		Separate *area* or *feature* calculations
Rationale for scores used in the Offsets Calculator	**Rationale**	**All**

Step 1: Determining conservation significance

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores (Or, if appropriate, manual data entry permitted)

Area / feature **(Impact site)**

Conservation significance determination for the environmental value impacted		
Conservation significance	**Description**	Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain Priority Ecological Community
	Type of environmental value	Ecological community
	Conservation significance of environmental value	Priority ecological community
	Conservation significance score	**0.1%**

Please select *area* or *feature* for the calculations	**Area**

Step 2: Calculating significant residual impact

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain Priority Ecological Community

***Area* (impact site)**

Part A: Significant impact calculation *Area*

	Description	Quantum of impact	
Significant impact	Clearing of 40.99 ha of Priority 3 Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain PEC	Significant impact (hectares)	40.99
		Quality (scale)	3.30
		Total quantum of impact	13.53

Part B: Rehabilitation credit calculation *Area* (onsite)

	Description				
Rehabilitation Credit		Proposed rehabilitation (area in hectares)		Time until ecological benefit (years)	
		Current quality of rehabilitation site (scale)		Confidence in rehabilitation result (%)	
		Future quality WITHOUT rehabilitation (scale)		Rehabilitation credit	0.00
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*

Significant residual impact	Total quantum of impact	13.53
	Rehabilitation credit	0.00
	Significant residual impact	13.53

WA Environmental Offsets Calculator

Step 3: Calculating offsets

Key:	
	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain Priority Ecological Community	Significant impact (step 2, part A)	40.99
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	13.53

***Area* (offset site)**

Offset calculation
Area

Offsets calculation							
	Description	**Proposed offset (area in hectares)**	40.00	**Duration of offset implementation (maximum 20 years)**	20.00	**Offset value**	**9.90**
	Restoration of Tuart Woodland PEC at Lot 277 Lake Mealup Drive, Birchmont	**Current quality of offset site (scale)**	6.00	**Time until offset site secured (years)**	1.00		**73.2%**
		Future quality WITHOUT offset (scale)	5.00	**Risk of future loss WITHOUT offset (%)**	15.0%		
		Future quality WITH offset (scale)	8.00	**Risk of future loss WITH offset (%)**	5.0%		
		Time until ecological benefit (years)	20.00				
		Confidence in offset result (%)	67.0%			**OFFSET ADEQUATE?**	**NO**

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain Priority Ecological Community		The proposed clearing will impact on 40.99 ha of Tuart Woodland and Forest of the Swan Coastal Plain PEC.
Type of environmental value	Ecological community		Tuart Woodland and Forest of the Swan Coastal Plain is listed a Priority 3 Ecological Community by the DBCA.
Conservation significance of environmental value	Priority ecological community		Tuart Woodland and Forest of the Swan Coastal Plain is listed a Priority 3 Ecological Community by the DBCA.
Landscape-level value impacted	yes/no		NA
Significant impact			
Description	Clearing of 40.99 ha of Priority 3 Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain PEC		The proposed clearing will impact on 40.99 ha of Tuart Woodlands and Forests of the Swan Coastal Plain PEC.
Significant impact (hectares) / Type of feature	40.99		Clearing of 40.99 ha of native vegetation representative of Tuart Woodlands and Forests of the Swan Coastal Plain PEC.
Quality (scale) / Number	3.30		Weighted score based on the vegetation condition of the impact site: - 5.52 ha x 'Very Good' (6) - 0.05 ha x 'Good - Very Good' (5) - 15.19 ha x 'Good' (4) - 1.11 ha x 'Degraded - Good' (3) - 10.31 ha x 'Degraded' (2) - 3.77 ha x 'Completely Degraded' (0) - 5.05 ha x 'NA' buffered Areas
Rehabilitation credit			
Description	0		
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	Restoration of Tuart Woodland PEC at Lot 277 Lake Mealup Drive, Birchmont		Offset involving restoration of 40 ha of Tuart Woodland and Forest of the Swan Coastal Plain PEC at 277 Lake Mealup Drive.
Proposed offset (area in hectares)	40.00		Offset will involve restoration of 40 ha of Tuart Woodland and Forest of the Swan Coastal Plain PEC.
Current quality of offset site / Start number (of type of feature)	6.00		Areas proposed to be restored contain Tuart Woodland PEC remnant vegetation considered to be of 'High' condtion according to the Commonwealth Conservation Advice (6).
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	5.00		Considering the existing threatening processes (weeds and kangaroo grazing) and lack of active management, the vegetation quality within the offset site is expected to decline over time without suitable management.
Future quality WITH offset (scale) / Future number WITH offset	8.00		With active management, the vegetation condition can be improved from 'High' (6) to 'High to Very High' (8) (measured in accordance with the Commonwealth Conservation Advice).
Time until ecological benefit (years)	20.00		It is estimated that it will take 10-20 years to achieve the desired species diversity, vegetation cover and weed density.

Confidence in offset result (%)	0.67		The offset will be managed by DBCA and will provide an overall benefit for long term conservation. A moderate to high degree of confidence has been assigned as DBCA is an experienced land manager. The site occurs adjacent to existing DBCA managed land and will provide an ecological linkage between these lands and remnant vegetation surrounding the offset site.
Duration of offset implementation (maximum 20 years)	20.00		Main Roads will fund DBCA's management of the offset site for 20 years. The maximum offset implementation time has been applied.
Time until offset site secured (years)	1.00		The site will be secured as an offset within 1 year of the commencement of the Proposal.
Risk of future loss WITHOUT offset (%)	15.0%		Risk of loss without offset has been set at 15% due to the current zoning (Regional Open Space / Rural), the existing land use (agricultural) and potential for commercial/residential development in the future that may lead to a loss of the ecological value. About a third of the land is zoned Regional Open Space, with the remainder Rural, but the property in its entirety is an active rural property and values present onsite are therefore at risk until the land use of the property changes. As a result the offset site is at risk until land use is formally secured for conservation.
Risk of future loss WITH offset (%)	5.0%		Risk of loss without the offset has been set at 5%. A residual risk of loss remains due to disease, salinity, sea level rise and/or catastrophic fire.
Offset ratio (Conservation area only)	N/A		

WA Environmental Offsets calculator

PLEASE ENABLE MACROS FOR THIS SPREADSHEET

Produced by:

The Department of Water and Environmental Regulation (DWER) in consultation with stakeholder working groups

Purpose:

Use the WA Envirionmental Offsets calculator in conjunction with the *Environmental offsets metric: Quantifying environmental offsets in Western Australia* guideline. Together, they form a supplement to section 4 of the *WA Environmental Offsets Guidelines* and provide information to help decision-makers, government officers, industry and the community to quantify environmental offsets.

Data currency:

The correct application of the WA Environmental Offsets Calculator relies on access to current datasets (such as vegetation extent and land tenure).

Process for using the WA Environmental Offsets Calculator		
Step	**Worksheet**	**Component**
Step 1: Determining conservation significance	**Step1_ConservationSignificance**	**Conservation significance determination**
		Combined *area* /*feature*
Step 2: Calculating significant residual impact	**Step2_SignificantResidualImpact**	**Part A: Significant impact calculation**
		Separate *area* or *feature* calculations
		Part B: Rehabilitation credit calculation
		Separate *area* or *feature* calculations
		Part C: Significant residual impact calculation
		Separate *area* or *feature* calculations
Step 3: Calculating offsets	**Step3_Offsets**	**Offsets calculation**
		Separate *area* or *feature* calculations
Rationale for scores used in the Offsets Calculator	**Rationale**	**All**

WA Environmental Offsets Calculator

Step 1: Determining conservation significance

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

(Or, if appropriate, manual data entry permitted)

Area / feature **(Impact site)**

Conservation significance determination for the environmental value impacted		
Conservation significance	**Description**	Carnaby's Black Cockatoo (Zanda latirostris)
	Type of environmental value	Species (flora/fauna)
	Conservation significance of environmental value	Rare/threatened species - endangered
	Conservation significance score	**1.2%**

Please select *area* or *feature* for the calculations	**Area**

Step 2: Calculating significant residual impact

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	Carnaby's Black Cockatoo (Zanda latirostris)

***Area* (impact site)**

Part A: Significant impact calculation *Area*

Significant impact	Description	Quantum of impact	
	Clearing of 56.98 ha of Carnaby's Black-Cockatoo foraging habitat	Significant impact (hectares)	56.98
		Quality (scale)	4.80
		Total quantum of impact	27.35

Part B: Rehabilitation credit calculation *Area* (onsite)

