Main Roads Western Australia

York Merredin Road Widening

Offset Proposal

October 2015

Executive summary

This report is subject to, and must be read in conjunction with, the limitations set out in Section 1.3 and the assumptions and qualifications contained throughout the Report.

Project Information

Project Title: York to Merredin Widening between Straight Line Kilometres (SLK) 1.95 and SLK 51.

Project location: The Project is located on the York – Merredin Road at SLK 1.95 to SLK 15, SLK 19 to SLK 29 and SLK 29 to SLK 51. The proposed works are within the Shires of York and Quairading will start east of York at SLK 1.95 and finish approximately 9 km east of Mawson at SLK 51.

Project purpose: Gradual and steady increases in traffic levels along the York-Merredin Road have occurred as a result of increased grain freight movements in the area. This has increased the volume of vehicles using the York-Merredin Road to access the Co-operative Bulk Handling (CBH) bins in the area. The width of the existing road is unsuitable for the increased traffic and these works are required to improve the road geometry and general road safety attributes along this section of road.

Area proposed to be cleared: The Project area (the disturbance footprint) is approximately 55.70 ha (excluding the existing cleared road area) and includes up to 38.85 ha native vegetation and fauna habitat and 16.85 ha of previously cleared and highly modified area.

Offset Information

Offset Type: Financial contribution to the Department of Environment Regulation (DER) to mitigate significant residual impacts associated with the project activities.

Offset Purpose: This offset is required as an approval condition (CPS 818), to offset significant residual impacts when project native vegetation clearing is at variance to one or more of the 10 Clearing Principles.

Offset Requirement: The offset proposal is required to offset vegetation and habitat values similar to those lost due to the York-Merredin Road Widening clearing requirements via a financial contribution.

The key factors which are required to be offset are:

- The loss of up to 38.85 ha native vegetation ranging from *Very good* to *Degraded* condition. Of the vegetation to be cleared within the Project area 4.92 ha is *Excellent-Very Good* to *Very Good – Good* condition.
- Approximately 15.81 ha of this vegetation represents three potentially *Endangered* vegetation associations (352, 694 and 1049) which are all below 30% threshold level for the state, IBRA bioregion and subregion
- The loss of 35.59 ha of habitat for Carnaby's Black Cockatoo, including 592 potential habitat trees (tree with a DBH of greater than 300 mm or 500 mm) of which 20 of these trees contains suitable hollows for breeding. It is considered that clearing of this habitat, is likely to result in a shortage of hollows in the local area, thus reducing the availability of potential breeding habitat in the future for Carnaby's Black Cockatoo
- The loss of an estimated 38.15 ha of suitable habitat including potential breeding habitat (i.e. hollow bearing trees) for the Red-tailed Phascogale. It is considered that clearing of

this habitat, in particular the potential breeding habitat is likely to result in a shortage of nesting resources and breeding hollows in the local area, thus reducing the availability of breeding habitat in the future for the Red-tailed Phascogale

Offset Proposal: Main Road's Offset Proposal is to provide $211,234 for the purchase of approximately 150 ha of bushland within the Shires of York, Beverley or Quairading to compensate for the significant residual impacts associated with the clearing of native vegetation for the road project. The offset includes a calculation of impacts under both state and federal requirements.

The Offset Proposal was developed using the EPBC Offset Calculator Tool (DotE 2012a, 2012b) to determine the area of the offset required in hectares, multiplied by the market valuation of the vegetated land within the relevant Shires, obtained from the Western Australian Valuer General (Landgate 2014).

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Appendices

1. Introduction

1.1 Background

An Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) report of the project activities was completed (GHD 2015a). The assessment involved a desktop analysis of environmental aspects and impacts and a site investigation, including a flora and fauna field survey. An assessment of native vegetation clearing and fauna impacts and an assessment against the ten Clearing Principles have been addressed in the Impact Assessment of Clearing and Matters of National Environmental Significance (IACMNES) report (GHD 2015b).

The IACMNES determined that native vegetation clearing associated with the project activities was at variance with Clearing Principles (a), (b), (e) and (h) as listed in Schedule 5 of the *Environmental Protection Act 1986*.

When native vegetation clearing will be undertaken using Main Roads' Statewide Purpose Clearing Permit CPS818 clearing activities must comply with specified permit conditions. When vegetation clearing impacts are assessed as likely to be at variance to one or more of the clearing principles an offset proposal is required to be prepared and implemented prior to the commencement of project activities unless an exemption has been obtained under condition 13c of CPS 818. Condition 13 (d) of CPS818 requires the offset proposal to be approved by the Department of Environment Regulation (DER) prior to the commencement of project activities.

This document sets out the requirements for the offset and how the proposed offset has been calculated.

