Referral of proposed action

Project title: Maintenance Zone Establishment - Toodyay Goomalling Road (M060), Williams Narrogin Highway (H053) and Pinjarra Williams Road (M053)

1 Summary of proposed action

1.1 **Short description**

Main Roads Western Australia (Main Roads) is planning to establish a wider maintenance zone for three roads in the Wheatbelt Region – Pinjarra Williams Road (M053), Williams Narrogin Highway (H053) and Toodyay Goomalling Road (M060), Western Australia over the next 3 years (see Figure 1, Attachment 1).

The Project is being referred to the Department of the Environment (DotE) as it may result in the loss of known and potential habitat for the following Matters of National Environmental Significance (MNES) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act):

- Eucalypt Woodlands of the Western Australian Wheatbelt – Critically Endangered Ecological Community
- *Pultenaea pauciflora* - Vulnerable
- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) – Endangered
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) – Vulnerable
- Red-tailed Phascogale (*Phascogale calura*) – Endangered

1.2 **Latitude and longitude**

	Latitude			Longitude		
location point	degrees	minutes	seconds	degrees	minutes	seconds

Co-ordinates are attached (Attachment 2).

1.3 **Locality and property description**

The Project area consists of three road sections located in the Wheatbelt region of Western Australia (Figure 1 - Attachment 1). Each Project area is within an existing road reserve managed by Main Roads including:

- Pinjarra Williams Road (M053) Straight Line Kilometres (SLK) 91.9 to SLK 125.5. From Quindanning east to the town of Williams.
- Williams Narrogin Highway (H053) SLK 0 to SLK 31.4. From town of Williams east to Narrogin.
- Toodyay Goomalling Road (MO60) SLK 1.2 to SLK 48.0. From Toodyay east to town of Goomalling.

1.4	**Size of the development footprint or work area (hectares)**	For the purpose of this referral the Project area is the maximum development footprint and includes the clearing area for native vegetation and fauna habitat within 4 metres of the road seal or marked edge The Project area is approximately 89.44 hectares (ha) in area, including 18.16 ha of native vegetation. The Project area includes: • Pinjarra Williams Road (M053) SLK 91.9 to SLK 125.5 = 26.81 ha • Williams Narrogin Highway (H053) SLK 0 to SLK 31.4 = 25.12 ha • Toodyay Goomalling Road (MO60) SLK 1.2 to SLK 48.0 = 37.44 ha. A detailed description of the Project area is provided in the Environmental Impact Assessment for the Project (see GHD 2016a – Attachment 2) Note the following terms and definitions apply to this referral: • **study area** – refers to the 10 km buffer area used for the desktop searches for the Project (see GHD 2016 a and b – Attachment 2 and 3) • **survey area** – refers to the area surveyed by GHD during the biological assessment undertaken by GHD in November 2015 for the Project (see GHD 2016b – Attachment 3).
1.5	**Street address of the site**	The street address is as follows (Figure 1 - Attachment 1): • Pinjarra Williams Road (M053) SLK 91.9 to SLK 125.5. From Quindanning east to the town of Williams. • Williams Narrogin Highway (H053) SLK 0 to SLK 31.4. From town of Williams east to Narrogin. • Toodyay Goomalling Road (MO60) SLK 1.2 to SLK 48.0. From Toodyay east to the town of Goomalling.
1.6	**Lot description** Not applicable	
1.7	**Local Government Area and Council contact (if known)** The Project is located within the following three Shires: • Pinjarra Williams Road (M053) SLK 91.9 to SLK 125.5 (Shire of Williams) • Williams Narrogin Highway (H053) SLK 0 to SLK 31.4 (Shire of Narrogin). • Toodyay Goomalling Road (MO60) SLK 1.2 to SLK 48.0 (Shire of Toodyay)	
1.8	**Time frame** Clearing will be undertaken in the 2016/2017, 2017/2018 and 2018/2019 (3 years) financial years, subject to funding.	

1.9	**Alternatives to proposed action**	✓	No
		X	Yes, you must also complete section 2.2
1.10	**Alternative time frames etc**	✓	No
		X	Yes, you must also complete Section 2.3. For each alternative, location, time frame, or activity identified, you must also complete details in Sections 1.2-1.9, 2.4-2.7 and 3.3 (where relevant).

1.11	**State assessment**	✓	No The Environmental Impact Assessment (EIA) report (GHD 2016a – Attachment 3) has determined the Project is unlikely to require referral to the WA Environmental Protection Authority (EPA) under the *Environmental Protection Act 1986* (EP Act). This is due to the low significance of its impacts to the surrounding environment except for impacts to native vegetation and fauna habitats. The potential impacts from the loss of native vegetation clearing and loss of fauna habitat for the Project may be effectively assessed through the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 and bilateral assessment process between the state of Western Australia and the Commonwealth.
		X	Yes, you must also complete Section 2.5
1.12	**Component of larger action**	✓	No
			Yes, you must also complete Section 2.7
1.13	**Related actions/proposals**	X	No
		✓	Yes, provide details: Currently Toodyay Road west of the Project area (Toodyay Goomalling Road SLK 1.2 to SLK 48.0) is being upgraded after assessment deemed this road unsafe. The Wheatbelt region of WA is recognised as being unsafe to drivers due to tree presence in close proximity to the road edge. This is part of an ongoing project within the region to improve road user safety.
1.14	**Australian Government funding**	✓	No
		X	Yes, provide details:
1.15	**Great Barrier Reef Marine Park**	✓	No
		X	Yes, you must also complete Section 3.1 (h), 3.2 (e)

2 Detailed description of proposed action

2.1 Description of proposed action

Main Roads is planning to establish a wider maintenance zone for three roads in the Wheatbelt Region – Pinjarra Williams Road (M053), Williams Narrogin Highway (H053) and Toodyay Goomalling Road (M060), in the Shires of Williams, Narrogin and Toodyay, Western Australia over the next 3 years. These three roads have been identified as three of the most unsafe roads in the Wheatbelt, and a significant safety hazard is the number of trees that are within 4 m of the road seal. Trees at this distance do not allow for driver recovery and often result in fatalities in an accident.