Rehabilitation Credit	Description	Proposed rehabilitation (area in hectares)		Time until ecological benefit (years)	
		Current quality of rehabilitation site (scale)		Confidence in rehabilitation result (%)	
		Future quality WITHOUT rehabilitation (scale)		Rehabilitation credit	0.00
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*

Significant residual impact		
	Total quantum of impact	27.35
	Rehabilitation credit	0.00
	Significant residual impact	27.35

WA Environmental Offsets Calculator

Step 3: Calculating offsets

Key:	
	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Carnaby's Black Cockatoo (Zanda latirostris)	Significant impact (step 2, part A)	56.98
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	27.35

Area **(offset site)**

Offset calculation *Area*							
Offsets calculation	**Description**	**Proposed offset (area in hectares)**	45.00	**Duration of offset implementation (maximum 20 years)**	20.00	**Offset value**	**5.67**
	Restoration of Carnaby's Black-Cockatoo Foraging Habitat at Lot 277 Lake Mealup Drive, Birchmont	**Current quality of offset site (scale)**	6.00	**Time until offset site secured (years)**	1.00		**20.7%**
		Future quality WITHOUT offset (scale)	6.00	**Risk of future loss WITHOUT offset (%)**	15.0%		
		Future quality WITH offset (scale)	7.00	**Risk of future loss WITH offset (%)**	5.0%		
		Time until ecological benefit (years)	15.00				
		Confidence in offset result (%)	80.0%			**OFFSET ADEQUATE?**	**NO**

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	Carnaby's Black Cockatoo (Zanda latirostris)		The proposed clearing will impact on 56.98 ha of foraging habitat for Carnaby's Black-Cockatoo.
Type of environmental value	Species (flora/fauna)		Carnaby's Black-Cockatoo is listed as Endangered under the state BC Act.
Conservation significance of environmental value	Rare/threatened species - endangered		Carnaby's Black-Cockatoo is listed as Endangered under the state BC Act and the Commonwealth EPBC Act.
Landscape-level value impacted	yes/no		NA
Significant impact			
Description	Clearing of 56.98 ha of Carnaby's Black-Cockatoo foraging habitat		Suitable foraging habitat for Carnaby's Black-Cockatoo is proposed to be cleared for the Anketell Road upgrade.
Significant impact (hectares) / Type of feature	56.98		Clearing of 56.98 ha of CBC foraging habitat.
Quality (scale) / Number	4.80		Weighted score based on the foraging habitat quality of the impact site: - 7.57 ha x HQS 8 - 7.36 ha x HQS 6 - 1.65 ha x HQS 5 - 40.40 ha x HQS 4
Rehabilitation credit			
Description	0		
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	Restoration of Carnaby's Black-Cockatoo Foraging Habitat at Lot 277 Lake Mealup Drive, Birchmont		Offset involves restoration 45 ha of Carnaby's Black-Cockatoo foraging habitat within Lot 277 Lake Mealup Drive.
Proposed offset (area in hectares)	45.00		Offset contains a 45 ha area of vegetation that will be restored to suitable foraging habitat for Carnaby's Black-Cockatoo.
Current quality of offset site / Start number (of type of feature)	6.00		The site is within the known distribution range for CBC and it is considered likely to regularly utilise the offset site for foraging. The offset site contains vegetation dominated by suitable foraging species for Carnaby's Black-Cockatoo and was determined to have a score of 6 made up of 4 for habitat quality, 1 for site context and 1 for presence. (Moderate foraging value. Examples: - Woodland/low forest with tree banksias (of key species B. attenuata and B. menziesii) 20-40% projected foliage cover. - Kwongan/Shrubland containing species of foraging value, such as shrubby banksias, have 20-40% projected foliage cover, - Eucalypt Woodland/Forest with marri 20-40% projected foliage cover (BCE 2020).) There are known or potential roosting sites for Black-Cockatoos within 6 km of this area, the closest being 4 km west. One known Black-Cockatoo breeding roosting sites ares located approximately 7.6 km south-west of the offset area and therefore a site context score of 1 has been applied.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	6.00		Without the threat of further clearing, the foraging habitat is unlikely to become further degraded over time and therefore the HQS for CBC are unlikely to change for future quality without offset.

Future quality WITH offset (scale) / Future number WITH offset	7.00		With active management as part of the conservation estate, the foraging quality can be improved on this site. Securing the offset will also provide an ecological linkage between Mealup Point Nature Reserve, McLarty Nature Reserve and Lake Mealup Nature Reserve.
Time until ecological benefit (years)	15.00		It is estimated that it will take 15 years for the revegetation to achieve the desired ecological benefit.
Confidence in offset result (%)	0.8		A high level of confidence in the offset result has been assigned as Main Roads has a significant amount of experience in Black-Cockatoo habitat restoration from previous offset projects.
Duration of offset implementation (maximum 20 years)	20.00		The maximum offset implementation time of 20 years has been applied.
Time until offset site secured (years)	1.00		The site will be secured as an offset within 1 year of the commencement of the Proposal.
Risk of future loss WITHOUT offset (%)	15.0%		Risk of loss without offset has been set at 15% due to the current zoning (Regional Open Space / Rural), the existing land use (agricultural) and potential for commercial/residential development in the future that may lead to a loss of the ecological value. About a third of the land is zoned Regional Open Space, with the remainder Rural, but the property in its entirety is an active rural property and values present onsite are therefore at risk until the land use of the property changes. As a result the offset site is at risk until land use is formally secured for conservation.
Risk of future loss WITH offset (%)	5.0%		Risk of loss without the offset has been set at 5%. A residual risk of loss remains due to disease, sea level rise and/or catastrophic fire.
Offset ratio (Conservation area only)	N/A		

WA Environmental Offsets calculator

PLEASE ENABLE MACROS FOR THIS SPREADSHEET

Produced by:

The Department of Water and Environmental Regulation (DWER) in consultation with stakeholder working groups

Purpose:

Use the WA Envirionmental Offsets calculator in conjunction with the *Environmental offsets metric: Quantifying environmental offsets in Western Australia* guideline. Together, they form a supplement to section 4 of the *WA Environmental Offsets Guidelines* and provide information to help decision-makers, government officers, industry and the community to quantify environmental offsets.

Data currency:

The correct application of the WA Environmental Offsets Calculator relies on access to current datasets (such as vegetation extent and land tenure).

Process for using the WA Environmental Offsets Calculator		
Step	**Worksheet**	**Component**
Step 1: Determining conservation significance	**Step1_ConservationSignificance**	**Conservation significance determination**
		Combined *area* /*feature*
Step 2: Calculating significant residual impact	**Step2_SignificantResidualImpact**	**Part A: Significant impact calculation**
		Separate *area* or *feature* calculations
		Part B: Rehabilitation credit calculation
		Separate *area* or *feature* calculations
		Part C: Significant residual impact calculation
		Separate *area* or *feature* calculations
Step 3: Calculating offsets	**Step3_Offsets**	**Offsets calculation**
		Separate *area* or *feature* calculations
Rationale for scores used in the Offsets Calculator	**Rationale**	**All**

WA Environmental Offsets Calculator

Step 1: Determining conservation significance

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

(Or, if appropriate, manual data entry permitted)

Area / feature **(Impact site)**

Conservation significance determination for the environmental value impacted		
Conservation significance	**Description**	Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso)
	Type of environmental value	Species (flora/fauna)
	Conservation significance of environmental value	Rare/threatened Species - vulnerable
	Conservation significance score	**0.2%**

Please select *area* or *feature* for the calculations	**Area**

Step 2: Calculating significant residual impact

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso)

***Area* (impact site)**

Part A: Significant impact calculation *Area*

Significant impact	Description	Quantum of impact	
	Clearing of 38.34 ha of Forest Red-tailed Black-Cockatoo foraging habitat	Significant impact (hectares)	38.34
		Quality (scale)	4.80
		Total quantum of impact	18.40

Part B: Rehabilitation credit calculation *Area* (onsite)

Rehabilitation Credit	Description			Time until ecological benefit (years)	
		Proposed rehabilitation (area in hectares)			
		Current quality of rehabilitation site (scale)		Confidence in rehabilitation result (%)	
		Future quality WITHOUT rehabilitation (scale)		Rehabilitation credit	0.00
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*

Significant residual impact		
	Total quantum of impact	18.40
	Rehabilitation credit	0.00
	Significant residual impact	18.40

WA Environmental Offsets Calculator

Step 3: Calculating offsets

Key:	
	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso)	Significant impact (step 2, part A)	38.34
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	18.40

