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NorthLinkWA
Perth-Darwin National Highway

SCP20a Offsets Strategy

Perth–Darwin National Highway (Swan Valley Section)

MAY 2019

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Revision	Date	Description	Prepared	Reviewed	Approved
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1 SUMMARY

The SCP20a Offsets Strategy (this offsets strategy) is submitted in accordance with Ministerial Statement No. 1036 conditions 16-19 to 16-22 for the Perth–Darwin National Highway (Swan Valley Section) by Main Roads Western Australia (MRWA).

Table 1 presents a summary of this plan including the completion criteria against which the environmental objectives are measured.

Table 1 SCP20a Offsets Strategy summary

Item	Details
Title of proposal	Perth-Darwin National Highway (Swan Valley Section)
Proponent name	Commissioner for Main Roads Western Australia
Ministerial Statement No.	1036
Purpose of this offsets strategy	This offsets strategy is submitted to fulfil the requirements of conditions 16-19 to 16-22 of the above Statement.
Environmental objective	To offset the significant residual impact to: • 4 ha of Threatened Ecological Community (TEC) SCP20a 'Banksia attenuata woodlands over species rich dense shrublands'.
Completion criteria	
Agreement and funding for initial and ongoing management.	• MRWA and DBCA have developed a Memorandum of Understanding (MoU) and will agree the arrangements and funding for upfront works associated with ongoing management of the SCP20a offset sites. • MRWA has provided funds in accordance with the MoU.
Management actions completed by DBCA.	• MRWA has assessed the management actions completed by DBCA upon review of DBCA's annual report on the completion of actions.
Completion of management actions after seven years of funding.	• MRWA has assessed the actions completed by DBCA.

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2 CONTEXT AND SCOPE

2.1 Description of the Project

Main Roads Western Australia (MRWA) is currently constructing a new 38 km section of the Perth–Darwin National Highway (PDNH) between Malaga and Muchea in Western Australia (the project). The project is a dual carriageway highway that will connect the intersection of Tonkin Highway and Reid Highway in the south with Great Northern Highway and Brand Highway in the north.

2.2 Requirements of the Conditions

This offsets strategy is submitted in accordance with conditions 16-19 to 16-22 of Ministerial Statement No. 1036.

Condition requirements and references to sections within this offsets strategy are provided in Table 2.

The objective of this offsets strategy is to offset the significant residual impact to SCP20a through implementation of the SCP20a Offsets Strategy.

Table 2 Requirements of Ministerial Statement No. 1036

Condition No.	Condition	Section of this offsets strategy
16-19	The proponent shall undertake an offset with the objective of counterbalancing the significant residual impacts to: 4 ha of Threatened Ecological Community SCP 20a '*Banksia attenuata woodlands over species rich dense shrublands*' as a result of the proposal.	This offsets strategy
16-20	Within twelve (12) months of the publications of this Statement [MS1036], the proponent shall prepare and submit an SCP 20a Offset Strategy to the CEO. The SCP 20a Offset Strategy shall: (1) Identify an area or areas to be protected, managed and/or rehabilitated for conservation or enhancement of SCP 20a, or habitat necessary to maintain or enhance SCP 20a, identified in condition 16-19(1).	Section 3
	(2) Include a completed WA Offset Template, as described in the WA Environmental Offset Guidelines 2014, as well as the Commonwealth's Offset Assessment Guide, to demonstrate how the proposed offset counterbalances the significant residual impact.	Appendices A, B and C
	(3) Identify the environmental attributes of the offset area(s).	Section 3
	(4) Commit to a protection mechanism for any areas of land acquisition, being either the area is ceded to the Crown for the purpose of conservation, or the area is managed under Conservation Covenant in perpetuity.	Section 4

Condition No.	Condition	Section of this offsets strategy
	(5) If any land is to be ceded to the Crown for the purpose of conservation, the proponent will identify: a) The quantum of, and provide funds for, the upfront works associated with establishing the conservation area. b) The quantum of, and provide a contribution of funds for, the management of this area for no less than seven (7) years. c) The quantum identified in conditions 16-20(5)(a) and 16-20(5)(b) shall provide for the requirements defined in condition 16-20(6)(a) to be met. d) An appropriate management body for ceded land.	Section 5.3
	(6) State the management and/or rehabilitation actions to be undertaken including: a) The objectives and targets to be achieved, including completion criteria. b) Management and/or rehabilitation actions and a timeframe for the actions to be undertaken. c) Funding arrangements and timing of funding for conservation activities. d) Monitoring, reporting and evaluation mechanisms for management and/or rehabilitation actions. (7) Define the role of the proponent and/or any third parties.	Section 5
16-21	After receiving notice in writing from the CEO that the SCP 20a Offset Strategy satisfies the requirements of condition 16-20, the proponent shall: (1) Implement the actions in accordance with the requirements of the approved SCP 20a Offset Strategy. (2) Continue to implement the approved SCP 20a Offset Strategy until the CEO has confirmed by notice in writing that it has demonstrated that the completion criteria in the SCP 20a Offset Strategy have been met and therefore the implementation of the actions is no longer required.	Section 6
16-22	The proponent shall review and revise the SCP 20a Offset Strategy as and when directed by the CEO.	Section 6

3 SCP20A OFFSET SITES – IDENTIFICATION AND ENVIRONMENTAL ATTRIBUTES

3.1 Offset Sites

MRWA is proposing three offset sites to counterbalance the significant residual impacts to SCP20a in accordance with conditions 16-19 to 16-22 of Ministerial Statement No. 1036. These sites have been identified by the Department of Biodiversity, Conservation and Attractions (DBCA) as sites containing SCP20a that would benefit from acquisition for inclusion in the conservation estate and/or additional management activities funded by MRWA.

The three offset sites are identified in Table 3 and are shown on Figure 1.

Table 3 Identified offset sites

Offset site name	Offset type	Parcel identifier	Street address	Shown on figure
Errina Road Bushland	On-ground management	Lot 2 on Plan 27289	40 Errina Road, Alexander Heights	Figure 2
		Lot 691 on Plan 18270	18 Errina Road, Alexander Heights	
		Lot 801 on Plan 72846	20 Crabtree Street, Alexander Heights	
Orange Grove	On-ground management	Lot 800 on Plan 47723	(Corner of Kelvin Road and White Road, Orange Grove)	Figure 3
	Acquisition	Lot 29 on Diagram 57957	90 White Road, Orange Grove	
	On-ground management	Lot 30 on Diagram 57957	78 White Road, Orange Grove	
Hawkevale Nature Reserve	On-ground management	Lot 604 on Plan 30106	310 Adelaide Street, High Wycombe	Figure 4
		Lot 605 on Plan 35010	308 Adelaide Street, High Wycombe	
		Lot 606 on Plan 35537	85 Lambertia Crescent, High Wycombe	

DBCA has advised that vegetation at each of these sites is consistent with SCP20a. The extent of SCP20a and supporting habitat at each site has been confirmed through flora and vegetation surveys and further consultation with DBCA. A brief description of each site based on information from DBCA and preliminary investigations at each site is provided in the following sections.

3.1.1 Errina Road Bushland

Identification of Offset Site

Errina Road Bushland is a 10 ha site situated within an urban area in Alexander Heights (Figure 2). It is bordered by roads on the southern, western and northern sides. On its eastern side, the site is adjacent to Highview Park, which contains further remnant bushland mapped as SCP20a as well as a playing field and recreation facilities.

The completed WA Offsets Guide and Commonwealth Offset Guide are included in Appendix A. This assessment identified that management at Errina Road Bushland accounts for 40.00% of the total offset requirement for SCP20a.

Environmental Attributes

DBCA has surveyed and mapped the vegetation within Errina Road Bushland as SCP20a. Preliminary additional investigations at the site have identified one vegetation community (Table 4), which is considered to be consistent with SCP20a (Eco Logical Australia, 2017).

Table 4 Vegetation communities at Errina Road Bushland

Vegetation community	Description	Size	Consistency with SCP20a
Banksia attenuata woodland	*Banksia attenuata* and *Banksia menziesii* woodland over *Jacksonia floribunda*, *Allocasuarina humilis* and *Xanthorrhoea preissii* sparse shrubland over *Eremaea pauciflora* var. *pauciflora* and *Hibbertia hypericoides* low sparse shrubland over *Patersonia occidentalis* and *Stirlingia latifolia* sparse forbland over *Alexgeorgea nitens* and *Mesomelaena pseudostygiasparse* sedgeland. Other common species include: *Amphipogon turbinatus*, *Anigozanthos ?manglesii*, *Banksia dallanneyi*, *Bossiaea eriocarpa*, *Burchardia congesta*, *Conostephium pendulum*, *Conostylis aurea*, *Dampiera linearis*, *Dasypogon bromeliifolius*, *Daviesia divaricata*, *Daviesia nudiflora*, *Daviesia triflora*, *Eucalyptus marginata*, *Gompholobium tomentosum*, *Haemodorum laxum*, *Hakea prostrata*, *Jacksonia sericea* (P4), *Jacksonia sternbergiana*, *Lyginia barbata*, *Persoonia* sp., *Petrophile linearis*, *Petrophile macrostachya*, *Scaevola repens*, *Thysanotus sparteus* and *Tricoryne tenella*.	9.00 ha	Consistent with SCP20a

Source: Eco Logical Australia (2017).

The majority of vegetation is in very good condition, with good vegetation condition along the edges of the site bordering roads where weed cover is higher. The northwestern corner contains 0.37 ha of completely degraded vegetation (excluded from offset calculations). A number of dead *Banksia* sp. were scattered through the site, although there was no dieback front apparent. While there is no vehicle access through the site, a number of walking tracks provide access for pedestrians.

Other environmental attributes of Errina Road Bushland are described later in Table 8 (in Section 3.2 below).

3.1.2 Orange Grove

Identification of Offset Site

Orange Grove is surrounded by mixed use rural residential lots and historical agricultural activities. The site is zoned as Parks and Recreation (Lot 800) and General Rural (Lots 29 and 30). The adjacent land is zoned as General Rural.

Lots 29 and Lot 30 have recently been purchased by DBCA and the acquisition funded by MRWA specifically for the purpose of this offset. Prior to their acquisition, Lots 29 and 30 were in private ownership. Lot 800 is owned by the Western Australian Planning Commission (WAPC), which has given permission through the Department of Planning, Land and Heritage (DPLH) for DBCA (on behalf of MRWA) to undertake on-ground management within the lot for the purposes of this offset. The offset strategy for Orange Grove has been developed with an assumption that part or all of Orange Grove would be managed under the formal conservation estate in future.