Main Roads proposes to clear selected trees (those considered dangerous to road users within 4 m of the road seal) within 4 m of the edge of the seal on all three roads. The three sections to be upgraded are:

- Pinjarra Williams Road (M053) SLK 91.9 to SLK 125.5 (herein referred to as the Pinjarra to Williams Project area)
- Williams Narrogin Highway (H053) SLK 0 to SLK 31.4 (herein referred to as the Williams to Narrogin Project area)
- Toodyay Goomalling Road (MO60) SLK 1.2 to SLK 48.0 (herein referred to as the Toodyay to Goomalling Project area)

The proposed Project will consist of clearing within the 4 m zone for the three sections of road and will include upgrades to the existing watercourses within the defined extent of the project area for each of the three sections.

2.2 Alternatives to taking the proposed action

There are no practical alternatives to the Project. The close proximity of isolated large trees to the road increases the risk to drivers. The proposed works are required to improve the road safety attributes along these roads.

2.3 Alternative locations, time frames or activities that form part of the referred action

There are no alternative locations, timeframes or activities for the proposed project. The removal of dangerous trees should take place as soon as possible. Timeframes will be dependent upon funding availability.

2.4 Context, planning framework and state/local government requirements

The Project area is located within the existing road reserves, as zoned within the relevant regional planning schemes. Additionally the trees are within Main Roads existing road maintenance zones. The road reserve is a designated State road reserve and is therefore managed by Main Roads and under the control of the Commissioner for Main Roads. State and Commonwealth Government requirements are detailed in Section 2.5.

2.5 Environmental impact assessments under Commonwealth, state or territory legislation

Environmental Impact Assessment

In deciding whether a proposal will be subject to the formal environmental impact assessment process under the *Environmental Protection Act 1986* (EP Act), the EPA takes into account the environmental significance of any potential impacts that may result from the implementation of the scheme or proposal.

The Environmental Impact Assessment (EIA) report (GHD 2016a – Attachment 3) has determined the Project is unlikely to require referral to the EPA. This is due to the low significance of its impacts to the surrounding environment except for impacts to native vegetation and fauna habitats. The potential impacts from the loss of native vegetation clearing and loss of fauna habitat for the Project may be effectively assessed through the Environmental Protection (Clearing of Native Vegetation) Regulations 2004. Therefore with consideration of the environmental values discussed in the EIA report including MNES, it is considered unlikely that the Project would require referral to the EPA under Section 38 of the EP Act.

The EIA process identified that the Project was likely to require referral under Commonwealth legislation due to potential impacts to fauna species listed under the EPBC Act, particularly Carnaby's Black Cockatoo, Forest Red-tailed Black Cockatoo and Red-tailed Phascogale.

Biological assessments

A biological assessment including Level 1 flora and fauna surveys and targeted Black Cockatoo habitat assessment was completed by GHD for Main Roads. Key terrestrial flora and fauna and ecological issues were identified (GHD 2015b – as Appendix in Attachment 3).

The biological survey was undertaken in November 2015 for a slightly broader area mostly within the road reserve (referred to as the survey area – GHD 2016b – appendix in Attachment 3) encompassing the three roads based on the preliminary impact area at the time of the survey. As the Project progressed, the impact area was reduced from 6.5 metres to 4 metres from edge of seal by Main Roads, which reduced the Project area and project impact. GHD completed additional site investigation with Main Roads on 11th and 17th February 2016 to capture and identify the key trees of concern within the 4 metre impact area. This task reduced the number of trees to be impacted and focused on key attributes of dangerous trees along the roads. This data has been incorporated into the EIA (GHD 2016a – Attachment 3) to inform the impact assessment for this Project and the EPBC referral to the DotE. The complete data set of biological values for the current Project area has been displayed in the attached EIA (Attachment 3, Figures 3 – 5).

Assessment bilateral agreement between Western Australia and the Commonwealth

The clearing of native vegetation in Western Australia requires a permit under Part V of the EP Act, unless an exemption applies. Main Roads has been granted a State-wide vegetation clearing permit (Clearing Permit CPS 818) which allows it to clear native vegetation for road projects and associated clearing activities. The Main Roads Purpose Permit (CPS 818) requires an assessment of the Project clearing against the Ten Clearing Principles and, where at variance, an environmental offset is required. The Project will be assessed against the 'Ten Clearing Principles' as part of the Assessment Report undertaken by Main Roads for the Project.

The Commonwealth of Australia and Western Australia governments have entered into a bilateral agreement under the EPBC Act relating to environmental assessment (assessment bilateral agreement). Specifically, this agreement now includes the clearing permit assessment process under Part V Division 2 of the EP Act. Under the assessment bilateral agreement, if a native vegetation clearing permit is required and the clearing will have or is likely to have an impact on a MNES, the assessment of the clearing application including the potential impacts to the MNES can be conducted by the Department of Environment and Regulation (DER). If the project is deemed a Controlled Action, it is likely to be assessed under this agreement and a project specific clearing permit will be applied for instead of the use of CPS818.