Area **(offset site)**

Offset calculation *Area*							
Offsets calculation	**Description**	**Proposed offset (area in hectares)**	45.00	**Duration of offset implementation (maximum 20 years)**	20.00	**Offset value**	**6.11**
	Restoration of Forest Red-tailed Black-Cockatoo Foraging Habitat at Lot 277 Lake Mealup Drive, Birchmont	**Current quality of offset site (scale)**	6.00	**Time until offset site secured (years)**	1.00		**33.2%**
		Future quality WITHOUT offset (scale)	6.00	**Risk of future loss WITHOUT offset (%)**	15.0%		
		Future quality WITH offset (scale)	7.00	**Risk of future loss WITH offset (%)**	5.0%		
		Time until ecological benefit (years)	15.00				
		Confidence in offset result (%)	80.0%			**OFFSET ADEQUATE?**	**NO**

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso)		The proposed clearing will impact on 38.34 ha of foraging habitat for FRTBC.
Type of environmental value	Species (flora/fauna)		FRTBC is listed as Vulnerable under the state BC Act.
Conservation significance of environmental value	Rare/threatened Species - vulnerable		FRTBC is listed as Vulnerable under the state BC Act and the Commonwealth EPBC Act.
Landscape-level value impacted	yes/no		NA
Significant impact			
Description	Clearing of 38.34 ha of Forest Red-tailed Black-Cockatoo foraging habitat		Native vegetation comprising of suitable foraging habitat for FRTBC is proposed to be cleared for the Anketell Road upgrade.
Significant impact (hectares) / Type of feature	38.34		Clearing of 38.34 ha of FRTBC foraging habitat.
Quality (scale) / Number	4.80		Weighted score based on the foraging habitat quality of the impact site: - 7.57 ha x HQS 8 - 30.78 ha x HQS 4
Rehabilitation credit			
Description	0		
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	Restoration of Forest Red-tailed Black-Cockatoo Foraging Habitat at Lot 277 Lake Mealup Drive, Birchmont		Offset involves restoration 45 ha of Forest Red-tailed Black-Cockatoo foraging habitat within Lot 277 Lake Mealup Drive.
Proposed offset (area in hectares)	45.00		Offset contains a 45 ha area of vegetation that will be restored to suitable foraging habitat for Forest Red-tailed Black-Cockatoo.
Current quality of offset site / Start number (of type of feature)	6.00		The site is within the known distribution range for FRTBC and it is considered likely to regularly utilise the offset site for foraging. The offset site contains vegetation dominated by suitable foraging species for Forest Red-tailed Black-Cockatoo and was determined to have a score of 6 made up of 4 for habitat quality, 1 for site context and 1 for presence. (Moderate foraging value. Examples: -Marri-Jarrah Woodland/Forest with 20- 40% projected foliage cover; Marri-Jarrah Forest with 40-60% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths; Sheoak Forest with 40-60% projected foliage cover. (BCE 2020).) There are known or potential roosting sites for Black-Cockatoos within 6 km of this area, the closest being 4 km west. One known Black-Cockatoo breeding roosting sites ares located approximately 7.6 km south-west of the offset area and therefore a site context score of 1 has been applied.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	6.00		Without acquisition of the proposed offset, it is considered that the site will be subject to impacts such as increase degradation, weed invasion, feral animals and dieback. Without the threat of further clearing, the foraging habitat is unlikely to become further degraded over time and therefore the HQS for FRTBC are unlikely to change for future quality without offset.

Future quality WITH offset (scale) / Future number WITH offset	7.00		With active management as part of the conservation estate, the foraging quality can be improved on this site. Securing the offset will also provide an ecological linkage between Mealup Point Nature Reserve, McLarty Nature Reserve and Lake Mealup Nature Reserve.
Time until ecological benefit (years)	15.00		It is estimated that it will take 15 years for the revegetation to achieve the desired ecological benefit.
Confidence in offset result (%)	0.8		A high level of confidence in the offset result has been assigned as Main Roads has a significant amount of experience in Black-Cockatoo habitat restoration from previous offset projects.
Duration of offset implementation (maximum 20 years)	20.00		The maximum offset implementation time of 20 years has been applied.
Time until offset site secured (years)	1.00		The site will be secured as an offset within 1 year of the commencement of the Proposal.
Risk of future loss WITHOUT offset (%)	15.0%		Risk of loss without offset has been set at 15% due to the current zoning (Regional Open Space / Rural), the existing land use (agricultural) and potential for commercial/residential development in the future that may lead to a loss of the ecological value. About a third of the land is zoned Regional Open Space, with the remainder Rural, but the property in its entirety is an active rural property and values present onsite are therefore at risk until the land use of the property changes. As a result the offset site is at risk until land use is formally secured for conservation.
Risk of future loss WITH offset (%)	5.0%		Risk of loss without the offset has been set at 5%. A residual risk of loss remains due to disease, sea level rise and/or catastrophic fire.
Offset ratio (Conservation area only)	N/A		

WA Environmental Offsets calculator

PLEASE ENABLE MACROS FOR THIS SPREADSHEET

Produced by:

The Department of Water and Environmental Regulation (DWER) in consultation with stakeholder working groups

Purpose:

Use the WA Envirionmental Offsets calculator in conjunction with the *Environmental offsets metric: Quantifying environmental offsets in Western Australia* guideline. Together, they form a supplement to section 4 of the *WA Environmental Offsets Guidelines* and provide information to help decision-makers, government officers, industry and the community to quantify environmental offsets.

Data currency:

The correct application of the WA Environmental Offsets Calculator relies on access to current datasets (such as vegetation extent and land tenure).

Process for using the WA Environmental Offsets Calculator		
Step	**Worksheet**	**Component**
Step 1: Determining conservation significance	**Step1_ConservationSignificance**	**Conservation significance determination**
		Combined *area* /*feature*
Step 2: Calculating significant residual impact	**Step2_SignificantResidualImpact**	**Part A: Significant impact calculation**
		Separate *area* or *feature* calculations
		Part B: Rehabilitation credit calculation
		Separate *area* or *feature* calculations
		Part C: Significant residual impact calculation
		Separate *area* or *feature* calculations
Step 3: Calculating offsets	**Step3_Offsets**	**Offsets calculation**
		Separate *area* or *feature* calculations
Rationale for scores used in the Offsets Calculator	**Rationale**	**All**

Step 1: Determining conservation significance

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores (Or, if appropriate, manual data entry permitted)

Area / feature **(Impact site)**

Conservation significance determination for the environmental value impacted		
Conservation significance	**Description**	Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain Priority Ecological Community
	Type of environmental value	Ecological community
	Conservation significance of environmental value	Priority ecological community
	Conservation significance score	**0.1%**

Please select *area* or *feature* for the calculations	**Area**

Step 2: Calculating significant residual impact

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain Priority Ecological Community

***Area* (impact site)**

Part A: Significant impact calculation *Area*

	Description	Quantum of impact	
Significant impact	Clearing of 40.99 ha of Priority 3 Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain PEC	Significant impact (hectares)	40.99
		Quality (scale)	3.30
		Total quantum of impact	13.53

Part B: Rehabilitation credit calculation *Area* (onsite)

	Description				
Rehabilitation Credit		Proposed rehabilitation (area in hectares)		Time until ecological benefit (years)	
		Current quality of rehabilitation site (scale)		Confidence in rehabilitation result (%)	
		Future quality WITHOUT rehabilitation (scale)		Rehabilitation credit	0.00
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*

Significant residual impact	Total quantum of impact	13.53
	Rehabilitation credit	0.00
	Significant residual impact	13.53

WA Environmental Offsets Calculator

Step 3: Calculating offsets

Key:	
	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain Priority Ecological Community	Significant impact (step 2, part A)	40.99
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	13.53

***Area* (offset site)**

Offset calculation *Area*							
Offsets calculation	Description	Proposed offset (area in hectares)	5.20	Duration of offset implementation (maximum 20 years)	20.00	Offset value	2.73
	Revegetation of Tuart Woodland PEC at Lot 277 Lake Mealup Drive, Birchmont	Current quality of offset site (scale)	0.00	Time until offset site secured (years)	1.00		20.2%
		Future quality WITHOUT offset (scale)	0.00	Risk of future loss WITHOUT offset (%)	0.0%		
		Future quality WITH offset (scale)	8.00	Risk of future loss WITH offset (%)	0.0%		
		Time until ecological benefit (years)	20.00				
		Confidence in offset result (%)	67.0%			OFFSET ADEQUATE?	NO