1.2 Project description

Main Roads Western Australia (Main Roads) is proposing to upgrade three sections of York - Merredin Road, in the Avon Wheatbelt region of Western Australia between Straight Line Kilometres (SLK) 1.95 and SLK 51. The three sections to be upgraded are at SLK 1.95 to SLK 15, SLK 19 to SLK 29 and SLK 29 to SLK 51 (Figure 1 Appendix A). The proposed Project will consist of the following:

- Road widening for three sections of road
- The extension of 24 culverts, one new culvert and the upgrade of 13 existing culverts with wider culverts in the first section (SLK 1.95 to SLK 15)
- The replacement of six culverts and extension of 10 culverts in the second section (SLK 19 to SLK 29)
- The replacement of 21 culverts extension of 26 and one new culvert in the third section (SLK 29 to SLK 51).

1.3 Scope and limitations of this report

1.3.1 Scope of this report

This report provides the background and justification for the calculation of an offset for the vegetation and habitat clearing required for the York-Merredin Road widening project, between SLK 1.95 and SLK 51. The offset calculation is based on a number of input values provided by Main Roads, as well as a calculation of clearing areas determined by GHD.

1.3.2 Limitations

This report has been prepared by GHD for Main Roads and may only be used and relied on by Main Roads for the purpose agreed between GHD and the Main Roads as set out in Section 1.3.1 of this report.

GHD otherwise disclaims responsibility to any person other than Main Roads arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

GHD has prepared this report on the basis of information provided by Main Roads and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

GHD has prepared the preliminary land offset cost set out in section 4.2.2 of this report using information reasonably available to the GHD employee(s) who prepared this report; and based on assumptions and judgments made by GHD (e.g. acceptability of breakdown of costs by Shire, use of Government supplied land valuations).

The Cost Estimate has been prepared for the purpose of land offset purchase for residual ecological impacts and must not be used for any other purpose. The Cost Estimate is a preliminary estimate only. Actual prices, costs and other variables may be different to those used to prepare the Cost Estimate and may change. Unless as otherwise specified in this report, no detailed quotation has been obtained for actions identified in this report. GHD does not represent, warrant or guarantee that the land offset purchase can or will be undertaken at a cost which is the same or less than the Cost Estimate.

Where estimates of potential costs are provided with an indicated level of confidence, notwithstanding the conservatism of the level of confidence selected as the planning level, there remains a chance that the cost will be greater than the estimate.

2. Clearing of Native Vegetation for the road Project

2.1 Clearing Principles likely to be at variance

The IACMNES report considered the ten Clearing Principles and determined native vegetation clearing associated with the project activities was as follows:

- Clearing of the 38.85 ha of native vegetation within the Project area is at variance with Principles (a), (b), (e) and (h). The Project is not likely to be at variance to the other principles.
- Terrestrial fauna – the loss of potential fauna habitats for two species of conservation significant fauna (Red-tailed Phascogale and Carnaby's Black Cockatoo). This will result in the overall reduction of habitat for both species and potentially impact local populations of both species.
- Flora and vegetation – loss of potentially *Endangered* vegetation (English and Blythe, 1999). The local and regional impacts on the loss of vegetation associations have been assessed using the mapped extent of the pre-European (Beard 1979) vegetation associations within the Project area. The Project will result in the clearing of a portion of three potentially *Endangered* vegetation associations (352, 694 and 1049) which are all below 30 % threshold level for the state, IBRA bioregion and subregion.

2.2 Residual impacts associated with specific clearing principles

Residual impacts have been considered based on a biological field survey (GHD 2015c) and an assessment of the ten Clearing Principles and MNES (IACMNES report, GHD 2015b) as summarised below. Residual impacts are expected to be associated with clearing principles (a), (b), (e) and (h).

a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

The clearing of up to 38.85 ha of native vegetation and fauna habitat is likely to result in the clearing of native vegetation that has similar biodiversity attributes to that of the surrounding native vegetation. The Project area is not likely to comprise a greater diversity than similar areas either locally or at a bioregional scale, however approximately 6 - 7 ha of the Priority 3 PEC, *Eucalypt Woodlands within the Western Australian Wheatbelt*, in varying vegetation condition, occurs within the Project area. The project will also involve clearing of two plants of *Hemigenia platyphylla* (Priority 4, P4).

b) **Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.**

Impacts to Carnaby's Black Cockatoo habitat are predicted as a result of the Project. The Project area provides foraging, potential breeding and roosting habitat for Carnaby's Black Cockatoo. The key potential impacts to Carnaby's Black Cockatoo resulting from clearing of the Project area is the loss of habitat including:

- Loss of an estimated 35.59 ha of foraging habitat including:
    - 15.77 ha of Eucalypt woodland

- 19.82 ha of scattered roadside Eucalypt trees

- Loss of potential breeding habitat which includes 592 potential habitat trees, of which 20 trees currently have hollows that provide nesting opportunities for the Carnaby's Black Cockatoo.
- The remaining 572 potential breeding these trees do not contain suitable breeding hollows at present but have a DBH (diameter breast height) greater than 300 millimetres (mm) or 500 mm and have the potential to develop a suitable nest hollow in the future.
- Suitable roosting habitat occurs throughout the Project area and consists of Eucalypt woodland and tall mature trees located in proximity to permanent water sources (e.g. farm dams).