The completed WA Offsets Guide and Commonwealth Offset Guide calculations are included at Appendix B. This assessment identified that management at Orange Grove accounts for 65.74% of the total offset requirement for SCP20a.

Environmental Attributes

DBCA and Focused Vision Consulting have surveyed and mapped the vegetation within Orange Grove as SCP20a. The site assessment identified two vegetation communities at the site (Table 5), the larger of which (*Banksia attenuata* and *Banksia menziesii* woodland) is considered to be consistent with SCP20a (Focused Vision Consulting, 2018). The second vegetation community (*Eucalyptus marginata* woodland) is considered to be supporting habitat to the surrounding SCP20a (Focused Vision Consulting, 2018). A later review confirmed the vegetation mapping covered almost the entire site – the exception being a sliver of land along the southwest (White Road) boundary (0.15 ha, approximately 1.9% of the total 7. 91 ha offset site). The offset calculations used the conservative approach of 7.76 ha. The discrepancy between 7.76 ha (mapped area) and the vegetation communities (7.41 ha) in Table 5 is due to 0.35 ha of cleared areas not included as 'vegetation'. Further explanation, with respect to the 'start quality' score of zero being given to these areas in the offset calculations, is provided in Section 3.2.1.

Table 5 Vegetation communities at Orange Grove

Vegetation community	Description	Size	Consistency with SCP20a
Banksia attenuata and *Banksia menziesii* woodland	*Banksia attenuata* and *Banksia menziesii* low woodland B over *Eremaea pauciflora, Hibbertia hypericoides* and *Xanthorrhoea preissii* dwarf scrub C over *Mesomelaena pseudostygia*, *Alexgeorgea nitens* and *Mesomelaena tetragona* very tall open sedges.	4.10 ha	Consistent with SCP20a
Eucalyptus marginata woodland	*Eucalyptus marginata* low woodland A over *Casuarina obesa* low woodland B over *Banksia sessilis* low scrub A over introduced weeds and grasses.	3.31 ha	Supporting habitat

Source: Focused Vision Consulting (2018).

The *Banksia attenuata* - *Banksia menziesii* woodland at Orange Grove is in predominantly very good to excellent condition, with some small fringes of good vegetation condition along the north eastern and south eastern boundaries of the vegetation community towards the centre of the site.

The *Eucalyptus marginata* woodland located in the east and south of the site is predominantly in degraded condition, with small pockets of good to very good condition. Lot 30 is bisected by several vehicle tracks and has a small area previously used for excavating sand. A house within part of Lot 29 is expected to be demolished.

Other environmental attributes of Orange Grove are described later in Table 8 (in Section 3.2 below).

3.1.3 Hawkevale Nature Reserve

Identification of Offset Site

Hawkevale Nature Reserve is an established A Class Nature Reserve (Reserve No. 49079) located in an urban area. The site is surrounded by residential development on two sides, undeveloped cleared land and Adelaide Street on the northern side and the Roe Highway road reserve on the eastern side. Existing fencing separates the reserve from surrounding land and roads.

The completed WA Offsets Guide and Commonwealth Offset Guide are included at Appendix C. This assessment identified that management at Hawkevale Nature Reserve accounts for 23.99% of the total offset requirement for SCP20a.

Environmental Attributes

DBCA has surveyed and mapped the vegetation within Hawkevale Nature Reserve as SCP20a. Preliminary additional investigations have identified two vegetation communities at the site (Table 6) (Eco Logical Australia, 2017). The largest vegetation community at the site is *Banksia attenuata - Eucalyptus marginata* woodland, which is considered to be consistent with SCP20a. A smaller Jarrah/Marri woodland unit exists in the southeast of the site and is considered to be supporting habitat.

Table 6 Vegetation communities at Hawkevale Nature Reserve

Vegetation community	Description	Size	Consistency with SCP20a
Banksia attenuata - Eucalyptus marginata woodland	*Banksia attenuata*, *Banksia menziesii* and *Eucalyptus marginata* woodland over *Adenanthos cygnorum* subsp. *cygnorum* tall sparse shrubland over *Eremaea pauciflora* var. *pauciflora*, *Hibbertia hypericoides* and *Xanthorrhoea brunonis* open shrubland over *Patersonia occidentalis* sparse forbland over *Alexgeorgea nitens* and *Mesomelaena pseudostygia* sparse sedgeland. Other common species include: *Allocasuarina fraseriana*, *Allocasuarina humilis*, *Banksia dallanneyi*, *Bossiaea eriocarpa*, *Dasypogon bromeliifolius*, **Ehrharta calycina*, **Gladiolus caryophyllaceus*, *Gompholobium tomentosum*, *Jacksonia floribunda*, *Lambertia multiflora*, *Lyginia barbata*, *Petrophile linearis* and *Stirlingia latifolia*.	7.95 ha	Consistent with SCP20a
Eucalyptus marginata - Corymbia calophylla woodland	*Eucalyptus marginata*, *Allocasuarina fraseriana* and *Corymbia calophylla* woodland over *Adenanthos cygnorum* subsp. *cygnorum* tall open shrubland over *Hibbertia hypericoides* and *Xanthorrhoea brunonis* open shrubland over *Dasypogon bromeliifolius* sparse forbland. Other common species include: *Banksia attenuata*, *Acacia pulchella*, *Amphipogon turbinatus*, *Anigozanthos ?manglesii*, *Banksia dallanneyi*, *Burchardia congesta*, *Conostephium pendulum*, *Desmocladus fasciculatus*, **Gladiolus caryophyllaceus*, *Nuytsia floribunda*, *Petrophile linearis* and *Stirlingia latifolia*.	1.58 ha	Supporting habitat

Source: Eco Logical Australia (2017).

Vegetation condition across most of the site is very good to excellent. A small pocket of vegetation on the western boundary with Norwich Way is in good condition. There are areas of small fire scars through part of the site. A vehicle access track circles the site on the inside of the boundary fence, while a limited number of walking tracks traverse the site (0.87 ha).

Other environmental attributes of Hawkevale Nature Reserve are described later in Table 8 (in Section 3.2 below).

3.2 Determination of Offset Requirements

The offset requirement has been determined using the WA Offset Template and Commonwealth's Offsets Assessment Guide provided in Appendices A, B and C.

3.2.1 Commonwealth Offsets Assessment Guide

The Commonwealth's Offsets Assessment Guide (also known as the offsets calculator) allows a proposed offset to be assessed for its adequacy in offsetting the significant residual impacts to a threatened species or ecological community. It was developed by the Commonwealth Department of the Environment and Energy (DoEE) for evaluating offsets for species and communities officially listed as matters of national environmental significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). As SCP20a is a TEC recognised only at a Western Australian level, the inputs to the offsets calculator have been determined with reference not only to guidance published by DoEE (DoEE, undated) but to other materials including the Western Australian Offsets Policy (Government of Western Australia, 2011) and associated guidelines (Government of Western Australia, 2014) and adapted as necessary.

The following assumptions underpin the inputs to the offsets calculator:

- The available statuses of matters of national environmental significance protected under the EPBC Act do not correspond directly to conservation statuses recognised in Western Australia. The SCP20a TEC is assumed to be approximately equivalent to the EPBC Act's 'Endangered' status.
- For the residual impacts from the project:
  - The area used is 4 ha in accordance with condition 16-19.
  - The quality of the community being impacted is 8 on a scale of 1 to 10. This assumption has been derived from the vegetation condition of the 4 ha of SCP20a being directly impacted, which was assessed in the Public Environment Review (Coffey, 2015) using the Keighery vegetation condition scale (Keighery, 1994) as being in Excellent (3.0 ha), Very Good (0.9 ha) and Degraded (0.1 ha) condition. None of the impacted SCP20a was considered Pristine, which is the best condition rating available in the Keighery vegetation condition scale.
- For each of the proposed offsets:
  - Risk-related time horizon is 20 years, in accordance with the offsets calculator guidance (DoEE, undated).
  - Time until ecological benefit is 5 years, which is two years prior to the conclusion of the seven-year period covered by this offsets strategy and is a reasonable estimate of when benefits of this offset strategy would be expected to be evident or be becoming evident.
  - Start area is the extent of SCP20a and/or supporting habitat (i.e., habitat necessary to maintain or enhance SCP20a) at each offset site. Although DBCA has advised that the vegetation within each of the three offset sites is SCP20a, further work has been undertaken to ensure that the extents of SCP20a and supporting habitat used in the offset calculations are ground-truthed. Vegetation in completely degraded condition was excluded from the calculations of total extent of SCP20a and supporting habitat within Errina Road Bushland.
  - Start quality is generally related to the current vegetation condition as described in the relevant part of Section 3.1. Other factors affecting the current quality of the site are also taken into account where applicable, e.g. presence of rubbish, sand excavation, unauthorised access, dieback etc. At Orange Grove, areas of Lots 29 and 30 that are currently cleared or otherwise do not contain vegetation (i.e. informal tracks, the sand excavation area and the house site) are proposed to be revegetated. Accordingly, separate offset calculations have been undertaken for these areas using a start quality of 0.
  - Future quality *without* offset is generally set less than the start quality, representing a deterioration in quality that could reasonably be expected to occur over time if the site is

unmanaged and threatening processes are not mitigated against. A deterioration in quality may represent a decrease in vegetation condition rating and/or an increase in or spread of some other threatening process relevant to that site, e.g. increasing urbanisation of the surrounding area leading to increased weed prevalence. For each offset site, the difference between start quality and future quality without offset is assumed to be relatively small (a change of 1 or 2) in order to remain conservative, i.e. to avoid the offsets calculator overestimating the value of the offset. The difference in quality scores is larger for the former private ownership parts of Orange Grove (i.e., Lots 29 and 30) to recognise that there is no guarantee the landowner would have maintained vegetation or avoided carrying out activities that could cause vegetation degradation.