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain Priority Ecological Community		The proposed clearing will impact on 40.99 ha of Tuart Woodland and Forest of the Swan Coastal Plain PEC.
Type of environmental value	Ecological community		Tuart WL is listed a Priority 3 Ecological Community by the DBCA.
Conservation significance of environmental value	Priority ecological community		Tuart WL is listed a Priority 3 Ecological Community by the DBCA.
Landscape-level value impacted	yes/no		NA
Significant impact			
Description	Clearing of 40.99 ha of Priority 3 Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain PEC		The proposed clearing will impact on 40.99 ha of Tuart Woodlands and Forests of the Swan Coastal Plain PEC.
Significant impact (hectares) / Type of feature	40.99		Clearing of 40.99 ha of native vegetation representative of Tuart Woodlands and Forests of the Swan Coastal Plain PEC.
Quality (scale) / Number	3.30		Weighted score based on the vegetation condition of the impact site: - 5.52 ha x 'Very Good' (6) - 0.05 ha x 'Good - Very Good' (5) - 15.19 ha x 'Good' (4) - 1.11 ha x 'Degraded - Good' (3) - 10.31 ha x 'Degraded' (2) - 3.77 ha x 'Completely Degraded' (0) - 5.05 ha x 'NA' buffered Areas
Rehabilitation credit			
Description	0		
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	Revegetation of Tuart Woodland PEC at Lot 277 Lake Mealup Drive, Birchmont		Offset involving revegetation of 5.2 ha of Tuart Woodland and Forest of the Swan Coastal Plain PEC at 277 Lake Mealup Drive.
Proposed offset (area in hectares)	5.20		Offset contains an area of 5.2 ha of cleared land that would once have contained Tuart Woodland and Forest of the Swan Coastal Plain that will be revegetated to the PEC.
Current quality of offset site / Start number (of type of feature)	0.00		Area proposed to be revegetated is largely devoid of intact remnant vegetation. A score of '0' has been applied.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	0.00		Without active management or revegetation of the site, due to the presence of weeds and grazing impacts, the vegetation condition is unlikely to improve.
Future quality WITH offset (scale) / Future number WITH offset	8.00		With active revegetation and management, vegetation condition will be improved from 'Completely Degraded' (0) to 'Very High' (8) (measured in accordance with the Commonwealth Conservation Advice).
Time until ecological benefit (years)	20.00		It is estimated that it will take 10-20 years to achieve the desired species diversity, vegetation cover and weed density.

Confidence in offset result (%)	0.67		A moderate to high level of confidence in the offset result has been assigned as Main Roads has a significant amount of experience in Tuart Woodland restoration from previous offset projects. The site occurs adjacent to existing DBCA managed land and will provide an ecological linkage between these lands and remnant vegetation surrounding the offset site.
Duration of offset implementation (maximum 20 years)	20.00		The site will be managed by DBCA for the long term conservation purposes. The maximum offset implementation time has been applied.
Time until offset site secured (years)	1.00		The site will be secured as an offset within 1 year of commencement.
Risk of future loss WITHOUT offset (%)	0.0%		Risk of loss without the offset has been set at 0% as the offset does not contain Tuart PEC values that could be lost. The offset will be managed by DBCA and added to the conservation estate.
Risk of future loss WITH offset (%)	0.0%		Risk of loss without the offset has been set at 0%. Due to the existing quality, it is considered that no risk of loss will occur with the offset.
Offset ratio (Conservation area only)	N/A		

WA Environmental Offsets calculator

PLEASE ENABLE MACROS FOR THIS SPREADSHEET

Produced by:

The Department of Water and Environmental Regulation (DWER) in consultation with stakeholder working groups

Purpose:

Use the WA Envirionmental Offsets calculator in conjunction with the *Environmental offsets metric: Quantifying environmental offsets in Western Australia* guideline. Together, they form a supplement to section 4 of the *WA Environmental Offsets Guidelines* and provide information to help decision-makers, government officers, industry and the community to quantify environmental offsets.

Data currency:

The correct application of the WA Environmental Offsets Calculator relies on access to current datasets (such as vegetation extent and land tenure).

Process for using the WA Environmental Offsets Calculator		
Step	**Worksheet**	**Component**
Step 1: Determining conservation significance	**Step1_ConservationSignificance**	**Conservation significance determination**
		Combined *area* /*feature*
Step 2: Calculating significant residual impact	**Step2_SignificantResidualImpact**	**Part A: Significant impact calculation**
		Separate *area* or *feature* calculations
		Part B: Rehabilitation credit calculation
		Separate *area* or *feature* calculations
		Part C: Significant residual impact calculation
		Separate *area* or *feature* calculations
Step 3: Calculating offsets	**Step3_Offsets**	**Offsets calculation**
		Separate *area* or *feature* calculations
Rationale for scores used in the Offsets Calculator	**Rationale**	**All**

WA Environmental Offsets Calculator

Step 1: Determining conservation significance

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

(Or, if appropriate, manual data entry permitted)

Area / feature **(Impact site)**

Conservation significance determination for the environmental value impacted		
Conservation significance	**Description**	Carnaby's Black Cockatoo (Zanda latirostris)
	Type of environmental value	Species (flora/fauna)
	Conservation significance of environmental value	Rare/threatened species - endangered
	Conservation significance score	**1.2%**

Please select *area* or *feature* for the calculations	**Area**

Step 2: Calculating significant residual impact

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	Carnaby's Black Cockatoo (Zanda latirostris)

***Area* (impact site)**

Part A: Significant impact calculation *Area*

Significant impact	Description	Quantum of impact	
	Clearing of 56.98 ha of Carnaby's Black-Cockatoo foraging habitat	Significant impact (hectares)	56.98
		Quality (scale)	4.80
		Total quantum of impact	27.35

Part B: Rehabilitation credit calculation *Area* (onsite)

Rehabilitation Credit	Description	Proposed rehabilitation (area in hectares)		Time until ecological benefit (years)	
		Current quality of rehabilitation site (scale)		Confidence in rehabilitation result (%)	
		Future quality WITHOUT rehabilitation (scale)		Rehabilitation credit	0.00
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*

Significant residual impact		
	Total quantum of impact	27.35
	Rehabilitation credit	0.00
	Significant residual impact	27.35

WA Environmental Offsets Calculator

Step 3: Calculating offsets

Key:	
	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Carnaby's Black Cockatoo (Zanda latirostris)	Significant impact (step 2, part A)	56.98
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	27.35

Area **(offset site)**

Offset calculation *Area*							
Offsets calculation	**Description**	**Proposed offset (area in hectares)**	16.70	**Duration of offset implementation (maximum 20 years)**	20.00	**Offset value**	**7.82**
	Revegetation of Carnaby's Black-Cockatoo Foraging Habitat at Lot 277 Lake Mealup Drive, Birchmont	**Current quality of offset site (scale)**	1.00	**Time until offset site secured (years)**	1.00		**28.6%**
		Future quality WITHOUT offset (scale)	1.00	**Risk of future loss WITHOUT offset (%)**	0.0%		
		Future quality WITH offset (scale)	8.00	**Risk of future loss WITH offset (%)**	0.0%		
		Time until ecological benefit (years)	15.00				
		Confidence in offset result (%)	80.0%			**OFFSET ADEQUATE?**	**NO**

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	Carnaby's Black Cockatoo (Zanda latirostris)		The proposed clearing will impact on 56.98 ha of foraging habitat for Carnaby's Black-Cockatoo..
Type of environmental value	Species (flora/fauna)		Carnaby's Black-Cockatoo is listed as Endangered under the state BC Act.
Conservation significance of environmental value	Rare/threatened species - endangered		Carnaby's Black-Cockatoo is listed as Endangered under the state BC Act and the Commonwealth EPBC Act.
Landscape-level value impacted	yes/no		NA
Significant impact			
Description	Clearing of 56.98 ha of Carnaby's Black-Cockatoo foraging habitat		Suitable foraging habitat for Carnaby's Black-Cockatoo is proposed to be cleared for the Anketell Road upgrade.
Significant impact (hectares) / Type of feature	56.98		Clearing of 56.98 ha of CBC foraging habitat.
Quality (scale) / Number	4.80		Weighted score based on the foraging habitat quality of the impact site: - 7.57 ha x HQS 8 - 7.36 ha x HQS 6 - 1.65 ha x HQS 5 - 40.40 ha x HQS 4
Rehabilitation credit			
Description	0		
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	Revegetation of Carnaby's Black-Cockatoo Foraging Habitat at Lot 277 Lake Mealup Drive, Birchmont		Offset involves revegetation of 16.7 ha of Carnaby's Black-Cockatoo foraging habitat within the St Ronans offset site.
Proposed offset (area in hectares)	16.70		Offset contains a 16.7 ha area of cleared land that will be revegetated to provide Carnaby's Black-Cockatoo habitat.
Current quality of offset site / Start number (of type of feature)	1.00		The offset currently does not provide foraging habitat for Carnaby's Black-Cockatoo however the species is considered likely to be a regular visitor to adjacent habitat. A score of '1' has been applied.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	1.00		Without active revegetation of the site, due to the presence of weeds and grazing impacts, the habitat condition will not improve.
Future quality WITH offset (scale) / Future number WITH offset	8.00		Revegetation with suitable foraging species for Carnaby's Black-Cockatoo will provide a projected foliage cover of >60% and an overall habitat quality score of '8' for the site.
Time until ecological benefit (years)	15.00		It is estimated that it will take 15 years for the revegetation to achieve the desired ecological benefit.
Confidence in offset result (%)	0.8		A high level of confidence in the offset result has been assigned as Main Roads has a significant amount of experience in Black-Cockatoo habitat restoration from previous offset projects.
Duration of offset implementation (maximum 20 years)	20.00		The maximum offset implementation time of 20 years has been applied.
Time until offset site secured (years)	1.00		The site will be secured as an offset within 1 year of the commencement of the Proposal.
Risk of future loss WITHOUT offset (%)	0.0%		Risk of loss without the offset has been set at 0% as the offset does not contain Carnaby's Black-Cockatoo habitat values that could be lost. The offset will be managed by DBCA and added to the conservation estate.