The Red-tailed Phascogale has been identified as likely to occur within the Project area. Given that the Project is located within the known breeding range of the species and that there is preferred habitat within the Project area (e.g. in the form of hollow-bearing Eucalypts and sheoak (*Allocasuarina*)), it has been assumed that the species could utilise the habitat within the Project area for breeding and therefore is likely to be impacted as a result of the Project. The key potential impacts to Red-tailed Phascogale resulting from clearing of the Project area is:

- Loss of an estimated 38.15 ha of suitable habitat including foraging, nesting and breeding habitat (i.e. hollow bearing trees). It is difficult to estimate the number of hollow-bearing trees within the Project area as counts for hollows suitable for Red-tailed Phascogale were not undertaken, however the presence of hollows (e.g. 20 hollows of suitable size for breeding for Carnaby's Black Cockatoo) and additional smaller hollows provides an indication that potentially suitable hollows for breeding may be present within the Project area.

e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Pre-European vegetation associations mapped by Beard (1979) and digitised by Shepherd et al. (2002) within the Project area are all below the 30 % threshold level at all levels and are considered *Endangered* (English and Blyth, 1999). Clearing for the project will also increase the fragmentation of the remnant vegetation within the region.

h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Two DPaW managed properties are adjacent to the Project area:

- Hardey Nature Reserve (Class C, No. 40642) – is located on the north and south side of the road reserve at approximately SLK 10 in Section 1. A maximum of 0.35 ha will be unavoidably cleared within this reserve, due to the requirements for curve design and drainage.
- An un-named Nature Reserve at Mawson (Class A, No. 46074) – is located on both sides of road reserve, between approximately SLK 42.2 and SLK 43, within Section 3. No clearing is proposed within this A Class reserve.

The Project area would currently provide a buffer from the road to conservation areas and is likely to act as an ecological linkage for fauna in an otherwise cleared and fragmented landscape. Additionally this habitat contains habitat for specially protected and/or Threatened fauna species considered likely to occur within the Project area (Carnaby's Black Cockatoo; Red-tailed Phascogale; and Rainbow Bee-eater) and would act as a corridor linkage for these

species. As such, clearing 38.85 ha of native vegetation within the Project area may impact on vegetated linkages within the region.

3. Measures Undertaken to Avoid and Mitigate Clearing Impacts

3.1 Avoidance measures

The road design and vegetation clearing have been considered where possible to reduce impacts as follows:

- The Project area has been refined to avoid any direct impacts to the two DPaW managed Nature Reserves, but indirect impacts such as sedimentation, dust and new weed invasions are possible.
- The Project will not involve the clearing or removal of any part of the Class A Reserve (No. 46074). Careful road design has minimised the impact to the Class C Reserve (No. 40642) and the Shire conservation reserve.
- Biological surveys of the Study area recorded an important population of the Priority 1 flora taxon *Eremophila glabra* subsp. York (P.G. Wilson 21172 B). The road clearing envelope was re-designed to avoid taking any individuals to this population. Construction for widening will only occur on the north side of the road and the road itself will therefore act as a barrier to the plants on the south side. Management measures will be put in place to minimise potential indirect risks to the population during project clearing and construction and will include flagging around the population and the establishment of a no-go zone, with Main Roads Environment Officer to be on site when clearing activities occur in the vicinity of the population.
- The existing road intersects Mackie River at three locations in Section 1 and Section 2, and one other large unnamed watercourse. The Project area does not include these four watercourses. The Project will not involve any changes to these four watercourses which occur along the York – Merredin Road. Main Roads will maintain the current watercourse crossing structures as part of the proposed road upgrade.
- During the detailed design process for the Project, Main Roads will aim to refine the design to reduce the Project area to a smaller area by positioning the disturbance footprint directly adjacent to the road within the more degraded areas where possible.
- One of the key strategies to avoid impacts to native vegetation, fauna and habitat during the construction phase of the Project is to strictly adhere to clearing and disturbance boundaries. The clearing area will be established by a surveyor and pegged and then checked by a member of the Main Roads' environment team before clearing is approved and then it will be checked again post-clearing for compliance reporting.
- Prior to clearing, pre-clearance surveys of trees identified as having hollows suitable for Carnaby's Black Cockatoo and Red-tailed Phascogales will be undertaken. Also, all trees identified as having suitable hollows for both species of Black Cockatoo will be checked to remove any fauna in the hollows prior to clearing.