2.6 Public consultation (including with Indigenous stakeholders)

Consultation with key stakeholders will be undertaken for this project in accordance with Main Roads internal processes. Letters will be sent to the following stakeholders:

- Conservation Council
- Department of Water (DoW)
- Shires of Williams, Narrogin and Toodyay and Goomalling

Additional stakeholders may be consulted, pending the outcome of the assessment against the Ten Clearing Principles.
Approvals have been sought from the Department of Water and Department of Aboriginal Affairs, including consultation with these departments, as required.

2.7 A staged development or component of a larger project

Clearing vegetation less than 10 years old, and pruning of overhead and lateral vegetation in the maintenance zone will be undertaken this financial year. However, no further stages of the current project (that are likely to need referral under the EPBC Act, or State Environmental Protection Act) are proposed.

3 Description of environment & likely impacts

3.1 Matters of national environmental significance

3.1 (a) World Heritage Properties

Description

There are no World Heritage Properties within the vicinity of the Project area.

Nature and extent of likely impact

Not applicable.

3.1 (b) National Heritage Places

Description

There are no National Heritage Places within the vicinity of the Project area.

Nature and extent of likely impact

Not applicable.

3.1 (c) Wetlands of International Importance (declared Ramsar wetlands)

Description

There are no Wetlands of International Importance within the vicinity of the Project area.

Nature and extent of likely impact

Not applicable.

3.1 (d) Listed threatened species and ecological communities

Description

A biological assessment consisting of a Level 1 flora and vegetation assessment, Level 1 fauna assessment and targeted Black Cockatoo habitat assessment of the survey area was conducted by GHD in November 2015 (in appendix of GHD 2016a, Attachment 3). An EPBC Act Protected Matters Search (PMST) was conducted on 5th November 2015 as part of the desktop assessment for the biological survey (GHD 2016b). This report identified:

- 31 threatened species (Toodyay Goomalling) as potentially occurring within a 10 km radius of the Project area, including 21 flora, nine vertebrate fauna and one invertebrate fauna species. (at this time the TEC Eucalypt Woodlands of the Western Australian Wheatbelt did not appear)
- 17 threatened species (Williams Narrogin and Williams Pinjarra Roads) as potentially occurring within a 10 km radius of the Project area, including 10 flora and seven vertebrate fauna species. (at this time the TEC Eucalypt Woodlands of the Western Australian Wheatbelt did not appear).

A more recent PMST search of the Project area (all three section) (Dote 2016a - Attachment 4) revealed the recent listing of the Critically Endangered Ecological Community, Eucalypt Woodlands of the Western Australian Wheatbelt as well as the plant species *Pultenaea pauciflora*, within the Narrogin area (Vulnerable).

Threatened Ecological Communities

The GHD 2015 survey recorded 19.48 ha of the Critically Endangered Ecological Community, Eucalypt Woodlands of the Western Australian Wheatbelt community within the survey area (all three locations combined) including:

- 8.85 ha within the Pinjarra to Williams survey area
- 2.14 ha within the Williams to Narrogin survey area
- 8.49 ha within the Toodyay to Goomalling survey area

Approximately 0.32 ha of the Critically Endangered Ecological Community, Eucalypt Woodlands of the Western Australian Wheatbelt was recorded within the Project areas and will be cleared as part of the Project including:

- 0.16 ha within the Pinjarra to Williams Project area
- 0.10 ha within the Williams to Narrogin Project area
- 0.06 ha within the Toodyay to Goomalling Project area.

In order to determine if the proposed Project will have a significant impact on the Critically Endangered Ecological Community, an assessment was undertaken against the Significant Impact Guidelines (DotE 2013), as presented in Table 1.

Outcome – The Project is unlikely to have a significant impact on the Critically Endangered Ecological Community, Eucalypt Woodlands of the Western Australian Wheatbelt.

Table 1. Significant Impact Criteria - Eucalypt Woodlands of the Western Australian Wheatbelt

Significant Impact Criteria	**Impact Outcome**
An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:	
Reduce the extent of an ecological community	**Unlikely** The Project may result in the loss of 0.32 ha of the TEC from three different locations including: • 0.16 ha within the Pinjarra to Williams Project area • 0.10 ha within the Williams to Narrogin Project area • 0.06 ha within the Toodyay to Goomalling Project area. There is approximately 930,075.8 ha of this TEC remaining (TTSC 2015[1]). The Project may clear up to 0.00003% (0.32 ha) from across three different locations. The Project is therefore unlikely to substantially reduce the extent of this ecological community.
Fragment or increase fragmentation of an ecological community, for example by clearing	**Unlikely** The Project will involve the clearing and/or modification of vegetation which is part of this community from the roadside reserve within the Project area. Although the Project will result in a very small reduction of this community from across three separate locations it would not

[1] Based on current extent of Beard vegetation associations (2014) that correspond to the WA Wheatbelt Woodland ecological community - See Appendix D TTSC 2015