Risk of future loss WITH offset (%)	0.0%		Risk of loss without the offset has been set at 0%. Due to the existing quality, it is considered that no risk of loss will occur with the offset.
Offset ratio (Conservation area only)	N/A		

WA Environmental Offsets calculator

PLEASE ENABLE MACROS FOR THIS SPREADSHEET

Produced by:

The Department of Water and Environmental Regulation (DWER) in consultation with stakeholder working groups

Purpose:

Use the WA Envirionmental Offsets calculator in conjunction with the *Environmental offsets metric: Quantifying environmental offsets in Western Australia* guideline. Together, they form a supplement to section 4 of the *WA Environmental Offsets Guidelines* and provide information to help decision-makers, government officers, industry and the community to quantify environmental offsets.

Data currency:

The correct application of the WA Environmental Offsets Calculator relies on access to current datasets (such as vegetation extent and land tenure).

Process for using the WA Environmental Offsets Calculator		
Step	**Worksheet**	**Component**
Step 1: Determining conservation significance	**Step1_ConservationSignificance**	**Conservation significance determination**
		Combined *area* /*feature*
Step 2: Calculating significant residual impact	**Step2_SignificantResidualImpact**	**Part A: Significant impact calculation**
		Separate *area* or *feature* calculations
		Part B: Rehabilitation credit calculation
		Separate *area* or *feature* calculations
		Part C: Significant residual impact calculation
		Separate *area* or *feature* calculations
Step 3: Calculating offsets	**Step3_Offsets**	**Offsets calculation**
		Separate *area* or *feature* calculations
Rationale for scores used in the Offsets Calculator	**Rationale**	**All**

WA Environmental Offsets Calculator

Step 1: Determining conservation significance

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

(Or, if appropriate, manual data entry permitted)

Area / feature **(Impact site)**

Conservation significance determination for the environmental value impacted		
Conservation significance	**Description**	Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso)
	Type of environmental value	Species (flora/fauna)
	Conservation significance of environmental value	Rare/threatened Species - vulnerable
	Conservation significance score	**0.2%**

Please select *area* or *feature* for the calculations	**Area**

Step 2: Calculating significant residual impact

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso)

***Area* (impact site)**

Part A: Significant impact calculation *Area*

Significant impact	Description	Quantum of impact	
	Clearing of 38.34 ha of Forest Red-tailed Black-Cockatoo foraging habitat	Significant impact (hectares)	38.34
		Quality (scale)	4.80
		Total quantum of impact	18.40

Part B: Rehabilitation credit calculation *Area* (onsite)

Rehabilitation Credit	Description			Time until ecological benefit (years)	
		Proposed rehabilitation (area in hectares)			
		Current quality of rehabilitation site (scale)		Confidence in rehabilitation result (%)	
		Future quality WITHOUT rehabilitation (scale)		Rehabilitation credit	0.00
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*

Significant residual impact		
	Total quantum of impact	18.40
	Rehabilitation credit	0.00
	Significant residual impact	18.40

WA Environmental Offsets Calculator

Step 3: Calculating offsets

Key:	
	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso)	Significant impact (step 2, part A)	38.34
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	18.40

***Area* (offset site)**

Offset calculation *Area*							
Offsets calculation	**Description**	**Proposed offset (area in hectares)**	16.70	**Duration of offset implementation (maximum 20 years)**	20.00	**Offset value**	**9.08**
	Revegetation of Forest Red-tailed Black-Cockatoo Foraging Habitat at Lot 277 Lake Mealup Drive, Birchmont	**Current quality of offset site (scale)**	1.00	**Time until offset site secured (years)**	1.00		**49.3%**
		Future quality WITHOUT offset (scale)	1.00	**Risk of future loss WITHOUT offset (%)**	0.0%		
		Future quality WITH offset (scale)	8.00	**Risk of future loss WITH offset (%)**	0.0%		
		Time until ecological benefit (years)	15.00				
		Confidence in offset result (%)	80.0%			**OFFSET ADEQUATE?**	**NO**

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso)		The proposed clearing will impact on 38.34 ha of foraging habitat for FRTBC.
Type of environmental value	Species (flora/fauna)		FRTBC is listed as Vulnerable under the state BC Act.
Conservation significance of environmental value	Rare/threatened Species - vulnerable		FRTBC is listed as Vulnerable under the state BC Act and the Commonwealth EPBC Act.
Landscape-level value impacted	yes/no		NA
Significant impact			
Description	Clearing of 38.34 ha of Forest Red-tailed Black-Cockatoo foraging habitat		Native vegetation comprising of suitable foraging habitat for FRTBC is proposed to be cleared for the Anketell Road upgrade.
Significant impact (hectares) / Type of feature	38.34		Clearing of 38.34 ha of FRTBC foraging habitat.
Quality (scale) / Number	4.80		Weighted score based on the foraging habitat quality of the impact site: - 7.57 ha x HQS 8 - 30.78 ha x HQS 4
Rehabilitation credit			
Description	0		
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	Revegetation of Forest Red-tailed Black-Cockatoo Foraging Habitat at Lot 277 Lake Mealup Drive, Birchmont		Offset involves restoration 16.7 ha of Forest Red-tailed Black-Cockatoo foraging habitat within Lot 277 Lake Mealup Drive.
Proposed offset (area in hectares)	16.70		Offset contains a 16.7 ha area of cleared land that will be revegetated to provide Forest Red-tailed Black-Cockatoo habitat.
Current quality of offset site / Start number (of type of feature)	1.00		The offset currently does not provide foraging habitat for Forest Red-tailed Black-Cockatoo however the species is considered likely to be a regular visitor to adjacent habitat. A score of '1' has been applied.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	1.00		Without active revegetation of the site, due to the presence of weeds and grazing impacts, the habitat condition will not improve.
Future quality WITH offset (scale) / Future number WITH offset	8.00		Revegetation with suitable foraging species for Forest Red-tailed Black-Cockatoo will provide a projected foliage cover of >60% and an overall habitat quality score of '8' for the site.
Time until ecological benefit (years)	15.00		It is estimated that it will take 15 years for the revegetation to achieve the desired ecological benefit.
Confidence in offset result (%)	0.8		A high level of confidence in the offset result has been assigned as Main Roads has a significant amount of experience in Black-Cockatoo habitat restoration from previous offset projects.
Duration of offset implementation (maximum 20 years)	20.00		The maximum offset implementation time of 20 years has been applied.
Time until offset site secured (years)	1.00		The site will be secured as an offset within 1 year of the commencement of the Proposal.
Risk of future loss WITHOUT offset (%)	0.0%		Risk of loss without the offset has been set at 0% as the offset does not contain Forest Red-tailed Black-Cockatoo habitat values that could be lost. The offset will be managed by DBCA and added to the conservation estate.
Risk of future loss WITH offset (%)	0.0%		Risk of loss without the offset has been set at 0%. Due to the existing quality, it is considered that no risk of loss will occur with the offset.

Offset ratio (Conservation area only)	N/A		

Appendix C – St Ronans Offset Calculators

WA Environmental Offsets calculator

PLEASE ENABLE MACROS FOR THIS SPREADSHEET

Produced by:

The Department of Water and Environmental Regulation (DWER) in consultation with stakeholder working groups

Purpose:

Use the WA Envirionmental Offsets calculator in conjunction with the *Environmental offsets metric: Quantifying environmental offsets in Western Australia* guideline. Together, they form a supplement to section 4 of the *WA Environmental Offsets Guidelines* and provide information to help decision-makers, government officers, industry and the community to quantify environmental offsets.