3.2 Management measures

A project specific Environmental Management Plan (EMP) has been developed to manage environmental impacts associated with the project.

Management measures to minimise the impact on potential Black Cockatoo breeding activities and Red-tailed Phascogale habitat have been considered. These are provided in Table 1.

Table 1 Management actions with respect to identified impacts to clearing and MNES

Environmental Factors	Management Action
Reserves and conservation areas **(vegetation clearing)**	• No clearing is permitted at the Class A Reserve, located 42.34 SLK. • Minor clearing within the Class C reserve will be strictly controlled through design, signage and site marking.
Pollution and Litter **(fauna)**	• All waste materials from the Project area will be removed from the site upon completion of the project and to the satisfaction of the Project Manager or Site Supervisor. • Construction waste and other rubbish will be contained in bins with lids (where practicable) and removed regularly.
Surface Drainage **(vegetation)**	• Road design should maintain existing surface water flows and incorporate soil erosion control measures. • Vegetation removal and soil disturbance will be minimised, where practicable. • Disturbed areas will be stabilised soon after construction activities are completed. • Existing natural drainage paths and channels along the road or the vicinity of the Project area will not be unnecessarily blocked or restricted during project construction. • Vehicle and equipment wash down areas will be located away from environmentally sensitive areas • No on-site storage of fuel, oils and other contaminant materials will be permitted within 50 m of a watercourse.
Fire **(vegetation and fauna)**	• No fires shall be lit within the Project area. • Machinery will be fitted with approved spark arresting exhaust systems. • All vehicles, plant and equipment to be fitted with fire extinguishers and restricted and to designated cleared areas. • A water tanker/fire fighter unit will be on site at all times during project construction and personnel trained in their use. • All hot works will be undertaken in accordance with standard safety procedures • Construction personnel will extinguish and report fires occurring within the Project area.
Topsoil **(vegetation)**	• Topsoil will be managed according to Main Roads Topsoil Management Guideline (TRIM Doc D12#256186). • The movement of topsoil will be restricted to the limits of the Project area. • Where possible construction activities will be undertaken in summer to reduce the potential for soil erosion and drainage line siltation due to vegetation removal and heavy rains.
Species specific management actions – Red-tailed Phascogale and Carnaby's Black Cockatoo **(MNES - Scenario 1 - Construction to be undertaken during the breeding season)**	• Development and implementation of a DPaW approved handling and relocation protocol. • Undertake pre-clearance surveys of trees identified as having hollows suitable for Carnaby's Black Cockatoo and Red-tailed Phascogale

Environmental Factors	Management Action
Species specific management actions – Red-tailed Phascogale and Carnaby's Black Cockatoo **(MNES - Scenario 2 - Construction to be undertaken outside the breeding season)**	• Check all trees identified as having suitable hollows for both species to remove any fauna in the hollows prior to clearing. • Clearly delineate the extent of the disturbance footprint (clearing footprint) with coloured pegs. • Prior to clearing/ construction operations the surveyor will mark out the clearing line and this will be checked by Main Roads Environment Officer to determine that it is clearly defined and compliant with permits. • The extent of this clearing will be clearly communicated in documentation and accurately demarcated on-ground. • All project construction personnel will be inducted prior to the commencement of works. The induction program will include communication about the 'No Go Areas', importance and consequences of entering/disturbing these areas. • Regular review of the disturbance footprint boundary to ensure 'No Go Areas' are clearly delineated • Restrict construction personnel to the disturbance footprint including designated access routes and parking areas. • Fauna encountered during the construction process shall be given the chance to move on if there is no threat to the person's safety in doing so. The Ecologist will be suitably experienced and licensed and will be available at all times during the clearing phase to interact with fauna that cannot move away freely.

4. Offset Proposal Requirements

4.1 Summary of offset(s) proposed

MRWA's offset proposal is to provide **$211,234** for the purchase of approximately 150 ha within the Shires of York, Beverley and/or Quairading to compensate for the significant residual impacts associated with the clearing of native vegetation for the road project. A summary of the offset proposed is provided in Table 2 below.