- Future quality *with* offset is generally set equal to or slightly better than the start quality, representing the maintenance of or a small improvement in the quality of the offset site as a result of the offset. Because the management actions proposed for each offset site are targeted at improving the future prospects of those sites, a difference is expected between the future quality *with* offset and the future quality *without* offset. In order to remain conservative, this difference is assumed to be relatively small (a change of 1 or 2) to avoid the offsets calculator overestimating the value of the offset. For areas intended for revegetation that have been given a starting quality score of 0, a relatively small change in score to future quality with offset of 3 has been applied to account for future revegetation of these areas.
- Risk of loss refers to the chance that the offset site (specifically the SCP20a and supporting habitat it contains) ceases to exist at some time in the future. Risk of loss aims to reflect security of tenure on the site as well as other risks that may cause loss of the site.
- Risk of loss *without* offset has been set based on:
    - Current site tenure and the security that tenure provides. Hawkevale Nature Reserve is already in conservation estate, and as such has a low risk of loss. Errina Road Bushland is not in conservation estate but has some existing management for conservation purposes. Orange Grove is in two different tenure situations: Lot 800, which is in the ownership of WAPC, is not in any formal conservation estate and is not subject to management for conservation purposes; and Lots 29 and 30, which were in private ownership prior to being acquired for this offset, and were therefore at a much higher risk of loss.
    - Existing management, if any, and its effect on the long-term viability of the offset site. Management of weeds, for example, reduces fuel loading, decreasing fire risk and therefore also decreasing the risk of loss due to catastrophic fire.
    - Assumptions about potential future uses of the offset site or adjacent land and how the offset site may be affected. For example, the risk of loss assumption for Orange Grove is influenced by how the wider range of permitted adjacent land uses in General Rural zoning could affect the offset.
- Risk of loss *with* offset has been set based on considering the same factors as for risk of loss *without* offset, but assuming the offset proposed in this offsets strategy has been put in place. Errina Road Bushland is assumed to have a lower risk of loss due to the formalisation of on-going management by DBCA through this offsets strategy. Hawkevale Nature Reserve is assumed to maintain its current risk of loss. At Orange Grove, Lot 800 is owned by WAPC and Lots 29 and 30 have recently been acquired by DBCA on behalf of MRWA for the purposes of this offset. All three lots at Orange Grove will be under ongoing DBCA management. The future risk of loss is therefore expected to be lower, recognising the change in conservation arrangements.

– Confidence in result has been set at a relatively high 90%. The management actions proposed are known to improve conservation outcomes, and they have been developed in consultation with and agreed with DBCA, whose ordinary responsibilities include the management of land for conservation purposes. The confidence factor relates to the achievement of the offset proposed, which has in-built conservatism in the assumptions as discussed above to avoid overestimating the value of the offset. A lower confidence in result of 70% has been used for areas of Orange Grove with a start quality of 0 recognising the increased difficulty of revegetation works.

3.2.2 WA Offset Template

The WA Offset Template considers of the same general offset concepts as the Commonwealth Offsets Assessment Guide, although it takes a less formulaic approach. The assumptions used in the Commonwealth Offsets Assessment Guide as described in Section 3.2.1 are all relevant for how the WA Offset Template was completed for each offset site.

Section 4 of the WA Environmental Offsets Guideline (Government of Western Australia, 2014) sets out guidance for determining the suitability of offsets. Table 7 provides a summary of how the key concepts from this guidance have been considered in the development of this offsets strategy.

Table 7 Consideration of key concepts from the WA Environmental Offsets Guideline

Concept	Summary of how concept has been considered in the offsets strategy
Type of offset	This offsets strategy is proposing a combination of land acquisition and on-ground management offsets. Although an exclusively land acquisition solution was preferred and investigated, the privately-owned Orange Grove properties were the only properties suitable for SCP20a offsets available for acquisition.
Relevant and proportional offsets	The three offset sites proposed are relevant (containing SCP20a and are near to the SCP20a impacted by the project) and proportional to the impact (as determined by the Commonwealth Offsets Assessment Guide), i.e. they are 'like for like'.
Sound knowledge	Environmental values of the impact site were determined through flora and vegetation survey as part of the Public Environmental Review (Coffey, 2015). Environmental values of the offset sites have been determined by targeted field survey (Eco Logical Australia, 2017; Focused Vision Consulting, 2018) as well as information provided by DBCA, and are described in Section 3.1. Alignment with the relevant recovery plan is described in Chapter 6.
Adaptive management	The management actions proposed in this offsets strategy are specific enough to ensure that the objective in condition 16-19 will be met but contain sufficient flexibility to enable DBCA, which will be responsible for implementing works, to vary the implementation methods to achieve the desired outcomes.
Value of significant residual impact	The significant residual impact is as per the objective in condition 16-19 (i.e. 4 ha of SCP20a) and area/quality determined as described in the assumptions in Section 3.2.1. Project-wide mitigations were considered as part of the Public Environmental Review (Coffey, 2015) but none were provided for impacts to SCP20a. This corresponding section of the WA Offset Template reflects this.
Value of environmental offset	The type of offset is land acquisition and on-ground management, as noted elsewhere in this table. Security of offset, likely success in achieving the offset and time lag in achieving the offset are all considered in the assumptions to the Commonwealth Offsets Assessment Guide (see Section 3.2.1).

Note: concepts approximately correspond to the headings in Section 4 of the WA Environmental Offsets Guide (Government of Western Australia, 2014).

3.3 Offsets Summary

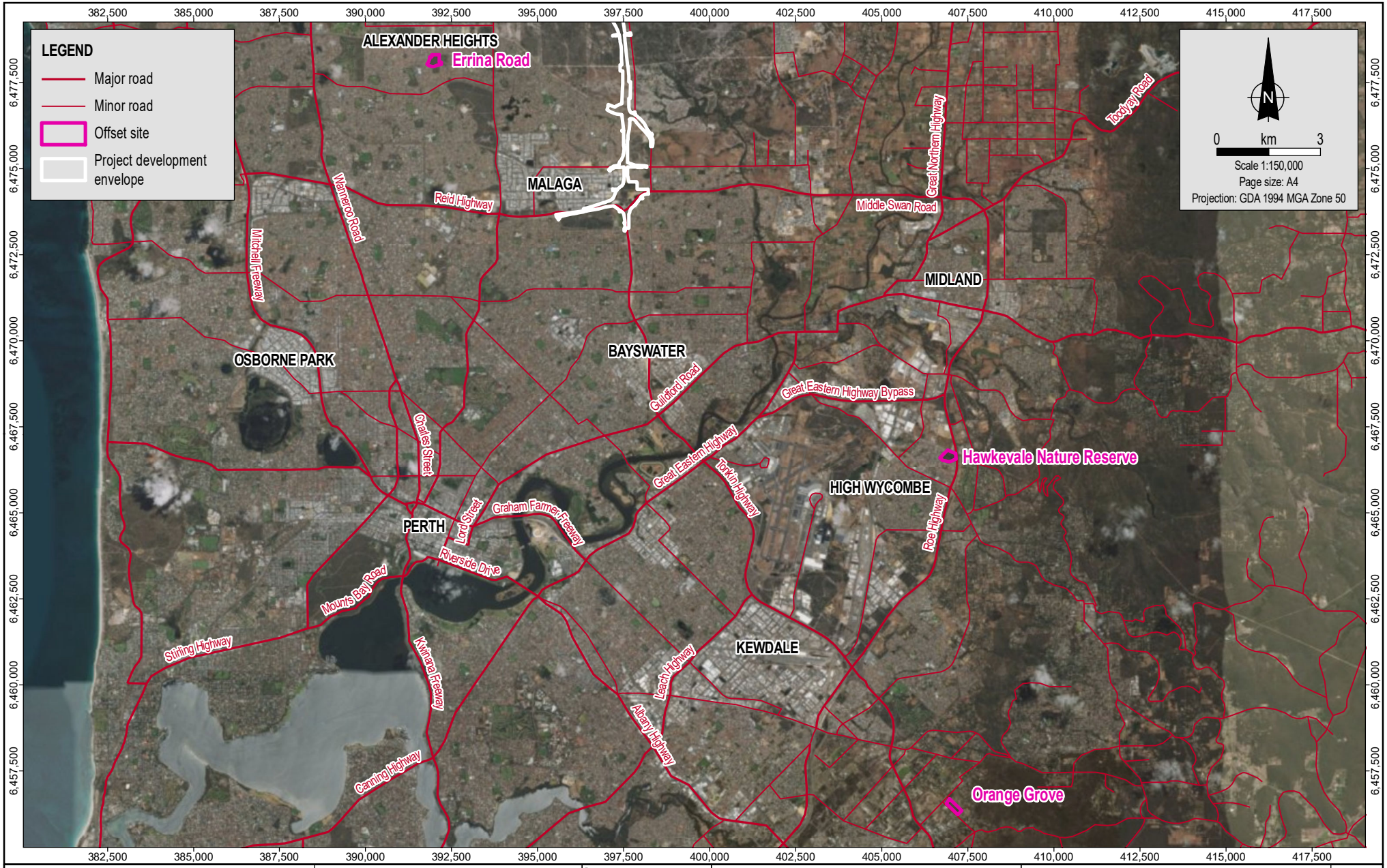
Table 8 provides a summary of the values within each SCP20a offset site, including the significant residual impact and offset required. The three SCP20a offset sites combined provide an offset of approximately 25.91 ha of SCP20a and supporting habitat, which is 129.73% of the offset required.

Table 8 Summary of environmental attributes at each SCP20a offset site

Attribute	Errina Road Bushland	Orange Grove	Hawkevale Nature Reserve	Total
Location	Crab Street / Errina Road	White Road / Kelvin Road	Roe Highway / Adelaide Street	–
Suburb	Alexander Heights	Orange Grove	High Wycombe	–
Lots	Lots 2, 691 and 801	Lots 29, 30 and 800	Lots 604, 605 and 606	–
Owner	Crown freehold	DBCA (Lots 29 and 30)[1] WAPC (Lot 800)	Crown reserve	–
Manager	DBCA	DBCA	DBCA	–
Reserve	Not applicable	Not applicable	Reserve No. 49079	–
Bush Forever	Bush Forever site 493	Bush Forever site 51	Bush Forever site 122	28 ha of Bush Forever
Vegetation complex	Karrakatta Complex – Central and South	Forrestfield Complex	Forrestfield Complex	–
Total SCP20a and supporting habitat[2]	8.62 ha	7.76 ha	9.53 ha	25.91 ha
Offset site size (cadastre boundary)	10.01 ha	7.91 ha	10.40 ha	28.32 ha
Threatened and Priority flora and fauna	*Jacksonia sericea* (P4) Contains known records of Graceful Sunmoth (*Synemon gratiosa*) (P4)	One known population of *Conospermum undulatum* (Vulnerable). One potential population of *Haemodorum ?loratum* (P3; identified to genus level)	One known population of *Conospermum undulatum* (Vulnerable) with other populations in adjacent areas Multiple records of Carnaby's Black Cockatoo in DBCA database	–

Attribute	Errina Road Bushland	Orange Grove	Hawkevale Nature Reserve	Total
Other attributes	Adjacent to other bushland containing SCP20a Near threatened vegetation complex (Karrakatta Complex – Central and South, 23.61% remaining) Contains foraging habitat for Carnaby's Black Cockatoo	Near threatened vegetation complexes (Forrestfield Complex, 12.4% remaining) Contains foraging habitat for Carnaby's Black Cockatoo	Near threatened vegetation complex (Forrestfield Complex, 12.4% remaining) Contains foraging habitat for Carnaby's Black Cockatoo Likely habitat for Quenda (*Isoodon obesulus*) (DBCA database records nearby)	–
Threatening processes	• Unauthorised access • Altered fire regime • Litter • Weeds and dieback	• Unauthorised access • Altered fire regime • Litter • Feral bees • Weeds and dieback • Lack of previous conservation management regime	• Unauthorised access • Altered fire regime • Litter • Weeds and dieback	–
% of SCP20a offset requirement[3]	40.00%	65.74%	23.99%	129.73%

1. DBCA has recently purchased these properties for the purpose of this offset using funds provided by MRWA. Previously, Lots 29 and 30 were in private ownership.
2. Total area used in Commonwealth's Offset Assessment Guide calculations.
3. The offset requirement has been determined using the WA Offset Template and Commonwealth's Offset Assessment Guide provided in Appendices A, B and C.