Data currency:

The correct application of the WA Environmental Offsets Calculator relies on access to current datasets (such as vegetation extent and land tenure).

Process for using the WA Environmental Offsets Calculator		
Step	**Worksheet**	**Component**
Step 1: Determining conservation significance	**Step1_ConservationSignificance**	**Conservation significance determination**
		Combined *area* /*feature*
Step 2: Calculating significant residual impact	**Step2_SignificantResidualImpact**	**Part A: Significant impact calculation**
		Separate *area* or *feature* calculations
		Part B: Rehabilitation credit calculation
		Separate *area* or *feature* calculations
		Part C: Significant residual impact calculation
		Separate *area* or *feature* calculations
Step 3: Calculating offsets	**Step3_Offsets**	**Offsets calculation**
		Separate *area* or *feature* calculations
Rationale for scores used in the Offsets Calculator	**Rationale**	**All**

WA Environmental Offsets Calculator

Step 1: Determining conservation significance

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

(Or, if appropriate, manual data entry permitted)

Area / feature **(Impact site)**

Conservation significance determination for the environmental value impacted		
Conservation significance	**Description**	Carnaby's Black Cockatoo (Zanda latirostris)
	Type of environmental value	Species (flora/fauna)
	Conservation significance of environmental value	Rare/threatened species - endangered
	Conservation significance score	**1.2%**

Please select *area* or *feature* for the calculations	**Area**

Step 2: Calculating significant residual impact

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	Carnaby's Black Cockatoo (Zanda latirostris)

***Area* (impact site)**

Part A: Significant impact calculation *Area*

Significant impact	Description	Quantum of impact	
	Clearing of 56.98 ha of Carnaby's Black-Cockatoo foraging habitat	Significant impact (hectares)	56.98
		Quality (scale)	4.80
		Total quantum of impact	27.35

Part B: Rehabilitation credit calculation *Area* (onsite)

Rehabilitation Credit	Description	Proposed rehabilitation (area in hectares)		Time until ecological benefit (years)	
		Current quality of rehabilitation site (scale)		Confidence in rehabilitation result (%)	
		Future quality WITHOUT rehabilitation (scale)		Rehabilitation credit	0.00
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*

Significant residual impact		
	Total quantum of impact	27.35
	Rehabilitation credit	0.00
	Significant residual impact	27.35

WA Environmental Offsets Calculator

Step 3: Calculating offsets

Key:	
	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Carnaby's Black Cockatoo (Zanda latirostris)	Significant impact (step 2, part A)	56.98
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	27.35

Area **(offset site)**

Offset calculation *Area*							
Offsets calculation	**Description**	**Proposed offset (area in hectares)**	6.00	**Duration of offset implementation (maximum 20 years)**	20.00	**Offset value**	**2.81**
	Revegetation of Carnaby's Black-Cockatoo Foraging Habitat at Lot 58, 706 and 1437 Great Southern Hwy, St Ronans	**Current quality of offset site (scale)**	1.00	**Time until offset site secured (years)**	1.00		**10.3%**
		Future quality WITHOUT offset (scale)	1.00	**Risk of future loss WITHOUT offset (%)**	0.0%		
		Future quality WITH offset (scale)	8.00	**Risk of future loss WITH offset (%)**	0.0%		
		Time until ecological benefit (years)	15.00				
		Confidence in offset result (%)	80.0%			**OFFSET ADEQUATE?**	**NO**

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	Carnaby's Black Cockatoo (Zanda latirostris)		The proposed clearing will impact on 56.98 ha of foraging habitat for Carnaby's Black-Cockatoo.
Type of environmental value	Species (flora/fauna)		Carnaby's Black-Cockatoo is listed as Endangered under the state BC Act.
Conservation significance of environmental value	Rare/threatened species - endangered		Carnaby's Black-Cockatoo is listed as Endangered under the state BC Act and the Commonwealth EPBC Act.
Landscape-level value impacted	yes/no		NA
Significant impact			
Description	Clearing of 56.98 ha of Carnaby's Black-Cockatoo foraging habitat		Suitable foraging habitat for Carnaby's Black-Cockatoo is proposed to be cleared for the Anketell Road upgrade.
Significant impact (hectares) / Type of feature	56.98		Clearing of 56.98 ha of CBC foraging habitat.
Quality (scale) / Number	4.80		Weighted score based on the foraging habitat quality of the impact site: - 7.57 ha x HQS 8 - 7.36 ha x HQS 6 - 1.65 ha x HQS 5 - 40.40 ha x HQS 4
Rehabilitation credit			
Description	0		
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	Revegetation of Carnaby's Black-Cockatoo Foraging Habitat at Lot 58, 706 and 1437 Great Southern Hwy, St Ronans		Offset involves revegetation of 6 ha of Carnaby's Black-Cockatoo foraging habitat within the St Ronans offset site.
Proposed offset (area in hectares)	6.00		Offset contains a 6 ha area of cleared land that will be revegetated to provide Carnaby's Black-Cockatoo habitat.
Current quality of offset site / Start number (of type of feature)	1.00		The offset currently does not provide foraging habitat for Carnaby's Black-Cockatoo however the species is a regular visitor to adjacent habitat on the property area. A score of '1' has been applied.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	1.00		Without active revegetation of the site, due to the presence of weeds and grazing impacts, the habitat condition will not improve.
Future quality WITH offset (scale) / Future number WITH offset	8.00		Revegetation with suitable foraging species for Carnaby's Black-Cockatoo will provide a projected foliage cover of >60% and an overall habitat quality score of '8' for the site.
Time until ecological benefit (years)	15.00		It is estimated that it will take 15 years for the revegetation to achieve the desired ecological benefit.
Confidence in offset result (%)	0.8		A high level of confidence in the offset result has been assigned as Main Roads has a significant amount of experience in Black-Cockatoo habitat restoration from previous offset projects.
Duration of offset implementation (maximum 20 years)	20.00		The maximum offset implementation time of 20 years has been applied.
Time until offset site secured (years)	1.00		Main Roads acquired the offset site in 2024.
Risk of future loss WITHOUT offset (%)	0.0%		Risk of loss without the offset has been set at 0% as the offset does not contain Carnaby's Black-Cockatoo habitat values that could be lost. The offset will be managed by DBCA and added to the conservation estate.

Risk of future loss WITH offset (%)	0.0%		Risk of loss without the offset has been set at 0%. Due to the existing quality, it is considered that no risk of loss will occur with the offset.
Offset ratio (Conservation area only)	N/A		

WA Environmental Offsets calculator

PLEASE ENABLE MACROS FOR THIS SPREADSHEET

Produced by:

The Department of Water and Environmental Regulation (DWER) in consultation with stakeholder working groups

Purpose:

Use the WA Envirionmental Offsets calculator in conjunction with the *Environmental offsets metric: Quantifying environmental offsets in Western Australia* guideline. Together, they form a supplement to section 4 of the *WA Environmental Offsets Guidelines* and provide information to help decision-makers, government officers, industry and the community to quantify environmental offsets.

Data currency:

The correct application of the WA Environmental Offsets Calculator relies on access to current datasets (such as vegetation extent and land tenure).

Process for using the WA Environmental Offsets Calculator		
Step	**Worksheet**	**Component**
Step 1: Determining conservation significance	**Step1_ConservationSignificance**	**Conservation significance determination**
		Combined *area* /*feature*
Step 2: Calculating significant residual impact	**Step2_SignificantResidualImpact**	**Part A: Significant impact calculation**
		Separate *area* or *feature* calculations
		Part B: Rehabilitation credit calculation
		Separate *area* or *feature* calculations
		Part C: Significant residual impact calculation
		Separate *area* or *feature* calculations
Step 3: Calculating offsets	**Step3_Offsets**	**Offsets calculation**
		Separate *area* or *feature* calculations
Rationale for scores used in the Offsets Calculator	**Rationale**	**All**

WA Environmental Offsets Calculator

Step 1: Determining conservation significance

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

(Or, if appropriate, manual data entry permitted)

Area / feature **(Impact site)**

Conservation significance determination for the environmental value impacted		
Conservation significance	**Description**	Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso)
	Type of environmental value	Species (flora/fauna)
	Conservation significance of environmental value	Rare/threatened Species - vulnerable
	Conservation significance score	**0.2%**

Please select *area* or *feature* for the calculations	**Area**

Step 2: Calculating significant residual impact

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso)

***Area* (impact site)**

Part A: Significant impact calculation *Area*

Significant impact	Description	Quantum of impact	
	Clearing of 38.34 ha of Forest Red-tailed Black-Cockatoo foraging habitat	Significant impact (hectares)	38.34
		Quality (scale)	4.80
		Total quantum of impact	18.40