vegetation for roads or transmission lines	involve the complete fragmentation to the community at any one location. The Project may result in a slight increase in fragmentation and small increase in fragmentation effects to the community, however it is considered unlikely that this would result in substantial fragmentation affects to the community, given the existing scattered nature of the community within the regions and the road corridors. .
Adversely affect habitat critical to the survival of an ecological community	**Unlikely** The Project is unlikely to affect habitat critical to the survival of the ecological community. The habitat located within the Project area does not consist of habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act (DotE 2013, pp10). The habitat in the Project area is mostly highly degraded, due to previous roadworks and maintenance and to weed infestation from adjacent agricultural areas. The Project area habitat is not considered to be critical to the survival of the community.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	**Unlikely** The Project is unlikely to modify or destroy abiotic factors (such as water, nutrients, or soil) necessary for an ecological community's survival. The extent of the Proposed works will be limited to the area within 4 m of the edge of the road. Although some of the existing watercourses (e.g. drainage lines with culverts) will be upgraded it is unlikely to result in the substantial alteration to any of the existing surface water drainage patterns.
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	**Unlikely** The Project is unlikely to cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species. The proposed impact to the community is 0.32 ha across three locations and the extent of the Proposed works will be limited to the area within 4 m of the edge of the road. The Project is unlikely to result in substantial decline of any flora or fauna species which may occur within this community in the Project area. Furthermore the loss of 0.32 ha is unlikely to result in the substantial loss of any habitat for any flora or fauna species of conservation significance.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: • assisting invasive species, that are harmful to the listed ecological community, to become established, or • causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which attkill or inhibit the growth of species in the ecological community, or	**Unlikely** The Project is unlikely to cause a substantial reduction in the quality or integrity of an occurrence of an ecological community. The Project is unlikely to assist in an invasive species becoming established or cause the regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which would kill or inhibit the growth of species in the community.
Interfere with the recovery of an ecological community.	**Unlikely**
Legend for Table 1 - For the purpose of this assessment,	

'Habitat critical to the survival of an ecological community' refers to areas that are necessary:

- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- to maintain genetic diversity and long term evolutionary development, or
- for the reintroduction of populations or recovery of the species or ecological community.

Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act (DotE 2013b).

Flora

Twenty-eight threatened flora species were identified as potentially occurring within 10 km of the Project area from the PMST. The Level 1 flora and vegetation assessment undertaken by GHD in November 2015 recorded one threatened flora species listed under the EPBC Act within the survey area – *Pultenaea pauciflora*. This location was in the Project area immediately adjacent to a known population at the Narrogin golf course approximately 1.4 km north east of Quarry Road. No other plants were recorded within the larger GHD survey area. This one plant was recorded growing in a disturbed area within the Project area, adjacent to the road. The *Pultenaea* was recorded in *Eucalyptus wandoo* open forest vegetation. Although only one plant was recorded within a highly disturbed area during the survey, *Eucalyptus wandoo* open forest was recorded adjacent to the *Pultenaea* plant, which provides known, suitable habitat for the species. Approximately 0.11 ha of this habitat occurs within the Williams to Narrogin survey area.

Department of Parks and Wildlife (DPaW) records show a population of *Pultenaea pauciflora* within the Williams to Narrogin GHD November 2015 survey area near the Narrogin Golf Course (see GHD 2016a - Attachment 3). A second population has previously been recorded 70 m south of the survey area. During the field survey, these areas within and adjacent to the alignment were searched by GHD botanists (GHD 2106a - Attachment 3). Table 2 presents the estimated loss of *Pultenaea pauciflora* from the Project area, based on known records.

No other EPBC listed flora were recorded during the GHD field survey.

Table 2. Estimated loss of *Pultenaea pauciflora* from the Project area

Taxon	Number in Project area	State-wide records (WA Herbarium 1998–)	Loss from Project area
Pultenaea pauciflora	1 – Williams to Narrogin	46 records on FloraBase with a minimum of 5000 individuals (a number of records identified as 'locally common/ abundant/ frequent/ scattered')	0.0002 % of species 0.11 ha of habitat

The impact to *Pultenaea pauciflora* is not considered to be significant due to the small percentage of loss of the known plants of the species and the loss of a very small area of habitat. The species is likely to be a disturbance opportunist, given that no other plants were recorded within the two known sub-populations near the Narrogin golf course.

Main Roads has an existing Permit to Take, approved by the Western Australian Minister for the Environment, for Threatened flora within the road maintenance zone (attached).

A likelihood of occurrence assessment of the 28 threatened flora species, which takes into account the habitats present, known species distribution and previous records and intensity of field surveys and season, was undertaken (GHD 2016b). This assessment determined that four Threatened flora species could possibly occur within the Project area (see Table 3). It should be noted that not all species identified as potentially occurring would be recorded during a single survey, due to spatial and temporal variations in flora population numbers. However, given the largely degraded condition of the Project area (e.g. majority of the road reserve supports an overstorey of scattered native Eucalypt species over a highly cleared understorey dominated by weeds), the survey effort and season, if populations of Threatened flora taxa were present, it is expected they would have been identified in the field during the survey.

Therefore it is considered unlikely that the proposed Project would have a significant impact on any of the EPBC

listed flora species listed in Table 3.

Table 3. EPBC listed flora species that could possibly occur within the Project area.

Species	Status	Description (WA Herbarium 1998-, DotE 2105-)	Survey efficacy	Likelihood of occurrence
Caladenia drakeoides	E	Tuberous, perennial, herb, 0.12-0.3 m high. Fl. green, Sep to Oct. Grey clayey sand, red sandy loam, in damp situations. Margins of salt lakes.	Low (due to survey timing)	Possible - Toodyay to Goomalling area; some suitable habitat present in the survey area and species is cryptic. However, the Project area will not include undisturbed salt lake margins as the road is built up over these areas. No potential habitat for this species will be directly impacted.
Gastrolobium hamulosum	E	Low shrub, 0.2-0.45 m high. Fl. Yellow & orange & red & purple, Aug to Oct. Sandy, often gravelly soils or clay. Flats, slopes, ridges. It grows in grey, white or brown sandy loam over laterite in shrubland and heath with *Allocasuarina campestris, Gastrolobium spinosum, Gastrolobium glaucum* (DRF), *Acacia cochlocarpa* subsp*. cochlocarpa (DRF)* and *Hakea scoparia.*	Medium	Possible - Toodyay to Goomalling: Not recorded from the study area, but suitable habitat is potentially present and plant is relatively small. Potential habitat for this species is very limited within the Project area, being less than 0.2 ha.
Grevillea christinae	E	Erect, wiry shrub, 0.5-0.6 m high. Fl. white-cream, Aug to Sep. Clay loam, sandy clay, rocky soil, often moist.	High (species is distinctive)	Possible - Toodyay to Goomalling: species recorded within the study area and some suitable habitat present. Potential habitat for this species includes 0.71 ha within the Project area.