Source & Notes
Offset area from Eco Logical Australia (February 2019).
Roads from GEODATA250k.
Imagery from ArcGIS Online (currency not stated).

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A TETRA TECH COMPANY

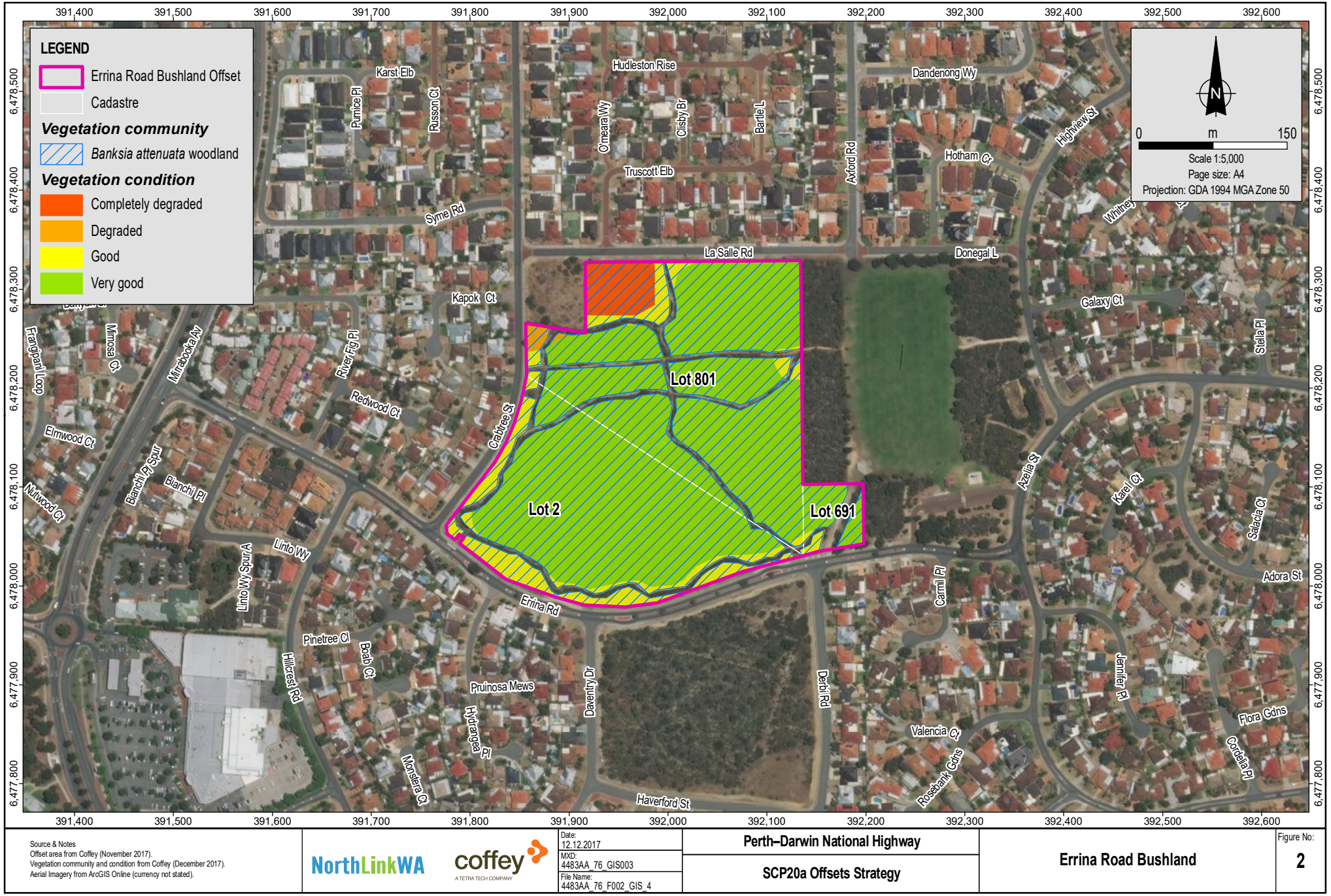
Date: 18.02.2019
MXD: 4483AA_76_GIS009
File Name: 4483AA_76_F001_GIS_7

Perth–Darwin National Highway

SCP20a Offsets Strategy

SCP20a offset site locations

Figure No: 1



Source & Notes
Offset area from Coffey (November 2017).
Vegetation community and condition from Coffey (December 2017).
Aerial Imagery from ArcGIS Online (currency not stated).

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Date: 12.12.2017
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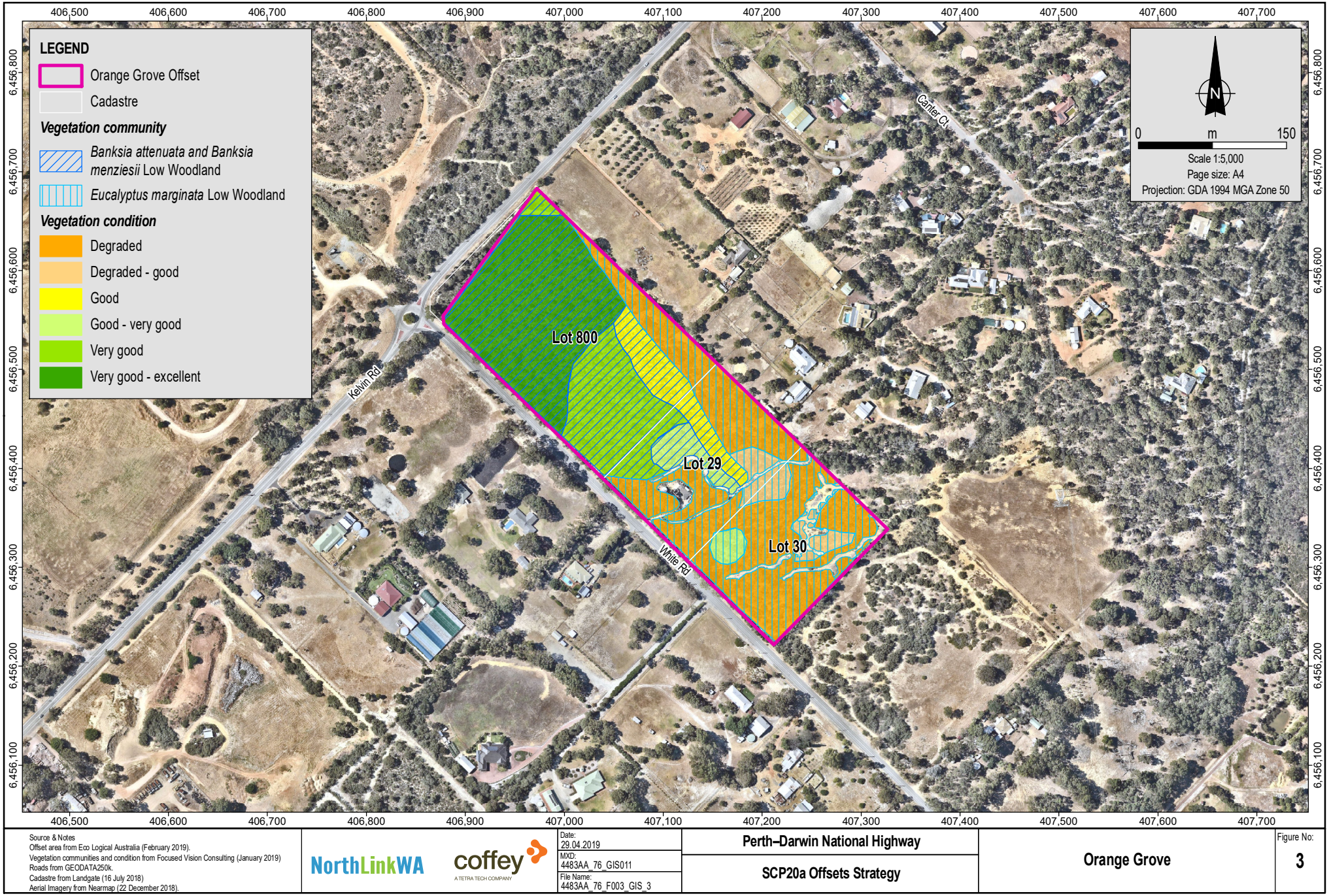
Perth–Darwin National Highway

SCP20a Offsets Strategy

Errina Road Bushland

Figure No: 2



Source & Notes
Offset area from Eco Logical Australia (February 2019).
Vegetation communities and condition from Focused Vision Consulting (January 2019)
Roads from GEODATA250k.
Cadastre from Landgate (16 July 2018)
Aerial Imagery from Nearmap (22 December 2018).

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Date: 29.04.2019
MXD: 4483AA_76_GIS011
File Name: 4483AA_76_F003_GIS_3

Perth–Darwin National Highway

SCP20a Offsets Strategy

Orange Grove

Figure No: **3**

Source & Notes
Offset area from Coffey (November 2017).
Vegetation communities and condition from Coffey (December 2017).
Aerial Imagery from ArcGIS Online (currency not stated).