Part B: Rehabilitation credit calculation *Area* (onsite)

Rehabilitation Credit	Description			Time until ecological benefit (years)	
		Proposed rehabilitation (area in hectares)			
		Current quality of rehabilitation site (scale)		Confidence in rehabilitation result (%)	
		Future quality WITHOUT rehabilitation (scale)		Rehabilitation credit	0.00
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*

Significant residual impact		
	Total quantum of impact	18.40
	Rehabilitation credit	0.00
	Significant residual impact	18.40

WA Environmental Offsets Calculator

Step 3: Calculating offsets

Key:	
	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso)	Significant impact (step 2, part A)	38.34
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	18.40

***Area* (offset site)**

Offset calculation *Area*							
Offsets calculation	**Description**	**Proposed offset (area in hectares)**	6.00	**Duration of offset implementation (maximum 20 years)**	20.00	**Offset value**	**3.26**
	Revegetation of Forest Red-tailed Black-Cockatoo Habitat at Lot 58, 706 and 1437 Great Southern Hwy, St Ronans	**Current quality of offset site (scale)**	1.00	**Time until offset site secured (years)**	1.00		**17.7%**
		Future quality WITHOUT offset (scale)	1.00	**Risk of future loss WITHOUT offset (%)**	0.0%		
		Future quality WITH offset (scale)	8.00	**Risk of future loss WITH offset (%)**	0.0%		
		Time until ecological benefit (years)	15.00				
		Confidence in offset result (%)	80.0%			**OFFSET ADEQUATE?**	**NO**

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	Forest Red-tailed Black-Cockatoo (Calyptorhynchus banksii naso)		The proposed clearing will impact on 38.34 ha of foraging habitat for Forest Red-tailed Black-Cockatoo.
Type of environmental value	Species (flora/fauna)		Forest Red-tailed Black-Cockatoo is listed as Vulnerable under the BC Act.
Conservation significance of environmental value	Rare/threatened Species - vulnerable		Forest Red-tailed Black-Cockatoo is listed as Vulnerable under the BC Act.
Landscape-level value impacted	yes/no		NA
Significant impact			
Description	Clearing of 38.34 ha of Forest Red-tailed Black-Cockatoo foraging habitat		Suitable foraging habitat for Forest Red-tailed Black-Cockatoo is proposed to be cleared for the Anketell Road upgrade.
Significant impact (hectares) / Type of feature	38.34		Clearing of 38.34 ha of Forest Red-tailed Black-Cockatoo foraging habitat.
Quality (scale) / Number	4.80		Weighted score based on the foraging habitat quality of the impact site: - 7.57 ha x HQS 8 - 30.78 ha x HQS 4
Rehabilitation credit			
Description	0		
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	Revegetation of Forest Red-tailed Black-Cockatoo Habitat at Lot 58, 706 and 1437 Great Southern Hwy, St Ronans		Offset involving revegetation of 6 ha of Forest Red-tailed Black-Cockatoo foraging habitat.
Proposed offset (area in hectares)	6.00		Offset contains a 6 ha area of cleared land that will be revegetated to provide Forest Red-tailed Black-Cockatoo habitat.
Current quality of offset site / Start number (of type of feature)	1.00		The offset currently does not provide foraging habitat for Forest Red-tailed Black-Cockatoo, however the species is a regular visitor to adjacent habitat on the property area. A score of '1' has been applied.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	1.00		Without active revegetation of the site, due to the presence of weeds and grazing impacts, the habitat condition will not improve.
Future quality WITH offset (scale) / Future number WITH offset	8.00		Revegetation with suitable foraging species for Forest Red-tailed Black-Cocktoo's will provide a projected foliage cover of >60% and an overall habitat quality score of '8' for the site.
Time until ecological benefit (years)	15.00		It is estimated that it will take 15 years for the revegetation to achieve the desired ecological benefit.
Confidence in offset result (%)	0.8		A high level of confidence in the offset result has been assigned as Main Roads has a significant amount of experience in Black-Cockatoo habitat restoration from previous offset projects.
Duration of offset implementation (maximum 20 years)	20.00		The maximum offset implementation time of 20 years has been applied.
Time until offset site secured (years)	1.00		The site will be secured as an offset within 1 year of commencement of the Proposal.
Risk of future loss WITHOUT offset (%)	0.0%		Risk of loss without the offset has been set at 0% as the offset does not contain Forest Red-tailed Black-Cockatoo habitat values that could be lost. The offset will be managed by DBCA and added to the conservation estate.
Risk of future loss WITH offset (%)	0.0%		Risk of loss without the offset has been set at 0%. Due to the existing quality, it is considered that no risk of loss will occur with the offset.

Offset ratio (Conservation area only)	N/A		

Appendix D – The Spectacles Offset Calculators

WA Environmental Offsets calculator

PLEASE ENABLE MACROS FOR THIS SPREADSHEET

Produced by:

The Department of Water and Environmental Regulation (DWER) in consultation with stakeholder working groups

Purpose:

Use the WA Envirionmental Offsets calculator in conjunction with the *Environmental offsets metric: Quantifying environmental offsets in Western Australia* guideline. Together, they form a supplement to section 4 of the *WA Environmental Offsets Guidelines* and provide information to help decision-makers, government officers, industry and the community to quantify environmental offsets.

Data currency:

The correct application of the WA Environmental Offsets Calculator relies on access to current datasets (such as vegetation extent and land tenure).

Process for using the WA Environmental Offsets Calculator		
Step	**Worksheet**	**Component**
Step 1: Determining conservation significance	**Step1_ConservationSignificance**	**Conservation significance determination**
		Combined *area* /*feature*
Step 2: Calculating significant residual impact	**Step2_SignificantResidualImpact**	**Part A: Significant impact calculation**
		Separate *area* or *feature* calculations
		Part B: Rehabilitation credit calculation
		Separate *area* or *feature* calculations
		Part C: Significant residual impact calculation
		Separate *area* or *feature* calculations
Step 3: Calculating offsets	**Step3_Offsets**	**Offsets calculation**
		Separate *area* or *feature* calculations
Rationale for scores used in the Offsets Calculator	**Rationale**	**All**

Step 1: Determining conservation significance

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores (Or, if appropriate, manual data entry permitted)

Area / feature **(Impact site)**

Conservation significance determination for the environmental value impacted		
Conservation significance	**Description**	Clearing of 4.0 ha of Bush Forever Site 268, 269 and 270.
	Type of environmental value	Conservation area
	Conservation significance of environmental value	Bush Forever site
	Conservation significance score	**A conservation significance score does not apply in this case; an offset ratio may be appropriate (step 3)**

Please select *area* or *feature* for the calculations	**Area**

Step 2: Calculating significant residual impact

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	Clearing of 4.0 ha of Bush Forever Site 268, 269 and 270.

***Area* (impact site)**

Part A: Significant impact calculation *Area*

Significant impact	Description	Quantum of impact	
	Clearing of 4.0 ha of Bush Forever Site 268, 269 and 270.	Significant impact (hectares)	4.00
		Quality (scale)	4.20
		Total quantum of impact	1.68

Part B: Rehabilitation credit calculation *Area* (onsite)

Rehabilitation Credit	Description			Time until ecological benefit (years)	
		Proposed rehabilitation (area in hectares)			
		Current quality of rehabilitation site (scale)		Confidence in rehabilitation result (%)	
		Future quality WITHOUT rehabilitation (scale)		Rehabilitation credit	0.00
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*

Significant residual impact		
	Total quantum of impact	1.68
	Rehabilitation credit	0.00
	Significant residual impact	1.68

WA Environmental Offsets Calculator

Step 3: Calculating offsets

Key:

	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Clearing of 4.0 ha of Bush Forever Site 268, 269 and 270.	Significant impact (step 2, part A)	4.00
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	1.68

Area **(offset site)**

Offset calculation *Area*							
Offsets calculation	**Description**	**Proposed offset (area in hectares)**	6.00	**Duration of offset implementation (maximum 20 years)**			
	The Spectacles (BF 268, 269 and 270)	**Current quality of offset site (scale)**		**Time until offset site secured (years)**			
		Future quality WITHOUT offset (scale)		**Risk of future loss WITHOUT offset (%)**		**Offset value Conservation area** (applied to step 2, part A)	**1.5**
		Future quality WITH offset (scale)		**Risk of future loss WITH offset (%)**			**100.0%**
		Time until ecological benefit (years)					
		Confidence in offset result (%)				**OFFSET ADEQUATE?**	**YES**