Outcome – The Project is unlikely to have a significant impact on the Vulnerable *Pultenaea pauciflora* or the Endangered species which were considered to possibly occur in the Project area. This is due to the very small areas of habitat being impacted and the poor quality vegetation within the impacted areas.

Fauna

The Level 1 fauna assessment including targeted Black Cockatoo habitat assessment was undertaken by GHD in November 2015 (GHD 2016b) and identified three EPBC listed threatened fauna species within the Project area:

- Red-tailed Phascogale – this species was recorded on camera traps (see Plate 1) numerous times over multiple nights in a small section of Wandoo/Sheoak woodland within the Pinjarra Williams Road (M053) survey area. Additionally the camera images show multiple animals both adult and juvenile. One individual, a female appeared to have pouch young with a large distorted pouch visible in the image (see GHD 2016b – Appendix in Attachment 3). Potential habitat for this species was also recorded in the Toodyay Goomalling Road and Williams to Narrogin Highway Project areas.
- Forest Red-tailed Black Cockatoo – no Forest Red-tailed Black Cockatoo were recorded within the Project area or broader survey area during the November 2015 GHD field survey (GHD 2016b). However individuals were observed during subsequent visits to the Project area in Pinjarra Williams Road (M053) and Williams Narrogin Highway (H053). Foraging evidence for Forest Red-tailed Black Cockatoo was recorded in both Williams Narrogin to Highway and Pinjarra to Williams Road survey areas. Similar to the Carnaby's Black Cockatoo, the survey area contains quality suitable foraging habitat for the Forest Red-tailed Black Cockatoo, with all of the Eucalypt woodlands, shrublands and rehabilitated areas providing foraging species.
- Carnaby's Black Cockatoo – no Carnaby's Black Cockatoo were recorded within the Project area or broader survey area during the GHD field survey (GHD 2016b). This species is known to utilise habitat within the Toodyay, Williams and Narrogin areas, however no evidence of use was recorded in the Toodyay Goomalling

Road (M060). Foraging evidence was record on Marri fruits along the Pinjarra Williams Road (M053) and within Williams Narrogin Highway (H053) and additionally *Banksia sessilis* was also utilised within the survey area.

Plate 1. Red-tailed Phascogale from a camera trap 10 December 2015 - Pinjarra to Williams Road Project area

The results of the field survey were combined with the results of the desktop assessment to provide a likelihood of occurrence assessment for the EPBC listed threatened fauna species identified during the desktop searches as occurring or potentially occurring within one or more of the three Project areas (see GHD 2016a – Attachment 3). Table 4 presents the results of the likelihood assessment.

Table 4. EPBC listed threatened fauna species that could potentially occur within the Project area.

Species	EPBC Act	Toodyay Goomalling Road	Williams Narrogin Highway	Pinjarra Williams Road
Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*)	En	Likely	Present.	Likely
Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)	Vu	Unlikely	Present.	Present.
Red-tailed Phascogale (*Phascogale calura*)	En	Likely	Likely	Present

The remaining EPBC listed fauna species identified in the desktop assessment are considered unlikely or highly unlikely to occur within the Project areas.

Carnaby's Black Cockatoo

Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) are found in southwest Australia from the Murchison River across to Esperance and inland to Coorow and Lake Cronin. They are commonly seen in some areas such as the coastal plain to the north of Perth and some areas of the northern Wheatbelt. Carnaby's Black Cockatoo are locally extinct in other areas, such as in many parts of the central Wheatbelt.

In the south-west of Western Australia, the species mostly occurs in the Wheatbelt, where the species breeds between July/August to January/February. The Carnaby's Black Cockatoo is highly mobile and displays a seasonal migratory pattern that is linked to breeding, with the majority of birds moving to the higher rainfall coastal areas to forage during the non-breeding season (DSEWPaC 2012). In the Wheatbelt during the nesting season Carnaby's Black Cockatoos occur in uncleared or remnant eucalypt woodlands, predominately salmon gum or Wandoo. They feed in heathland called Kwongan heath, on different types of banksia, grevillea, hakea and

dryandra species. They also feed on seeds of eucalyptus species, and introduced species such as wild radish and pines (DotE 2016b). During the non-nesting season Carnaby's Black Cockatoo predominantly occur in banksia woodlands, coastal and near-coastal scrub and forests and introduced pine trees of the coastal regions (DotE 2015c).

The Project area is located within the known breeding range of Carnaby's Black Cockatoo (DSEWPaC 2012, DotE 2016b), and there is suitable habitat for the species within the Project area. The field survey carried out by GHD was undertaken during the breeding season of Carnaby's Black Cockatoo, however no birds were sighted and there were no evidence of current breeding recorded within the Project area.

A description of the extent of the foraging, potential breeding and roosting habitat for the species within the GHD Project areas are summarised in Table 5.

Forest Red-tailed Black Cockatoo

Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) are found in southwest Australia from the Muchea across to east of Albany and inland to Brookton, Narrogin and Cranbrook. The species is now not found in the eastern most areas of its former range. They are commonly seen in some areas such as the Darling Range to the eastern fringes of the Swan Coastal Plain around Perth and some areas of the central Wheatbelt.