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Date: 12.12.2017
MXD: 4483AA_76_GIS004
File Name: 4483AA_76_F004_GIS_4

Perth–Darwin National Highway

SCP20a Offsets Strategy

Hawkevale Nature Reserve

Figure No: 4

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4 PROTECTION MECHANISM

Errina Road Bushland is owned by the state as freehold land and is managed for the purpose of conservation. No change to its current tenure is proposed.

Orange Grove comprises three lots in differing tenures. Lot 800 is owned by WAPC as freehold land. Lots 29 and 30 have recently been purchased by DBCA with funds provided by MRWA specifically for the purpose of this offset. Prior to their acquisition, Lots 29 and 30 were in private ownership. DBCA will take on management of all three lots (directly for Lots 29 and 30, and with agreement of WAPC for Lot 800) and will manage the offset site on an ongoing basis for conservation purposes. This offsets strategy will enable the future progression by DBCA of at least Lots 29 and 30 towards forming part of the conservation estate.

Hawkevale Nature Reserve is an A Class Nature Reserve (Reserve No. 49709) within Crown land. It is an existing conservation estate under the management of DBCA. No change to its current tenure is proposed.

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5 MANAGEMENT AND/OR REHABILITATION ACTIONS

5.1 Objectives, Targets and Completion Criteria

Table 9 sets out the objectives, targets and completion criteria for this offsets strategy.

Note that the completion criteria in Table 9 are also linked to relevant management actions, which are set out in Section 5.2 and Table 10.

Table 9 Objectives, targets and completion criteria

Objective	Target	Completion criteria
Counterbalance the significant residual impact to 4 ha of the TEC SCP20a.	To conserve, maintain and/or enhance 10 ha of SCP20a and supporting vegetation at Errina Road Bushland.	• Flora and vegetation survey completed. • Baseline weed mapping completed. • Weed monitoring and mapping completed. • 60% reduction of WONS, declared plants and invasive grasses from the baseline survey. • Baseline dieback mapping completed. • *Phytophthora* management plan completed. • Signage installation completed. • 1 km of limestone paths installed. • 1.3 km of homestead style fencing and one heavy duty gate installed and existing fencing removed. • 0.5 ha of degraded areas revegetated. • Rubbish removal completed.
	To conserve, maintain and/or enhance 8 ha of SCP20a and supporting vegetation at Orange Grove.	• Flora and vegetation survey completed. • Flora survey completed. • Baseline weed mapping completed. • 60% reduction of WONS, declared plants and invasive grasses from the baseline survey. • Baseline dieback mapping completed. • *Phytophthora* management plan completed. • *Phytophthora* treatments applied. • Eight nature reserve signs installed. • Eight dieback signs installed. • Reserve information board installed. • Shelter installed. • 1.3 km of boundary cable fencing installed.

Objective	Target	Completion criteria
		• House removed and site cleaned up in preparation for revegetation. • 3.1 ha of degraded areas revegetated, including closed access tracks, former sand excavation area and former house site. • Rubbish removal completed. • Reserve environmental management plan implemented. • Feral bee hive control implemented.
	To conserve, maintain and/or enhance 10 ha of SCP20a and supporting vegetation at Hawkevale Nature Reserve.	• Flora and vegetation survey completed. • Baseline weed mapping completed. • Weed monitoring and mapping completed. • 60% reduction of WONS, declared plants and invasive grasses from the baseline survey. • Baseline dieback mapping completed. • *Phytophthora* management plan completed. • 0.25 ha of degraded areas revegetated. • Signage installation completed.

Note: the completion criteria in Table 10 prevail to the extent of any inconsistencies with the completion criteria in this table.

5.2 Management Actions

The following actions will be undertaken at all the offset sites (unless stated otherwise).

Flora and vegetation survey. Results from the flora and vegetation condition surveys were used to develop the offsets strategy, in particular to ensure that the extents of SCP20a and supporting habitat used in the offset calculations are ground-truthed (see Section 3.2). Refer to Sections 3.1.1, 3.1.2 and 3.1.3 for further details on the surveys undertaken. An additional flora survey is proposed for Orange Grove.

Weed mapping. Weed mapping is an action consistent with the recovery plan for SCP20a (DPAW, 2016) that will enable effective weed control to be undertaken. Baseline weed survey and mapping is proposed at all offset sites, and follow-up weed monitoring and mapping is proposed at Errina Road Bushland and Hawkevale Nature Reserve.

Weed control program. A weed control program will target a reduction in weeds. Weeds have been identified in the recovery plan for SCP20a (DPAW, 2016) as a significant threat to SCP20a. Grassy weeds also increase fire risk.

***Phytophthora* mapping.** Dieback disease caused by *Phytophthora* species is a potential threat to SCP20a (DPAW, 2016). Mapping its presence is important in being able to manage the spread of disease. Mapping of *Phytophthora* dieback is an action consistent with the recovery plan for SCP20a (DPAW, 2016).

***Phytophthora* management plan (Errina Road Bushland and Hawkevale Nature Reserve).** A *Phytophthora* management plan will document the *Phytophthora* mapping and set out actions to enable DBCA to target ongoing *Phytophthora* management. The implementation of this management plan is outside the scope of the management actions in this offsets strategy for Errina Road Bushland and Hawkevale Nature Reserve.

***Phytophthora* treatment (Orange Grove).** The application of phosphite dieback treatments will protect the bushland at Orange Grove from dieback threats posed by adjacent properties. *Phytophthora* treatments are proposed for Orange Grove only.

Interpretive signage. Installation of signage is important in raising awareness in the community about the values of SCP20a, the key threats to SCP20a and measures that can be taken by members of the public to minimise threats to the offset sites. The installation of signage (or "markers") is consistent with the recovery plan for SCP20a (DPAW, 2016). Signage requirements are customised for each offset site.

Replacement of existing fencing (Errina Road Bushland) and installation of new fencing (Errina Road Bushland and Orange Grove only). As all three SCP20a offset sites are located in developed urban or semi-urban settings, limiting unauthorised access by vehicles and restricting other access to marked pathways is important for the maintenance of the sites. Limiting access also assists with limiting the spread of weeds and disease. Perimeter access controls in the form of fencing are proposed for Errina Road Bushland and Orange Grove. At Errina Road Bushland, existing fencing will be removed and new fencing installed. New fencing is proposed to be post and rail 'homestead' style (approximately 1.3 km) including one heavy duty gate. At the Orange Grove site, new fencing will be installed. New fencing at Orange Grove is proposed to be cable style (approximately 1.3 km). Note that the fencing types and lengths stated above are indicative only and may be altered to suit installation requirements while still having the effect of limiting access.

Revegetation planting within degraded areas. All three offset sites contain degraded areas that would benefit from revegetation works. Revegetation planting will assist by limiting weed species and fire risk and providing better quality vegetation to buffer the remnant SCP20a. Errina Road Bushland contains some degraded areas. Approximately 0.5 ha of predominantly degraded areas will undergo revegetation planting. At Hawkevale Nature Reserve, approximately 0.25 ha of degraded areas will undergo revegetation planting. Orange Grove contains some degraded areas within supporting habitat for SCP20a, including a number of internal access tracks, a house footprint and a former sand extraction area. Approximately 3.1 ha of degraded areas at Orange Grove predominantly within Lots 29 and 30 will undergo revegetation planting.

Rubbish removal (Errina Road Bushland and Orange Grove). The removal of rubbish will limit the degradation of vegetation and introduction of weeds and disease. This will consist of an annual event of cleaning up fly tipping within the site.

Demolition of existing house (Orange Grove). The existing house on Lot 29 at Orange Grove will be demolished. The house footprint and immediately surrounding area will be cleaned up to prepare it for revegetation works. The clean-up will involve the removal of all building materials associated with the house and garden.

Feral bee control (Orange Grove). The establishment of feral bees and their hives displaces other species, including native bees but also vertebrate fauna using tree hollows. Controlling feral bees will remove competition with native bee species, allowing important ecosystem services to function and enhance the ecological functionality of the offset site.

Installation of shelter (Orange Grove). Following removal of the house at Orange Grove, a shelter will be installed to facilitate its recreational use as reserve post-acquisition by DBCA. The shelter will be installed on Lot 29 or Lot 30 as this land is intended to become part of the formal conservation estate in future. This management action aligns with DBCA's standards for conservation reserve establishment and management.

Reserve environmental management plan (Orange Grove). As Orange Grove (Lots 29 and 30 in the first instance) is intended to become a formal conservation reserve in future, the development of an environmental management plan will assist DBCA in its long-term management for conservation purposes.

Installation of limestone pathways (Errina Road). Applying limestone to existing pathways within the offset site will reduce the spread of *Phytophthora* disease in the offset site. It will also better delineate formal walking tracks in the bushland, reducing informal tracks made by users of the site.

More information on the consistency of proposed management actions with the recovery plan for SCP20a is provided in Chapter 6.

Table 10 details the specific activities to be undertaken within the offset sites, including timeframes and completion criteria.

Table 10 Activities, timeframes, roles and responsibilities and completion criteria for SCP20a offset sites

Activity	Actions	Timeframe	Roles and responsibility	Funding arrangement	Completion criteria
Errina Road Bushland					
Flora and vegetation survey.	Flora and vegetation survey.	By December 2018 (completed)	MRWA	MRWA will arrange and fund this activity directly.	Flora and vegetation survey completed.
Weed mapping.	Map weeds (baseline).	By December 2020	DBCA	MRWA to provide funding in accordance with MoU.	Baseline weed mapping completed.
	Map weeds (monitoring).	By December 2023 and December 2026	DBCA	MRWA to provide funding in accordance with MoU.	Weed monitoring and mapping completed.
Weed control.	Implement weed control programs.	Annually from 2020 until 2026	DBCA	MRWA to provide funding in accordance with MoU.	60% reduction of WONS, declared plants and invasive grasses from the baseline survey.
Phytophthora mapping.	Map dieback.	By December 2021	DBCA	MRWA to provide funding in accordance with MoU.	Baseline dieback mapping completed.
Phytophthora management plan.	Develop a dieback management plan for the offset site.	By December 2021	DBCA	MRWA to provide funding in accordance with MoU.	*Phytophthora* management plan completed.
Interpretive signage.	Install interpretive signage detailing values of reserve, and specifically the SCP20a occurrence, to educate public on the values of the bushland.	By December 2020	DBCA	MRWA to provide funding in accordance with MoU.	Signage installation completed.
Limestone paths.	Install 1 km of limestone paths.	By December 2020	DBCA	MRWA to provide funding in accordance with MoU.	1 km of limestone paths installed.