Table 2 Summary of Residual Impacts

Residual impact		Revegetation mitigation for temporary clearing applicable? (Y/N)	Offset type (Other)	*Size of offset applicable to residual impact (ha)	% of residual impact offset
1	Loss of Red-tailed Phascogale habitat	N	Financial contribution to a fund established by DER	150 ha	100.35
2	Loss of Black Cockatoo habitat	N	Financial contribution to a fund established by DER	140 ha	100.37
3	Loss of vegetation which is significant as a remnant	N	Financial contribution to a fund established by DER	-	Not calculated: offset through fauna habitat
4	Loss of three Priority 4 plants	N	Financial contribution to a fund established by DER	-	Not calculated: offset through fauna habitat

*Size of offset applicable to residual impact (ha) is taken directly from the outputs of the EPBC Offset Calculator Tool (DotE 2012a, 2012b).

4.2 Justification for the offset proposal

4.2.1 Commonwealth offset

The EPBC Offset Assessment Guide (DotE 2012b) was used to evaluate project impacts for biodiversity clearing principles with significant residual impacts.

Under the requirements of the EPBC Act the residual impacts are:

- the loss of 35.59 ha of foraging habitat for the Endangered Carnaby's Black Cockatoo as well as up to 592 potential breeding trees including 20 trees with suitable hollows (not evidence of breeding was found)
- the loss of 38.15 ha of potential feeding and breeding habitat for the Vulnerable Red Tailed Phascogale.

Discussions with DotE identified that a financial offset may be considered suitable for this project.

Based on these impacts, Table 3 indicates the values that were used to populate the EPBC Calculator tool.

Table 3 Values that were input into the EPBC Calculator Tool

Attribute	Value	Justification
Area of habitat impacted	38.2 ha	Loss of trees and scattered understory used as foraging and potential nesting habitat for the Red-tailed Phascogale and Carnaby's Black Cockatoo; GHD biological survey (2015c) and IACMNES assessment report (GHD 2015b)
Vegetation/Habitat quality of the impacted area (takes into account the regional context and stocking rate)	5	Vegetation condition based on Keighery (1994) scale. Much of the Project area (38.12 ha) is very highly modified, with only scattered native species remaining and was rated Condition 6 (*Completely Degraded*). Sections of the road reserve that contained native vegetation but which did not have all vegetation layers intact and which were dominated by weeds, were rated Condition 5 - 6 (*Degraded – Completely Degraded*) (6.14 ha). The habitat is scattered along the road reserve and there are few linkages to habitat either side of the road.
Start quality Vegetation/habitat Quality of the offset area (takes into account the regional context and stocking rate)	9	Rating for Excellent condition vegetation based on Keighery (1994) scale. It is assumed that land purchase with funds provided under s51i (2b) of the EP Act would be in Excellent condition.
Future Quality without Offset	9	Unlikely to change over a period of one year
Future Quality with Offset	9	Acquisition only therefore no change
Time Horizon over which loss is averted (security of land tenure)	20 years	Land purchased with financial contributions will be added to the conservation estate so long term protection is afforded. Twenty years is the maximum value that can be input.
Time until ecological benefit	1 year	Short time-frame required for land to be purchased and placed into the conservation estate.
Risk of loss without offset	30%	Moderate risk of loss.
Risk of loss with offset	10%	Minimal risk. Offset placed into secure tenure managed by the State (i.e. conservation estate). Ten percent allows for ongoing management of the offset site.
Confidence in result	90%	High degree of confidence. Financial contributions are used to purchase land that is added to the conservation estate through a State guaranteed scheme.

A copy of the EPBC Offset Calculator Tool worksheets for the residual impacts to clearing principle (b) for the project is included in Appendix B.

Assessment against Commonwealth Offset Principles

Offsets are defined as measures that compensate for the residual adverse impacts of an action on the environment. Where appropriate, offsets are considered during the assessment phase of

an environmental impact assessment under the EPBC Act. The proposed offset has been assessed against the Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy 2012.

1. Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter.

Suitable offsets must improve or maintain the viability of the protected matter in comparison to the status quo, if the action was not undertaken or the offset provided. The funds provided for the offset of this project would be used by the Western Australian Department of Parks and Wildlife (DPaW) for the purchase of land to be placed in a conservation covenant. This is considered to be an improvement on the status quo for the following reasons:

- *Land in the project area is linear in nature and subject to edge effects from the road. Land placed in conservation covenant as part of an offset would typically be in Excellent condition, and non-linear, resulting in better quality habitat and improved management outcomes.*
- *Land placed in conservation covenant as an offset would typically be adjacent to other vegetation in good condition, as well as watercourses and known foraging or breeding habitat. The project area is not known to be used by threatened species and therefore, habitat known to be used is preferable and would result in improved outcomes.*
- *Land placed in conservation covenant by DPaW would be part of an overall strategic offset for the region, resulting in better habitat connectivity and the protection of other environmental values that are not specifically impacted by the project.*

2. Suitable offsets must be built around direct offsets but may include other compensatory measures.

The offset proposed for this project has been built around a direct offset, in that funds provided to the Offset Fund will be used within 1 year towards the purchase of land suitable as an offset for this project.

3. Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter

Carnaby's Black Cockatoo is listed as Endangered and the Red-tailed Phascogale as Vulnerable.. A suitable offset has been provided for both species, based on the EPBC Offset Calculator which uses the International Union for Conservation of Nature data on the probability of annual extinction for different categories of threatened species.

The probability of annual extinction for Carnaby's Black Cockatoo according to the EPBC Offset Calculator is 1.2%.

4. Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter

The size and scale of an offset required for each impact is determined by the:

- *Level of statutory protection that applies to the protected matter.*
- *Specific attributes of the protected matter, or its habitat, being impacted.*
- *Quality or importance of the attributes being impacted with regard to the protected matter's ongoing viability.*
- *Permanent or temporary nature of the residual impacts.*
- *Level of threat (risk of loss) that a proposed offset site is under.*
- *Time it will take an offset to yield a conservation gain for the protected matter.*
- *Risk of the conservation gain not being realised.*

The above factors are included in the EPBC offset calculator.

5. Suitable offsets must effectively account for and manage the risks of the offset not succeeding

The purchase of appropriate offset land and placement in conservation covenant is not considered to be a significant risk of failure. If the proposed offset land is not available for purchase, an alternative will be identified.

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6. Suitable offsets must be additional to what is already required, determined by law or planning regulations, or agreed to under other schemes or programs

The land proposed for purchase is currently private property and not part of an existing offset, scheme or program.

7. Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable

The offset has been developed in consultation with DPaW to obtain the best strategic outcomes. Offset land will be purchased within 12 months of funds transfer. The proposed offset is considered the most efficient and effective option given the constraints associated with the purchase of small areas of land. In addition, the proposed offset will provide scientifically robust and reasonable protection for both Carnabys' Black Cockatoos and the Red-tailed Phascogale through protection of known habitat.

8. Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.

The proposed offset funds will be provided to DPaW for purchase of offset lands to be added to the existing nature reserve. DPaW have practical and long standing experience as land managers.

4.2.2 State Offset

Assessment against Ten Clearing Principles

Findings from the clearing assessment (see section 2.1) indicate that the project is at variance with Principles a), b), e) and h) as follows:

- Clearing of 38.85 ha of vegetation with high biodiversity
- Clearing of 35.59 ha of Carnaby's Black Cockatoo foraging habitat as well as 572 potential nesting trees
- Clearing of 38.15 ha of foraging and potential breeding habitat for the Red Tailed Phascogale
- Clearing of approximately 6 - 7 ha of the Priority 3 PEC, *Eucalypt Woodlands within the Western Australian Wheatbelt*, in varying vegetation condition, occurs within the Project area in an area which has less than 30% remaining at Stage, Bioregion and local levels
- Clearing of 0.35 ha of a Class C Nature Reserve

The value of the residual impacts was calculated in accordance with the requirements of the WA Environmental Offsets Guidelines (Government of Western Australia 2014). The values input into the EPBC Offset Calculator Tool for the significant residual impacts for Clearing Principle (b) are provided in Table 3 and cover the highest valued impacts (loss of Red-tailed Phascogale habitat) under the EPBC Act requirements.

The assessments of principles found to be at variance are summarised below. The following table also summarises the offset required as defined by the EPBC Offset Calculator.

Table 4 Offsets for York Merredin road upgrade

Factor	Area of vegetation at variance with 10 Clearing Principles	Proposed Offset (if required)
At variance to Clearing Principle (a) - Native vegetation should not be cleared if it comprises a high level of biological diversity.	35.59 ha of foraging habitat for Carnaby's Black Cockatoo 592 potential future breeding trees 38.19 ha of potential foraging and breeding habitat for the Red-tailed Phascogale 6-7 ha of Priority Ecological Community 'Eucalyptus Woodlands of the Western Australian Wheatbelt'	Main Roads is proposing to provide a monetary contribution to the Offset Fund. Monetary funds will be based on land values and the Commonwealth Offset Calculator. The monetary offset would be used for the purposes of purchasing land to offset the impacts to Black Cockatoo and Red-tailed Phascogale habitat, both foraging and breeding, which would be placed in a conservation covenant. This land would also offset the Priority Ecological Community 'Eucalyptus Woodlands of the Western Australian Wheatbelt'. .