This species occurs throughout the south west of Western Australia in a variety of Eucalyptus forest and woodland habitats. They typically breed in hollows in live or dead tress of Marri, Karri, Wandoo, Tuart, Jarrah, *Eucalyptus megacarpa* (Bullich) and *E. patens* (Blackbutt). Breeding commonly occurs close to a water source and areas suitable for foraging. The exact breeding range of the species is unknown (DSEWPaC 2012), however records have been identified from Lake Clifton, Murdoch, Bedfordale, Wungong, Rolystone and Wundowie. The primary food source for the species are seed from Eucalyptus species including Jarrah and Marri. Other feeding species are *Allocasuarina fraseriana* (sheoak) and a number of introduced species.

The Williams Pinjarra Road and Williams Narrogin Road Project areas are located within the modelled distribution for the Forest Red-tailed Black Cockatoo. The Toodyay Goomalling Road falls just outside of the modelled distribution.

A description of the extent of the foraging, potential breeding and roosting habitat for the species within the GHD Project areas are summarised in Table 5.

Table 5. Summary of Black Cockatoo habitat within the Project area

Habitat type	Toodyay to Goomalling Project area	Pinjarra to Williams Project area	Williams to Narrogin Project area
Foraging habitat	6.412 ha of Eucalypt woodland foraging habitat including scattered roadside Eucalypt trees that also provide foraging habitat for Carnaby's Black Cockatoo. No evidence of foraging by Carnaby's Black Cockatoos was recorded.	7.46 ha of Eucalypt woodland foraging habitat including scattered roadside Eucalypt trees that also provide foraging habitat. Evidence of foraging by Black Cockatoos was recorded on Marri nuts (6 occasions).	5.52 ha of Eucalypt woodland foraging habitat including scattered roadside Eucalypt trees that also provide foraging habitat. Evidence of foraging by Black Cockatoos was recorded on *B.sessilis* and Marri nuts (4 occasions).
Actual breeding habitat	No breeding events were recorded of any species of Black Cockatoo during the current survey.		
Potential breeding habitat	67 potential breeding habitat trees with DBH ≥ 300 mm (for Wandoo and York) and DBH ≥ 500 mm (for Flooded Gum) including: 22 *E. wandoo* 31 *E. loxophleba* 14 *E. rudis*	58 potential breeding habitat trees with DBH ≥ 300 mm (for Wandoo) and DBH ≥ 500 mm (for Flooded Gum and Marri) including: 30 *E. wandoo* 22 *E. rudis* 6 *C. calophylla*	56 potential breeding habitat trees with DBH ≥ 300 mm (for Wandoo and York) and DBH ≥ 500 mm (for Flooded Gum, Marri and Jarrah) including: 24 *E. wandoo* 4 *E. loxophleba* 7 *E. rudis*

	Eighteen hollows within 11 trees were recorded. Of these, 13 were small hollows and 4 were medium hollows. One large hollow suitable for breeding was recorded.	Three trees with 6 hollows were recorded. Of these 2 were small hollows and 3 were medium hollows. One large hollow suitable for breeding was recorded.*	19 *C. calophylla* 1 *E. marginata* 1 Stag No trees with hollows were recorded within the Project area.
Roosting habitat	No roosting sites were recorded as being used by Black Cockatoos. Suitable roosting habitat occurs throughout the Project area and consists of Eucalypt woodland and tall mature trees	No roosting sites were recorded as being used by Black Cockatoos. Suitable roosting habitat occurs throughout the Project area and consists of Eucalypt woodland and tall mature trees.	No roosting sites were recorded as being used by Black Cockatoos. Suitable roosting habitat occurs throughout the Project area and consists of Eucalypt woodland and tall mature trees.

Table notes:

*Chews recorded on large hollows are possibly due to Black Cockatoo; however without observations of an actual breeding event these records cannot be substantiated. The timing of the surveys were undertaken during the breeding season however breeding periods can be over several months and timing of the event can vary depending on resources available and environmental factors.

Red-tailed Phascogale

The Red-tailed Phascogale is a small arboreal dasyurid that inhabits Wandoo (*Eucalyptus wandoo*) and dense Sheoak (*Allocasuarina huegeliana*) woodland associations with populations being most dense in the latter vegetation type (DotE 2016c). The species is semelparous, that is, the males of the species die–off after the mating season in most populations and females have an age span of approximately two years (DotE 2016c). The species is confined to remnant patches of vegetation containing suitable habitat in the central and southern Wheatbelt, where vegetation is long unburnt. This habitat type provides the continuous canopy cover to assist their arboreal habits. Trees need to be of a sufficient age to provide hollows for nesting in limbs or logs, and grass trees need to have ample skirts (which develop after longer periods of fire exclusion) to provide cover. The species can also be found inhabiting letter boxes, ceiling cavities and other opportunistic refuges. This suggests that although their habitat preference is clear, they will use other vegetation types and artificial refuges, in lower densities, as nesting sites where preferred habitat is not available (DotE 2016c). Home ranges vary from 1.5 ha to 8 ha, depending on the breeding season (DEC 2007).

The Project area is located at the northern and central extent of the Red-tailed Phascogale's currently known range. A description of the extent of the known and potential habitat for the species within the GHD Project areas are summarised in Table 6.