Activity	Actions	Timeframe	Roles and responsibility	Funding arrangement	Completion criteria
Replacement of fencing.	Replace existing fencing with 1.3 km of new 'homestead' style fencing, including one heavy duty gate.	By December 2021	DBCA	MRWA to provide funding in accordance with MoU.	1.3 km of 'homestead' style fencing and one heavy duty gate installed and existing fencing removed.
Revegetation planting within degraded areas.	Revegetate 0.5 ha of degraded areas.	By December 2022	DBCA	MRWA to provide funding in accordance with MoU.	0.5 ha of degraded areas revegetated.
Rubbish removal.	Remove rubbish.	Annually from 2020 to 2026	DBCA	MRWA to provide funding in accordance with MoU.	Rubbish removal completed.
Orange Grove					
Flora and vegetation survey.	Flora and vegetation survey.	By December 2018 (completed)	MRWA	MRWA will arrange and fund this activity directly.	Flora and vegetation survey completed.
	Flora survey.	By December 2021	DBCA	MRWA to provide funding in accordance with MoU.	Flora survey completed.
Weed mapping.	Map weeds.	By December 2021	DBCA	MRWA to provide funding in accordance with MoU.	Baseline weed mapping completed.
Weed control.	Implement weed control programs.	Annually from 2020 until 2026	DBCA	MRWA to provide funding in accordance with MoU.	60% reduction of WONS, declared plants and invasive grasses from the baseline survey.
Phytophthora mapping and treatment.	Map dieback and apply dieback control treatments.	By December 2020, December 2022, December 2024 and December 2026	DBCA	MRWA to provide funding in accordance with MoU.	Baseline dieback mapping completed. *Phytophthora* treatments applied.
Interpretive signage.	Install 8 nature reserve signs.	By December 2020	DBCA	MRWA to provide funding in accordance with MoU.	8 nature reserve signs installed.

Activity	Actions	Timeframe	Roles and responsibility	Funding arrangement	Completion criteria
	Install 8 dieback signs.	By December 2021	DBCA	MRWA to provide funding in accordance with MoU.	8 dieback signs installed.
	Install reserve information board.	By December 2025	DBCA	MRWA to provide funding in accordance with MoU.	Reserve information board installed.
Shelter.	Install shelter.	By December 2025	DBCA	MRWA to provide funding in accordance with MoU.	Shelter installed.
Installation of fencing.	Install 1.3 km of boundary cable fencing.	By December 2021	DBCA	MRWA to provide funding in accordance with MoU.	1.3 km of boundary cable fencing installed.
Demolition of existing house.	Removal of house within Lot 29 and clean-up of immediate surroundings.	Before December 2023	MRWA	MRWA will arrange and fund this activity directly.	House removed and site cleaned up in preparation for revegetation.
Revegetation planting within degraded areas.	Revegetate 3.1 ha of degraded areas including closed access tracks, former sand excavation area and former house site.	By December 2022 and ongoing until December 2026	DBCA	MRWA to provide funding in accordance with MoU.	3.1 ha of degraded areas revegetated, including closed access tracks, former sand excavation area and former house site.
Rubbish removal.	Remove rubbish.	Annually from 2020 to 2026	DBCA	MRWA to provide funding in accordance with MoU.	Rubbish removal completed.
Reserve environmental management plan.	Prepare and implement a reserve environmental management plan.	By December 2022	DBCA	MRWA to provide funding in accordance with MoU.	Reserve environmental management plan completed and implemented.

Activity	Actions	Timeframe	Roles and responsibility	Funding arrangement	Completion criteria
Feral bee control.	Implement feral bee hive control.	Annually from 2020 to 2026	DBCA	MRWA to provide funding in accordance with MoU.	Feral bee hive control completed.

Activity	Actions	Timeframe	Roles and responsibility	Funding arrangement	Completion criteria
Hawkevale Nature Reserve					
Flora and vegetation survey.	Flora and vegetation survey.	By December 2018 (completed)	MRWA	MRWA will arrange and fund this activity directly.	Flora and vegetation survey completed.
Weed mapping.	Map weeds (baseline).	By December 2020	DBCA	MRWA to provide funding in accordance with MoU.	Baseline weed mapping completed.
	Map weeds (monitoring).	By December 2023 and December 2026	DBCA	MRWA to provide funding in accordance with MoU.	Weed monitoring and mapping completed.
Weed control.	Implement weed control programs.	Annually from 2020 until 2026	DBCA	MRWA to provide funding in accordance with MoU.	60% reduction of WONS, declared plants and invasive grasses from the baseline survey.
Phytophthora mapping.	Map dieback.	By December 2021	DBCA	MRWA to provide funding in accordance with MoU.	Baseline dieback mapping completed.
Phytophthora management plan.	Develop a dieback management plan for the offset site.	By December 2021	DBCA	MRWA to provide funding in accordance with MoU.	*Phytophthora* management plan completed.
Interpretive signage.	Install interpretive signage detailing values of reserve, and specifically the SCP20a occurrence, to educate public on the values of the bushland.	By December 2020	DBCA	MRWA to provide funding in accordance with MoU.	Signage installation completed.
Revegetation planting within degraded areas.	Revegetate 0.25 ha of degraded areas.	By December 2021	DBCA	MRWA to provide funding in accordance with MoU.	0.25 ha of degraded areas revegetated.

5.3 Timing and Funding Arrangements for Conservation Activities

MRWA and DBCA will establish a Third Party Delivery Arrangements MoU for the implementation of the offsets strategy within six months of the approval of this offsets strategy. A single MoU will cover all offsets sites proposed in this offsets strategy.

Subject to the conditions of the MoU, the funding arrangements will be as follows:

- MRWA will fully fund all activities required under this offsets strategy.
- DBCA is to set up one or more Specific Purpose Accounts that are interest-bearing for the sole purpose of funding the implementation of the activities in this offsets strategy.
- DBCA will invoice MRWA the full amount agreed in the MoU prior to work commencing.
- MRWA will pay DBCA invoices for activities covered by this offsets strategy within 60 days of receiving the invoice.
- Contribution of funds will be provided for the management of the offset sites for seven years.

5.4 Monitoring

Under the MoU with DBCA, DBCA will be required to provide MRWA with a report detailing the activities undertaken at each offset site and completion criteria as applicable. MRWA will monitor the implementation of the management actions set out in Section 5.4 and Table 10 and progress towards achievement of the completion criteria in Table 10 through the report provided by DBCA.

5.5 Reporting and Evaluation

The annual compliance assessment report prepared by MRWA will include:

- DBCA's annual report on activities undertaken under this offsets strategy (see below)
- The activities undertaken in the previous 12 months under this offsets strategy (i.e. the management actions set out in Section 5.4 and Table 10).
- The activities proposed in the next 12 months under this offsets strategy in accordance with the management actions set out in Section 5.4 and Table 10.
- A summary of compliance with the offsets strategy.
- An evaluation of the results of monitoring and survey actions to identify progress on meeting the completion criteria detailed in the MoU.

DBCA will provide an annual report to MRWA for activities conducted between 21 September and 20 September annually. It will include:

- The progress in undertaking the activities for which DBCA is identified as the responsible party.
- Expenditure incurred.
- Proposed activities in the following year.

5.6 Roles and Responsibilities

This section sets out the roles and responsibilities related to the implementation of this offsets strategy.

5.6.1 Main Roads Western Australia

MRWA will be responsible for the following in relation to the SCP20a offset sites:

- Fund the acquisition by DBCA of Lots 29 & 30 Orange Grove
- Reach an agreement with DBCA for the arrangement and funding for works associated with ongoing management of the SCP20a offset sites through a MoU.
- Provide funding to DBCA for the agreed costs of the seven year works plan. (Note that the 'works plan' is the part of the MoU that will reflect the provisions relevant to DBCA in Chapter 5 of this offsets strategy.)
- Provide the completed MoU and evidence of the funds transfer to the CEO of the Department of Water and Environmental Regulation once the MoU has been signed and the funds transferred.
- Report on activities undertaken under the works plan in the annual CAR.

5.6.2 Department of Biodiversity, Conservation and Attractions

DBCA will be responsible for the following activities, subject to the conditions of the MoU:

- Invoice MRWA for the agreed funds once the MoU takes effect.
- Prepare an operational works plan to undertake the tasks in the MoU.
- Allocate the funds provided by MRWA to agreed tasks and activities over the timeframe of the works plan.
- Provide an annual update of works activities completed, expenditure incurred and proposed actions to MRWA by 20 November annually, during the lifetime of the works plan.
- Keep MRWA informed of activities and works pursuant to the MoUs that might affect or have implications for MRWA projects and proposals.

6 CONSISTENCY OF ACTIONS WITH RECOVERY PLAN

The management actions proposed in this offsets strategy are consistent with the recovery actions of Interim Recovery Plan No. 359 *Banksia attenuata* woodlands over species rich dense shrublands (Swan Coastal Plain Community type 20a – Gibson et al. 1994): Interim Recovery Plan 2016–2021 (DPAW, 2016). They have been developed in consultation with DBCA.

Table 11 includes a summary of the recovery actions in the SCP20a Interim Recovery Plan and how these have been addressed in this offsets strategy.

Table 11 Consistency of offsets strategy with SCP20a Interim Recovery Plan

Item	Recovery action from Interim Recovery Plan (DPAW, 2016)	How recovery action has been addressed in this offsets strategy
1	Liaise with stakeholders to implement recovery.	Discussions by MRWA with DBCA (Swan Coastal District) and City of Wanneroo.
2	Seek to minimise further clearing of SCP20a.	Recovery action is not applicable to this offsets strategy. Minimisation of impact was considered during impact assessment.
3	Verify occurrences of SCP20a as required.	The occurrence and extent of SCP20a at each offset site has been verified by DBCA. Advice provided by DBCA on survey effort required for these known occurrences indicated that further quadrat surveys were not required.
4	Continue to monitor the extent and boundaries of occurrences.	Targeted vegetation surveys were conducted in late 2017 (Eco Logical Australia, 2017) and late 2018 (Focused Vision Consulting, 2018) to confirm DBCA-mapped extents.
5	Install markers at locations of occurrences.	Signage is proposed as part of this offsets strategy.
6	Encompass monitoring in an adaptive management framework.	Ongoing weed monitoring is proposed at each of the offset sites. This will be an adaptive management framework, as results from weed monitoring will be used to define the next weed control actions to be implemented.
7	Implement weed control and rehabilitation as required.	Ongoing weed monitoring and control is proposed at each of the offset sites. Some revegetation is proposed along access tracks that are no longer required at two of the offset sites. Rubbish removal is proposed at one of the offset site.
8	Develop and implement a fire management strategy.	Not proposed as part of this strategy. DBCA has not indicated that fire management (above and beyond what would normally be implemented for these sites) is required as part of this offsets strategy. Normal fire management practices would include maintenance of fire breaks around the boundary of the site.
9	Interpret and map disease areas.	Dieback mapping has been included as one of the management actions in the offsets strategy.
10	Implement disease hygiene procedures.	Dieback treatment has been included as a management action at one of the offset sites in this offsets strategy.