Factor	Area of vegetation at variance with 10 Clearing Principles	Proposed Offset (if required)
At variance with Clearing Principle (b) - Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	35.59 ha of foraging habitat for Carnaby's Black Cockatoo 592 potential future breeding trees 38.19 ha of potential foraging and breeding habitat for the Red-tailed Phascogale	Main Roads is proposing to provide a monetary contribution to the Offset Fund. Monetary funds will be based on land values and the Commonwealth Offset Calculator.
At variance with Clearing Principle (e) - Clearing of Under-represented vegetation types	Clearing of Beard vegetation assocations 352, and 1049, which have less than 10% remaining at the State, Bioregion and Local Government levels.	Main Roads is proposing to provide a monetary contribution to the Offset Fund. Monetary funds will be based on land values and the Commonwealth Offset Calculator. The land purchased should include the relevant under-represented vegetation types.
At variance with Clearing Principle (h) – Impacts to a conservation reserve	Clearing of 0.35 ha of land within a Class C nature reserve.	The monetary offset proposed for Principles a), b) and e) will provide suitable bushland which will be covenanted for conservation or may ultimately become a conservation reserve.

4.2.3 Assessment against State Offset Principles

According to the Environmental Offsets Policy, released by the Western Australian Government (2011), environmental offsets are to be used as a last resort measure, after due consideration of avoidance and mitigation measures.

In this context, the assessment and decision making process in regard to offsets are underpinned by the following principles:

1. Environmental offsets will only be considered after avoidance and mitigation options have been pursued.

All strategies to avoid and mitigate environmental impacts have been explored and implemented:

- Temporary clearing impacts will be avoided through the use of existing cleared areas.
- The disturbance footprint associated with the Project has been minimised as far as practicable.
- Temporary fencing and other management practices have been applied to prevent impacts to the P1 species *Eremophila glabra* and to minimise clearing of P4 species *Hemigenia platyphylla*.
- The clearing line is checked by an Environment Officer prior to clearing to ensure strict compliance with clearing limits.

2. Environmental offsets are not appropriate for all projects

Environmental offsets are required when clearing is at variance with one or more of the biodiversity related clearing principles (principles a- f and h) and a significant residual impact remains (DER,2014). The project is at variance with principles a, b, e and h. Despite mitigation measures, this project will have a significant residual impact. An environmental offset is therefore considered appropriate.

3. Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted.

Main Roads believes that the proposed offset area represents a cost-effective solution that is proportionate to the environmental value being impacted by the project.

4. Environmental offsets will be based on sound environmental information and knowledge.

Funds will be provided to the Department of Environment Regulation which will be provided to the DPaW to purchase suitable land for management as close as practical to the location of clearing. This land will be purchased for the purpose of conservation and managed in perpetuity.

5. Environmental offsets will be applied within a framework of adaptive management.

The proposed offset area will be managed by DPaW as part of a conservation reserve. The proposed offset has a risk of time lag associated with the surveying and subdividing of the land proposed to be purchased. This work will be conducted by DPaW, and can take up to 12 months to occur.

6. Environmental offsets will be focussed on longer term strategic outcomes.

The financial offset will be used to purchase land as part of a larger strategic offset by the DPaW. This will be managed under a conservation covenant.

4.1 Calculation of financial contribution

The financial contribution was calculated using the EPBC Offset Calculator Tool to determine the area of the offset required in hectares (150 ha), multiplied by the market valuation of the unimproved (vegetated) land for a land parcel size of 200 ha within the Shires of York, Beverley and Quairading and obtained from the Valuer General (Landgate 2014). The breakdown of area and costs for each Shire is provided in Table 5.

Table 5 Offset area financial contribution

Offset area costs for Red-tailed Phascogale Using land values for 200 ha				
Weighted Contribution (%)	50% York	25% Beverley	25% Quairading	**Total**
Area (ha)	75 ha	37 ha	38 ha	**150 ha**
Cost ($)	$130,350	$55,500	$25,384	**$211,234**

The market valuation of the vegetated land was based on the valuation obtained from the Valuer General (on a $/ha basis) for unimproved (vegetated) land within the LGA (Landgate 2014). As the Valuer General's market valuation ($/ha) of vegetated land differs according to the size of the land parcel, the valuation of the closest 'standard parcels' of land (i.e. 10, 50, 100, 200 or 500 ha) was used to determine the market valuation of the offset area.

4.2 Offset condition milestones

Condition Milestone 1 - Main Roads shall provide documentary evidence to the Chief Executive Officer of DER that funding of $211,234 has been transferred to the Department.

Timeframe for Completion – Prior to undertaking any clearing for the York-Merredin upgrade authorised under CPS818.

5. Application of Environmental Offset Policy Principles

The WA Environmental Offsets Policy (Government of Western Australia 2011) states that environmental offsets are to be used as a last resort and details six principles to be applied in the assessment and decision making with respect to offsets.

The application of these environmental offset principles to the Project offset proposal is provided in Table 6.