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	Clearing of 4.0 ha of Bush Forever Site 268, 269 and 270.		The proposal will impact on 4.0 ha of vegetation considered to be of 'High' conservation significance within Bush Forever Sites 268, 269 and 270.
Type of environmental value	Conservation area		Bush Forever Sites 268, 269 and 270.
Conservation significance of environmental value	Bush Forever site		Clearing of 4.0 ha of vegetation within Bush Forever sites.
Landscape-level value impacted	yes/no		NA
Significant impact			
Description	Clearing of 4.0 ha of Bush Forever Site 268, 269 and 270.		The proposed clearing will impact on 4.0 ha of vegetation associated with Bush Forever Sites 268, 269 and 270.
Significant impact (hectares) / Type of feature	4.00		Clearing of 4.0 ha of vegetation within Bush Forever Sites 268, 269 and 270.
Quality (scale) / Number	4.20		High' conservation significance in accordance with SPP 2.8 offset criteria - 0.49 ha 'Very Good to Excellent' - 0.69 ha 'Very Good' - 0.06 ha 'Good to Very Good' - 1.51 ha 'Good' - 0.39 ha 'Degraded to Good' - 0.86 ha 'Degraded'
Rehabilitation credit			
Description	0		
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	The Spectacles (BF 268, 269 and 270)		Offset involves the management and enhancement of vegetation within Bush Forever Sites 268, 269 and 270 adjacent to the Proposal.
Proposed offset (area in hectares)	6.00		A total of 6 ha within Bush Forever Sites 268, 269 and 270 will be managed as part of the offset strategy.
Current quality of offset site / Start number (of type of feature)	0.00		
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	0.00		
Future quality WITH offset (scale) / Future number WITH offset	0.00		
Time until ecological benefit (years)	0.00		
Confidence in offset result (%)	0		
Duration of offset implementation (maximum 20 years)	0.00		
Time until offset site secured (years)	0.00		
Risk of future loss WITHOUT offset (%)	0.0%		
Risk of future loss WITH offset (%)	0.0%		
Offset ratio (Conservation area only)	1.5		Offset ratio of 1.5:1 has been applied in accordance with SPP 2.8 for impacts on vegetation with a 'High' conservation significance.

WA Environmental Offsets calculator

PLEASE ENABLE MACROS FOR THIS SPREADSHEET

Produced by:

The Department of Water and Environmental Regulation (DWER) in consultation with stakeholder working groups

Purpose:

Use the WA Envirionmental Offsets calculator in conjunction with the *Environmental offsets metric: Quantifying environmental offsets in Western Australia* guideline. Together, they form a supplement to section 4 of the *WA Environmental Offsets Guidelines* and provide information to help decision-makers, government officers, industry and the community to quantify environmental offsets.

Data currency:

The correct application of the WA Environmental Offsets Calculator relies on access to current datasets (such as vegetation extent and land tenure).

Process for using the WA Environmental Offsets Calculator		
Step	**Worksheet**	**Component**
Step 1: Determining conservation significance	**Step1_ConservationSignificance**	**Conservation significance determination**
		Combined *area* /*feature*
Step 2: Calculating significant residual impact	**Step2_SignificantResidualImpact**	**Part A: Significant impact calculation**
		Separate *area* or *feature* calculations
		Part B: Rehabilitation credit calculation
		Separate *area* or *feature* calculations
		Part C: Significant residual impact calculation
		Separate *area* or *feature* calculations
Step 3: Calculating offsets	**Step3_Offsets**	**Offsets calculation**
		Separate *area* or *feature* calculations
Rationale for scores used in the Offsets Calculator	**Rationale**	**All**

Step 1: Determining conservation significance

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores (Or, if appropriate, manual data entry permitted)

Area / feature (Impact site)

Conservation significance determination for the environmental value impacted		
Conservation significance	Description	Clearing of 0.55 ha of Class A Reserve.
	Type of environmental value	Conservation area
	Conservation significance of environmental value	Crown reserve established under the Conservation and Land Management Act 1984 and/or the Land Administration Act 1997 for the purpose of conservation
	Conservation significance score	A conservation significance score does not apply in this case; an offset ratio may be appropriate (step 3)

Please select *area* or *feature* for the calculations	Area

WA Environmental Offsets Calculator

Step 2: Calculating significant residual impact

Key:
- Data to be entered
- Drop-down selection
- Automatically-generated scores

Environmental value (step 1)	Clearing of 0.55 ha of Class A Reserve.

***Area* (impact site)**

Part A: Significant impact calculation *Area*

	Description	Quantum of impact	
Significant impact	Clearing of 0.55 ha of Class A Nature Reserve.	Significant impact (hectares)	0.55
		Quality (scale)	6.20
		Total quantum of impact	0.34

NOTE: Quality score must be entered as '10' for a Crown reserve established for the purpose of conservation

Part B: Rehabilitation credit calculation *Area* (onsite)

	Description				
Rehabilitation Credit		Proposed rehabilitation (area in hectares)		Time until ecological benefit (years)	
		Current quality of rehabilitation site (scale)		Confidence in rehabilitation result (%)	
		Future quality WITHOUT rehabilitation (scale)		Rehabilitation credit	0.00
		Future quality WITH rehabilitation (scale)			

Part C: Significant residual impact calculation *Area*

Significant residual impact	Total quantum of impact	0.34
	Rehabilitation credit	0.00
	Significant residual impact	0.34

WA Environmental Offsets Calculator

Step 3: Calculating offsets

Key:

	Data to be entered
	Drop-down selection
	Automatically-generated scores

Environmental value (step 1)	Clearing of 0.55 ha of Class A Reserve.	Significant impact (step 2, part A)	0.55
		Rehabilitation credit (step 2, part B)	0.00
		Significant residual impact (step 2, part C)	0.34

Area **(offset site)**

Offset calculation *Area*							
Offsets calculation	**Description**	**Proposed offset (area in hectares)**	1.65	**Duration of offset implementation (maximum 20 years)**			
	The Spectacles (Class A Reserve)	**Current quality of offset site (scale)**		**Time until offset site secured (years)**			
		Future quality WITHOUT offset (scale)		**Risk of future loss WITHOUT offset (%)**		**Offset value Conservation area** (applied to step 2, part A)	**3**
		Future quality WITH offset (scale)		**Risk of future loss WITH offset (%)**			**100.0%**
		Time until ecological benefit (years)					
		Confidence in offset result (%)				**OFFSET ADEQUATE?**	**YES**

WA Environmental Offsets Calculator

Rationale for scores used in the offsets calculator

Environmental value to be offset			
Calculation	***Score (Area)***		***Rationale***
Conservation significance			
Description	Clearing of 0.55 ha of Class A Reserve.		The proposal will impact on 0.55 ha of vegetation within Class A Reserve.
Type of environmental value	Conservation area		Class A Reserve (Conservation Park) under CALM Act 1984 - Section 5(1)(ca)
Conservation significance of environmental value	Crown reserve established under the Conservation and Land Management Act 1984 and/or the Land Administration Act 1997 for the purpose of conservation		Clearing of 0.55 ha of vegetation within Class A Reserve.
Landscape-level value impacted	yes/no		NA
Significant impact			
Description	Clearing of 0.55 ha of Class A Nature Reserve.		The proposed clearing will impact on 0.55 ha of vegetation associated with Class A Reserve.
Significant impact (hectares) / Type of feature	0.55		Clearing of 0.55 ha of Class A Reserve.
Quality (scale) / Number	6.20		Vegetation condition within Class A Reserve: - 0.17 ha 'Very Good to Excellent' - 0.35 ha 'Very Good' - 0.03 ha 'Good'
Rehabilitation credit			
Description	0		
Proposed rehabilitation (area in hectares)	0.00		
Current quality of rehabilitation site / Start number (of type of feature)	0.00		
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00		
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00		
Time until ecological benefit (years)	0.00		
Confidence in rehabilitation result (%)	0		
Offset			
Description	The Spectacles (Class A Reserve)		Offset involves the management and enhancement of vegetation within Class A reserve within the Spectacles, adjacent to the Proposal.
Proposed offset (area in hectares)	1.65		A total of 1.65 ha of Class A reserve within the Spectacles will be managed as part of the offset strategy.
Current quality of offset site / Start number (of type of feature)	0.00		
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	0.00		
Future quality WITH offset (scale) / Future number WITH offset	0.00		
Time until ecological benefit (years)	0.00		
Confidence in offset result (%)	0		
Duration of offset implementation (maximum 20 years)	0.00		
Time until offset site secured (years)	0.00		
Risk of future loss WITHOUT offset (%)	0.0%		
Risk of future loss WITH offset (%)	0.0%		
Offset ratio (Conservation area only)	3		Highest Offset ratio has been applied