Table 6. Summary of habitat for Red-tailed Phascogale within the Project area

Habitat type	Pinjarra to Williams Project area	Williams to Narrogin Project area	Toodyay to Goomalling Project area
Wandoo woodland	1.44 ha	0.56 ha	0.21 ha
Wandoo/Allocasuarina shrubland	1.26 ha	0.08 ha	0 ha
Mixed Eucalyptus woodland	0.6 ha	1.66 ha	4.94 ha
Low shrubland	1.66 ha	0.37 ha	0.35 ha
Rivers, creeks and drainage lines	1.32 ha	0.062 ha	0.91 ha
Planted shrub species within road verge	1.18 ha	2.79 ha	
Total	7.46 ha	5.52 ha	6.41 ha

Nature and extent of likely impact

Carnaby's Black Cockatoo

Impacts to Carnaby's Black Cockatoo 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 impact to Carnaby's Black Cockatoo resulting from clearing of the Project area is the loss of habitat:

- Loss of an estimated 19.39 ha of habitat including foraging and potential breeding and roosting habitat
    - Loss of potential breeding habitat including 181 potential habitat trees
    - Two (2) of these trees contains suitable hollows for breeding (see GHD 2016a, Attachment 3)
    - The remaining 179 of these trees do not contain suitable breeding hollows at present but have a DBH greater than 300 mm or 500 mm and have the potential to develop a suitable nest hollows in the future

Forest Red-tailed Black Cockatoo

The Williams Pinjarra Road and Williams Narrogin Road Project areas are located within the modelled distribution for the Forest Red-tailed Black Cockatoo. The Toodyay Goomalling Road falls just outside of the modelled distribution, therefore it is considered unlikely that this species would breed within the Toodyay Goomalling Road Project area. The Project area provides foraging, potential breeding and roosting habitat for Forest Red-tailed Black Cockatoo. The key potential impact to Forest Red-tailed Black Cockatoo resulting from clearing of the Project area is the loss of habitat:

- Loss of an estimated 12.98 ha of habitat including foraging and potential breeding and roosting habitat
    - Loss of potential breeding habitat including 114 potential habitat trees
    - One (1) of these trees contains suitable hollows for breeding (see GHD 2016a, Attachment 3)
    - The remaining 113 of these trees do not contain suitable breeding hollows at present but have a DBH greater than 300 mm or 500 mm and have the potential to develop a suitable nest hollows in the future.

In addition, the other impacts to Black Cockatoo species for the Project include:

- Exacerbation of existing fragmentation and reduction in connectivity of habitats within the Wheatbelt region
- Localised temporary disturbance to Carnaby's Black Cockatoo's from increased noise from the clearing of the Project. This disturbance may deter the species from occupying adjacent areas, and is considered to be a temporary disturbance during the clearing period.

In order to determine if the proposed Project will have a significant impact on Carnaby's Black Cockatoo and Forest Red-tailed Black Cockatoo an assessment was undertaken against the Significant Impact Guidelines (DotE 2013), as presented in Table 7 (Carnaby's Black Cockatoo) and 8 (Forest Red-tailed Black Cockatoo).

For the purpose of this assessment 'population of a species' in this case for the Carnaby's Black Cockatoo is the population that occurs within the Shires of Toodyay, Williams and Narrogin. These shires are predominantly rural with the dominant land use being agriculture. It has been assumed that the habitats within the Project area are part of the breeding range of the species based on the location of the Project considering the modelled distribution of the species range (DSEWPaC 2012) and known breeding events in the Wheatbelt (DSEWPaC 2012 and DotE 2016b).

Outcome – The Project is **Likely** to have a significant impact on Carnaby's Black Cockatoo and Forest Red-tailed Black Cockatoo.

Table 7. Significant Impact Criteria for Carnaby's Black Cockatoo

Significant Impact Criteria	**Impact Outcome**
An action is likely to have a significant impact on an endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a population	**Likely** There is suitable foraging and potential breeding habitat for Carnaby's Black Cockatoo and the

	species has previously been recorded within 10 km of the Project area (DPaW 2007 -). Foraging habitat The proposed Project is likely to result in removal of up to 19.39 ha of suitable foraging habitat. The 19.39 ha of foraging habitat within the Project area probably represents less than 0.1%[2] of the overall area of suitable foraging habitat within the three Shire areas. Roosting habitat There are no known roosting sites within the Project area. Potential roosting habitat was recorded during the field survey. There is potential for the Carnaby's Black Cockatoos to roost in the Eucalyptus trees in the Project area and there is water located within proximity to the Project area (e.g. farm dams) and watercourses intersected by the Project. Given the location of the Project (i.e. within the breeding range of the species), the potential roosting habitat within the Project area is not considered to be important night roosting habitat for the species (because it is part of the species breeding range). Given the availability of foraging (as discussed above) and potential roosting habitat in the local and regional surrounding area (including within the Shires), the loss of this potential night roosting habitat is not considered substantial. Breeding habitat The proposed Project is likely to result in removal of up to 181 potential breeding trees, including two trees containing potentially suitable breeding hollows and 179 trees with suitable DBH that may form hollows in the future. There was no evidence of breeding recorded during the field survey, however nine (9) hollows in the survey area (outside the Project area) had evidence of recent / historical use (chew marks – see GHD 2016b). Given that the Project is located within the known breeding range of the species and that there is potential breeding habitat within the Project area, it has been assumed that the species could utilise the habitat within the Project area for breeding in the future. Six Beard (1979) vegetation associations (4, 7, 352, 946, 1023, 1049) mapped within the Project area align with the Black Cockatoo habitats recorded within the Project area that provide potential breeding habitat (e.g. Wandoo and York Gum trees of suitable DBH, some containing hollows). It is not possible to estimate the density of suitable breeding trees (including trees that do not contain hollows) within each of the mapped Beard (1979) vegetation associations in the locality of the Project area as the number of suitable breeding trees contained in these associations was not assessed. However, the extent of each of six vegetation associations mapped within the Project area is less than 20% within each of the Shires (GHD 2016b), therefore it is reasonable to assume that the extent of similar potentially suitable breeding habitats within these Shires is low and probably declining. It is therefore likely that the loss of the 181 potential breeding trees for the Project with respect to similar potentially suitable breeding habitat in the local area is likely to be substantial. Clearing of this potentially suitable breeding habitat is also likely to result in loss of hollow recruitment for Carnaby's Black Cockatoo within the Shires. Outcome It is considered that clearing of up to 19.39 ha of habitat; in particular the potential breeding habitat (including 181 potential breeding trees, 2 with hollows suitable for breeding) is likely to result in a shortage of hollows in the local area, thus reducing the availability of potential breeding habitat in the future. This may in turn lead to a long-term decrease in the size of the local populations of Carnaby's Black Cockatoo due to the lack of available breeding resources.
Reduce the area of occupancy of the species	**Unlikely** The Project is unlikely to substantially reduce the area of occupancy of a population of Carnaby's Black Cockatoo within the local area or region. The Project may reduce the overall area of potentially suitable habitat for Carnaby's Black Cockatoo within the Shires as a result of direct loss of habitat from clearing. Clearing for the Project will probably reduce the area of available habitat for Carnaby's Black Cockatoo in these Shires by less than 0.1%. The removal of this habitat (including foraging and potential breeding habitat) could be considered substantial for a local population of the species, however the removal of up to 19.39 ha of habitat is not considered to be significant for the Carnaby's Black Cockatoo species, due to the availability of potential habitat in the remaining road reserve and in the regional area (i.e. within the Shires) and small extent of removal compared to the extent of available habitat throughout the species range.
Fragment an existing population into two or more populations	**Unlikely** The Project is unlikely to fragment the population into two or more populations. The Project proposes to clear small sections (up to 4 m wide) along the edge of an existing road within a roadside reserve.