Item	Recovery action from Interim Recovery Plan (DPAW, 2016)	How recovery action has been addressed in this offsets strategy
11	Design and conduct research.	Not proposed as part of this strategy.
12	Seek long-term protection of the community for conservation.	Part of the Orange Grove offset has resulted in land containing SCP20a or its supporting habitat moving to a more secure tenure. Lots 29 and 30 White Road, Orange Grove have been purchased from a private owner by DBCA and will be managed for conservation on an ongoing basis. The process of formally creating conservation reserves is outside the control of MRWA, however the transfer of the land into DBCA management is an important step enabling the creation of conservation reserves in future in Lots 29 and 30.
13	Report on recovery plan implementation.	Implementation of the Interim Recovery Plan is not the responsibility of MRWA.

7 IMPLEMENTATION, REVIEW AND REVISION OF THE OFFSETS STRATEGY

This offsets strategy will continue to be implemented until directed otherwise by the CEO in accordance with condition 16-21(2).

In accordance with condition 16-22, MRWA shall review and revise this offsets strategy as and when directed by the CEO.

Once the extent of SCP20a has been confirmed through flora and vegetation survey and in consultation with DBCA, MRWA will revise this offsets strategy if required.

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8 STAKEHOLDER CONSULTATION

MWRA consulted with stakeholders while developing this offsets strategy. This section provides a summary of consultation that occurred. The comments raised during consultations with stakeholders were considered in the developing the offsets strategy.

A summary of the consultation and MRWA's response is included in Table 12.

Table 12 Stakeholders consulted, comments and responses

Date	Organisation	Summary of consultation	MRWA response to comments/concerns
21 March 2016	Former Department of Parks and Wildlife pers. comm. Alex Errington	No viable properties containing SCP20a to be purchased and/or managed.	Nil.
3 July 2017	City of Wanneroo pers. comm. Belinda McCawley	Limited further opportunities within City of Wanneroo for MRWA to contribute to SCP20a for the purpose of an offset. City of Wanneroo identified several other sites including Lake Gnangara and Errina Road Bushland.	Investigate other potential SCP20a sites, including Lake Gnangara. Followed up with DBCA regarding Errina Road Bushland.
22 August 2017	DBCA (Parks and Wildlife Service) pers. comm. Michael Roberts	Identification of SCP20a patches that would benefit from further management actions, including: • Errina Road Bushland. • Sultana Road West. • Hawkevale Nature Reserve.	Followed up with DBCA regarding these offset sites and have developed this offsets strategy around these sites.
21 March 2018	DBCA (Parks and Wildlife Service) pers. comm. Alex Errington	Availability of SCP20a in properties that may be suitable for acquisition and inclusion into conservation estate. Still none considered viable.	No suitable properties available.
23 March 2018	DBCA (Parks and Wildlife Service) DWER (EPA Services)	Discussed other potential SCP20a offset sites identified by DBCA, with most agreed unavailable and/or unsuitable for use in this offsets strategy. One potential site to be investigated further by DBCA.	As at the time of revision of this offsets strategy (June 2018), DBCA was unable to confirm the one potential site as available. MRWA has retained offset sites currently proposed, subject to revisions and clarifications discussed.
23 March 2018 to 21 June 2018	DBCA (Parks and Wildlife Service) pers. comm. Alex Errington	Status of acquisition process regarding Lot 615 Daventry Drive Alexander Drive.	As at 21 June 2018, Department of Education has not indicated whether it is willing to sell.

Date	Organisation	Summary of consultation	MRWA response to comments/concerns
July 2018 to March 2019	DBCA (Parks and Wildlife Service) pers. comm. Alex Errington	Status of acquisition process regarding Lots 29 & 30 White Road Orange Grove.	As at 19 March 2019, DBCA indicated that acquisition was close to being finalised.
1 February 2019	DPLH	Status of management of Lot 800 White Road, Orange Grove.	DPLH (WAPC) has confirmed MRWA may undertake offset actions for SCP20a at Lot 800 White Road, Orange Grove.
8 March 2019	DBCA (Hills District)	Discussion on management actions and funding arrangements for Lots 29, 30 and 800 White Road Orange Grove.	Agreed on actions and funding for Orange Grove offset subject to approval of this plan.

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APPENDIX A

WA Offset Template and Commonwealth's Offset Assessment Guide for Errina Road Bushland

NorthLink WA Perth-Darwin National Highway									
Existing environment/ Impact	*Mitigation*			*Significant Residual Impact*	*Offset Calculation Methodology*				
	Avoid and minimise	*Rehabilitation Type*	*Likely Rehab Success*		*Type*	*Risk*	*Likely offset success*	*Time Lag*	*Offset Quantification*
Threatened Ecological Community SCP20a. Removal of 4 ha of threatened ecological community SCP20a.	The alignment predominantly follows existing infrastructure, cleared land or secondary habitat, which reduces the impacts. Through design the project footprint has avoided occurrence of SCP20a to the east and further reduced the impact by 0.3 ha.	Project will be a permanent road carriageway. Onsite rehabilitation opportunties will be limited to tempoary constrcution areas.	Can the environmental values be rehabilitated/Evidence? No rehabilitation proposed. Operator experience in undertaking rehabilitation? What is the type of vegetation being rehabilitated? Time lag? Credibility of the rehabilitation proposed (evidence of demonstrated success)	Extent Significant residuala impact remains at 4 ha of SCP20a. Quality Vegetation in good to excellent condition Conservation Significance Threatened Ecological Community Land Tenure The FCT SCP20a is located in Bush Forever Site: 304, within Whiteman Park. Time Scale No temporary clearing. Permanent.	Land management of existing conservation estate - offset site Errina Road Bushland has been identified.	Low - Land already under DBCA management.	Can the values be defined and measured? Yes - value to SCP20a habitat can be measured. SCP20a habitat has been identified at the offset site. Operator experience/Evidence? DBCA will manage the land. What is the type of vegetation being revegetated? N/A Is there evidence the environmental values can be re-created (evidence of demonstrated success)? Values (SCP20a habitat) are already present at the offset site.	Management actions will result in improvement / retention of existing condition over time. 5 year time lag on benefits.	8.62 ha of SCP20a habitat protected, within this one offset site (approx 40%). The ratio of habitat protected compared to land cleared was determined using the Commonwealth Calculator as a guide.

Offsets Assessment Guide

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

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	State-listed TEC?
EPBC Act status	Other
Annual probability of extinction Based on IUCN category definitions	**0.0%**

Other annual probability of extinction	Information source

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

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	Yes	SCP 20a, Banksia attenuata woodland over species rich dense shrublands (Endangered, State-listed TEC)	**Area**	4	Hectares	
			Quality	**8**	Scale 0-10	
			Total quantum of impact	3.20	Adjusted hectares	
Threatened species habitat						
Area of habitat	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	Yes	3.20	Adjusted hectares	Provide funding for additional management actions within 10 ha offset site.	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	8.62	**Risk of loss (%) without offset**	15%	**Risk of loss (%) with offset**	5%	0.86	90%	0.78	0.78	1.28	40.00%	No	
									Future area without offset (adjusted hectares)	7.3	**Future area with offset (adjusted hectares)**	8.2								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**7**	**Future quality without offset (scale of 0-10)**	**7**	**Future quality with offset (scale of 0-10)**	**8**	1.00	90%	0.90	0.90				
Threatened species habitat																				
Area of habitat	No				**Time over which loss is averted (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	0				$0.00		$0.00
Area of community	3.2	1.28	40.00%	**No**	$0.00	#DIV/0!	#DIV/0!
					$0.00	**#DIV/0!**	**#DIV/0!**

APPENDIX B

WA Offset Template and Commonwealth's Offset Assessment Guide for Orange Grove

NorthLink WA Perth-Darwin National Highway									
Existing environment/ Impact	*Mitigation*			*Significant Residual Impact*	*Offset Calculation Methodology*				
	Avoid and minimise	*Rehabilitation Type*	*Likely Rehab Success*		*Type*	*Risk*	*Likely offset success*	*Time Lag*	*Offset Quantification*
Threatened Ecological Community SCP20a. Removal of 4 ha of threatened ecological community SCP20a.	The alignment predominantly follows existing infrastructure, cleared land or secondary habitat, which reduces the impacts. Through design the project footprint has avoided occurrence of SCP20a to the east and further reduced the impact by 0.3 ha.	Project will be a permanent road carriageway. Onsite rehabilitation opportunties will be limited to tempoary constrcution areas.	Can the environmental values be rehabilitated/Evidence? No rehabilitation proposed. Operator experience in undertaking rehabilitation? What is the type of vegetation being rehabilitated? Time lag? Credibility of the rehabilitation proposed (evidence of demonstrated success)	Extent Significant residual impact remains at 4 ha of SCP20a. Quality Vegetation in good to excellent condition Conservation Significance Threatened Ecological Community Land Tenure The FCT SCP20a is located in Bush Forever Site: 304, within Whiteman Park. Time Scale No temporary clearing. Permanent.	Land acquisition and management - offset site Orange Grove has been identified.	Low - Lot 800 is managed by WAPC, Lot 29 and 30 are being purchased by DBCA for long-term management as conservation estate. All Lots are to be managed by DBCA.	Can the values be defined and measured? Yes - value to SCP20a habitat can be measured. 7.76 ha of SCP20a and supporting habitat (a minimum of 4.10 ha is SCP20a) has been identified at the offset site. Operator experience/Evidence? DBCA will manage the land. What is the type of vegetation being revegetated? Supporting habitat (comprising Eucalyptus marginata woodland) and SCP20a will be revegetated to improve the quality of the buffering vegetation. Is there evidence the environmental values can be re-created (evidence of demonstrated success)? Values (SCP20a habitat) are already present at the offset site. DBCA will apply standard revegetation works to degraded areas within the offset sites.	Management actions will result in improvement / retention of existing condition over time. Five year time lag on benefits.	7.76ha of SCP20a habitat protected, with one offset site (approx. 65.74% of significant residual impact counterbalanced with this offset). The ratio of habitat protected compared to land cleared was determined using the Commonwealth Calculator as a guide.