Table 6 Application of WA Environmental Offset Policy principles to the offset proposal

Principle No.	Principle	Comment
1.	Environmental offsets will only be considered after avoidance and mitigation options have been pursued.	All strategies to avoid and mitigate environmental impacts have been explored and implemented. Refer Section 3.
2	Environmental offsets are not appropriate for all projects.	Environmental offsets are required when clearing is at variance with one or more of the biodiversity related clearing principles and a significant residual impact remains. An assessment report was conducted in accordance with Main Roads State-wide Clearing permit CPS 818 and determined that the project is at variance with principles a), b), e) and h) of the ten Clearing Principles listed in Schedule 5 of the EP Act.
3	Environmental Offsets will be cost effective, as well as relevant and proportionate to the significance of the environmental value being impacted.	Main Roads believes that the proposed offset represents a cost-effective solution that is proportionate to the environmental value being impacted by the project. The area to be purchased with the financial contribution will consist of environmental values that are equal or of higher value than the vegetation proposed to be cleared within the project footprint
4.	Environmental offsets will be based on sound environmental information and knowledge.	Funds will be provided for the purchase of land of suitable environmental values as close as practical to the location of clearing. The selection and management of land to be purchased will be based on sound environmental information and knowledge.
5.	Environmental offsets will be applied within a framework of adaptive management.	Funds will be provided for the purchase of land of suitable environmental values. The land will be added to the conservation estate and will be managed in accordance with advances in environmental knowledge and understanding.
6	Environmental offsets will be focussed on longer term strategic outcomes.	The proposed offset will contribute to the Offset Fund established by DER under the EP Act (1986) for the acquisition of offset sites. Land to be purchased will be added to the conservation estate.

6. Stakeholder Consultation

Consultation with key stakeholders has been undertaken for this Project in accordance with Main Roads internal processes. Letters were sent to the following stakeholders in November 2014:

- Department of the Environment
- Conservation Council
- Department of Water
- Shire of York
- Shire of Quairading
- Conservation Commission of WA

7. References

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Appendices

Appendix A – Figures

Figure 1 Project Location

480,000 490,000 500,000 510,000 520,000

6,470,000

6,460,000

TIPPERARY
MACKIES CROSSING
DYLOTT RANGE
MALEBELLING
NAN NAN
NARRALOGGAN
YORK
0
COLD HARBOUR
MOUNT HARDEY
NEEDLING HILLS
Northam-Cranbrook Road
15
MARLEY POOL
GREENHILLS
QUALEN
19
York-Merredin Road
KAURING
29
GWAMBYGINE
GLEN IRWIN
RICKEYS
BALKULING
MADIKIN
MAWSON
FLEAYS
GILGERING CROSSING
51
YANGEDINE
DUMBODIL
JACOBS WELL
DULBELLING
ADDINGTON

Location Map
NORTHAM
PERTH
BROOKTON
MANDURAH
BUNBURY

Paper size : A3

0 1 2 3 4 5
Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Grid: Map Grid of Australia 1994, Zone 50

N

LEGEND

- SLK Points
- Project Envelope
- Project Area
- Study Area

Main Roads Western Australia
York-Merredin Road Widening
Referral

Job Number	61-32010
Revision	0
Date	27 Jul 2015

Locality

Figure 1

G:\61\32010\GIS\Maps\MXD\Referral\6132010_G001_Rev0_RefFig1.mxd

Data source: MRWA: Road Network - 201411; GHD: SLK Points - 20140926, Project Area, Project Envelope - 20150619. Created by: jbmonteignies

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Appendix B – Offset Calculator Tool

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	Red-tailed Phascogale
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	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Threatened species habitat						
Area of habitat	Yes	Open woodland habitat of Wandoo and Allocasuarina	**Area**	38.15	Hectares	Biological Survey Report. GHD 2015
			Quality	**5**	Scale 0-10	
			Total quantum of impact	19.08	Adjusted hectares	
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	No				**Risk-related time horizon (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)**									
Threatened species habitat																				
Area of habitat	Yes	19.08	Adjusted hectares	Purchase of suitable habitat.	**Time over which loss is averted (max. 20 years)**	20	**Start area (hectares)**	150	**Risk of loss (%) without offset**	30%	**Risk of loss (%) with offset**	10%	30.00	90%	27.00	21.27	19.14	100.35%	Yes	
									Future area without offset (adjusted hectares)	105.0	**Future area with offset (adjusted hectares)**	135.0								
					Time until ecological benefit	1	**Start quality (scale of 0-10)**	9	**Future quality without offset (scale of 0-10)**	9	**Future quality with offset (scale of 0-10)**	9	0.00		0.00	0.00				
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																			

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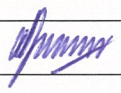
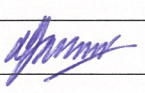
0	A Napier	D Farrar		D Farrar		30/09/2015

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