0

Offsets Assessment Guide

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

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Lot 800 - Threatened Ecological Community SCP20a and/or supporing habitat

Matter of National Environmental Significance	
Name	State-listed TEC?
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

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

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	Yes	SCP 20a, Banksia attenuate woodland over species rich dense shrublands (Endangered, State-listed TEC)	**Area**	4	Hectares	
			Quality	**8**	Scale 0-10	
			Total quantum of impact	3.20	Adjusted hectares	
Threatened species habitat						
Area of habitat	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	Yes	3.20	Adjusted hectares	Provide funding for additional management actions within 15 ha offset site.	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	3.91	**Risk of loss (%) without offset**	30%	**Risk of loss (%) with offset**	5%	0.98	95%	0.93	0.73	1.05	32.81%	No	
									Future area without offset (adjusted hectares)	2.7	**Future area with offset (adjusted hectares)**	3.7								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**8**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**8**	2.00	90%	1.80	1.70				
Threatened species habitat																				
Area of habitat	No				**Time over which loss is averted (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	0				$0.00		$0.00
Area of community	3.2	1.05	32.81%	**No**	$0.00	#DIV/0!	#DIV/0!
					$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

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

This guide relies on Macros being enabled in your browser.

Lot 30 - Threatened Ecological Community SCP20a and/or supporting habitat

Matter of National Environmental Significance	
Name	State-listed TEC?
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

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

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	Yes	SCP 20a, Banksia attenuate woodland over species rich dense shrublands (Endangered, State-listed TEC)	**Area**	4	Hectares	
			Quality	**8**	Scale 0-10	
			Total quantum of impact	3.20	Adjusted hectares	
Threatened species habitat						
Area of habitat	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	Yes	3.20	Adjusted hectares	Provide funding for additional management actions within 15 ha offset site.	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	1.71	**Risk of loss (%) without offset**	50%	**Risk of loss (%) with offset**	5%	0.77	90%	0.69	0.54	0.43	13.58%	No	
									Future area without offset (adjusted hectares)	0.9	**Future area with offset (adjusted hectares)**	1.6								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**3**	**Future quality without offset (scale of 0-10)**	**1**	**Future quality with offset (scale of 0-10)**	**4**	3.00	90%	2.70	2.54				
Threatened species habitat																				
Area of habitat	No				**Time over which loss is averted (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	0				$0.00		$0.00
Area of community	3.2	0.43	13.58%	**No**	$0.00	#DIV/0!	#DIV/0!
					$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

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

This guide relies on Macros being enabled in your browser.

Lot 30 - Cleared areas

Matter of National Environmental Significance	
Name	State-listed TEC?
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

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

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	Yes	SCP 20a, Banksia attenuate woodland over species rich dense shrublands (Endangered, State-listed TEC)	**Area**	4	Hectares	
			Quality	**8**	Scale 0-10	
			Total quantum of impact	3.20	Adjusted hectares	
Threatened species habitat						
Area of habitat	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	Yes	3.20	Adjusted hectares	Provide funding for additional management actions within 15 ha offset site.	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	0.21	**Risk of loss (%) without offset**	100%	**Risk of loss (%) with offset**	30%	0.14	70%	0.10	0.08	0.02	0.74%	No		
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.1								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**0**	**Future quality without offset (scale of 0-10)**	**0**	**Future quality with offset (scale of 0-10)**	**3**	3.00	70%	2.10	1.98				
Threatened species habitat																				
Area of habitat	No				**Time over which loss is averted (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	0				$0.00		$0.00
Area of community	3.2	0.02	0.74%	**No**	$0.00	#DIV/0!	#DIV/0!
					$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

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

This guide relies on Macros being enabled in your browser.

Lot 29 - Threatened Ecological Community SCP20a and/or supporting habitat

Matter of National Environmental Significance	
Name	State-listed TEC?
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

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

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	Yes	SCP 20a, Banksia attenuate woodland over species rich dense shrublands (Endangered, State-listed TEC)	**Area**	4	Hectares	
			Quality	**8**	Scale 0-10	
			Total quantum of impact	3.20	Adjusted hectares	
Threatened species habitat						
Area of habitat	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	Yes	3.20	Adjusted hectares	Provide funding for additional management actions within 15 ha offset site.	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	1.80	**Risk of loss (%) without offset**	50%	**Risk of loss (%) with offset**	5%	0.81	90%	0.73	0.57	17.88%	No		
									Future area without offset (adjusted hectares)	0.9	**Future area with offset (adjusted hectares)**	1.7								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**5**	**Future quality without offset (scale of 0-10)**	**3**	**Future quality with offset (scale of 0-10)**	**6**	3.00	90%	2.70	2.54				
Threatened species habitat																				
Area of habitat	No				**Time over which loss is averted (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	0				$0.00		$0.00
Area of community	3.2	0.57	17.88%	**No**	$0.00	#DIV/0!	#DIV/0!
					$0.00	**#DIV/0!**	**#DIV/0!**

Offsets Assessment Guide

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

This guide relies on Macros being enabled in your browser.

Lot 29 - Cleared areas

Matter of National Environmental Significance	
Name	State-listed TEC?
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

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

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	Yes	SCP 20a, Banksia attenuate woodland over species rich dense shrublands (Endangered, State-listed TEC)	**Area**	4	Hectares	
			Quality	**8**	Scale 0-10	
			Total quantum of impact	3.20	Adjusted hectares	
Threatened species habitat						
Area of habitat	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	Yes	3.20	Adjusted hectares	Provide funding for additional management actions within 15 ha offset site.	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	0.15	**Risk of loss (%) without offset**	100%	**Risk of loss (%) with offset**	30%	0.10	70%	0.07	0.06	0.02	0.53%	No	
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.1								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**0**	**Future quality without offset (scale of 0-10)**	**0**	**Future quality with offset (scale of 0-10)**	**3**	3.00	70%	2.10	1.98				
Threatened species habitat																				
Area of habitat	No				**Time over which loss is averted (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	0				$0.00		$0.00
Area of community	3.2	0.02	0.53%	**No**	$0.00	#DIV/0!	#DIV/0!
					$0.00	**#DIV/0!**	**#DIV/0!**

APPENDIX C

WA Offset Template and Commonwealth's Offset Assessment Guide for Hawkevale Nature Reserve

NorthLink WA Perth-Darwin National Highway									
Existing environment/ Impact	*Mitigation*			*Significant Residual Impact*	*Offset Calculation Methodology*				
	Avoid and minimise	*Rehabilitation Type*	*Likely Rehab Success*		*Type*	*Risk*	*Likely offset success*	*Time Lag*	*Offset Quantification*
Threatened Ecological Community SCP20a. Removal of 4 ha of threatened ecological community SCP20a.	The alignment predominantly follows existing infrastructure, cleared land or secondary habitat, which reduces the impacts. Through design the project footprint has avoided occurrence of SCP20a to the east and further reduced the impact by 0.3 ha.	Project will be a permanent road carriageway. Onsite rehabilitation opportunities will be limited to tempoary constrcution areas.	Can the environmental values be rehabilitated/Evidence? No rehabilitation proposed. Operator experience in undertaking rehabilitation? What is the type of vegetation being rehabilitated? Time lag? Credibility of the rehabilitation proposed (evidence of demonstrated success)	Extent Significant residuala impact remains at 4 ha of SCP20a. Quality Vegetation in good to excellent condition Conservation Significance Threatened Ecological Community Land Tenure The FCT SCP20a is located in Bush Forever Site: 304, within Whiteman Park. Time Scale No temporary clearing. Permanent.	Land management - offset site Hawkvale Nature Reservet has been identified.	Low - Land already under DBCA management.	Can the values be defined and measured? Yes - value to SCP20a habitat can be measured. SCP20a habitat has been identified at the offset site. Operator experience/Evidence? DBCA will manage the land. What is the type of vegetation being revegetated? N/A Is there evidence the environmental values can be re-created (evidence of demonstrated success)? Values (SCP20a habitat) are already present at the offset site.	Management actions will result in improvement / retention of existing condition over time. 5 year time lag on benefits.	9.53 ha of SCP20a habitat protected, with one offset site (approx. 23.99%). The ratio of habitat protected compared to land cleared was determined using the Commonwealth Calculator as a guide.

Offsets Assessment Guide

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

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	State-listed TEC?
EPBC Act status	Endangered
Annual probability of extinction Based on IUCN category definitions	**1.2%**

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

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	Yes	SCP 20a, Banksia attenuate woodland over species rich dense shrublands (Endangered, State-listed TEC)	**Area**	4	Hectares	
			Quality	**8**	Scale 0-10	
			Total quantum of impact	3.20	Adjusted hectares	
Threatened species habitat						
Area of habitat	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	Yes	3.20	Adjusted hectares	Provide funding for additional management actions within 10 ha offset site.	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	9.53	**Risk of loss (%) without offset**	5%	**Risk of loss (%) with offset**	5%	0.00	90%	0.00	0.00	0.77	23.99%	No	
									Future area without offset (adjusted hectares)	9.1	**Future area with offset (adjusted hectares)**	9.1								
					Time until ecological benefit	5	**Start quality (scale of 0-10)**	**7**	**Future quality without offset (scale of 0-10)**	**6**	**Future quality with offset (scale of 0-10)**	**7**	1.00	90%	0.90	0.85				
Threatened species habitat																				
Area of habitat	No				**Time over which loss is averted (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Summary

Protected matter attributes	Quantum of impact	Net present value of offset	% of impact offset	Direct offset adequate?	Cost ($)		
					Direct offset ($)	Other compensatory measures ($)	Total ($)
Birth rate	0				$0.00		$0.00
Mortality rate	0				$0.00		$0.00
Number of individuals	0				$0.00		$0.00
Number of features	0				$0.00		$0.00
Condition of habitat	0				$0.00		$0.00
Area of habitat	0				$0.00		$0.00
Area of community	3.2	0.77	23.99%	**No**	$0.00	#DIV/0!	#DIV/0!
					$0.00	**#DIV/0!**	**#DIV/0!**

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