[2] This area calculation is based on the extent remaining of Beard (1979) vegetation associations within the three shires which contain plant species suitable for Carnaby's Black Cockatoo foraging and breeding (based on Groom (2011)).

	The cleared vegetation is unlikely to impose a physical barrier to the movement of Carnaby's Black Cockatoo from one side of the road to the other, or between areas of remnant vegetation. The species is mobile and capable of traversing gaps (< 100 m) between patches of habitat. Based on the mobility of Carnaby's Black Cockatoo and the occurrence of nearby potential habitat adjacent to the Project area, it is considered unlikely that the Project would fragment an existing population into two or more populations.
Adversely affect habitat critical to the survival of a species	**Unlikely** The Project is unlikely to affect habitat critical to the survival the Carnaby's Black Cockatoo species. Up to 19.39 ha of Carnaby's Black Cockatoo habitat in the Project area would be cleared for this Project. The habitat located within the Project area does not consist of habitat described by a recovery plan critical for the survival of the Carnaby's Black Cockatoo (DPaW 2013), nor is it habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act (DotE 2013, pp10).
Disrupt the breeding cycle of a population	**Unlikely** The works associated with the Project, are unlikely to disrupt the breeding cycle of the population of Carnaby's Black Cockatoo that occur within the Project area given that there was no evidence of breeding recorded in the 38 hollow-bearing trees deemed potentially suitable for Black Cockatoo breeding (as identified during the field survey). The field survey was conducted within the breeding season for all three species of Black Cockatoos and the species was not recorded in the Project area. The Project area is located within the documented breeding range for Carnaby's Black Cockatoo. Considering this information and that there has been no known Black Cockatoo breeding records within the Project area, it is unlikely that Carnaby's Black Cockatoo will initiate breeding in the Project area prior to the clearing of the habitat (assuming clearing commences within the next 12 months). Given the lack of breeding evidence within the Project area, it is likely that the breeding cycle of the local population occurs in other locations across the three shires and is not limited to this Project area. As such it is unlikely that the breeding cycle will be disrupted for any individual of the local population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Unlikely** The works associated with the Project, may modify and destroy a proportion of foraging habitat, potential breeding and potential roosting habitat for Carnaby's Black Cockatoo, but not to the point that a species would decline. The clearing of 19.39 ha of habitat for the Project consists of less than 0.1% of the overall area of potentially suitable habitat within the Shires. The clearing areas are also spread over a large section of the relevant Shire areas, due to their linear nature and the separation of the Project areas. Given the availability of potential foraging and to a lesser extent potential breeding habitat in the Shires, the impacts of this clearing are not considered significant to the species. The clearing and operational phases of the Project may reduce the functionality of the retained habitat alongside the road. The area of occupancy alongside the new road is likely to reduce, however the affected area is unlikely to be substantial reduced or modified to the extent that the species is likely to decline. However the loss of potential breeding habitat in the form of 181 trees with suitable DBH that may form hollows in the future may be substantial for the local population of the species. Despite these impacts the proposed Project is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat	**Unlikely** The Project may potentially exacerbate existing invasive species (such as weeds and introduced honey bees) that already occur within the Project area. The Project may result in the establishment of an invasive weed species within the Project area. However, these weed species are unlikely to be harmful to Black Cockatoo individuals and probably already occur on land surrounding the Project area. The Project is unlikely to result in an invasive species becoming established in the Project area to the extent that Carnaby's Black Cockatoo are substantially impacted.
Introduce disease that may cause the species to decline	**Unlikely** The Project is unlikely to introduce a disease (e.g. beak and feather disease virus) that may cause this species to decline. There are no known diseases that may be introduced to the area that may cause the Carnaby's Black Cockatoo population to decline, and it is unlikely that any diseases already exist in the Project area that may be spread by the activities of the Project.
Interfere with the recovery of the species.	**Unlikely** The Project is unlikely to interfere substantially with the recovery of Carnaby's Black Cockatoo as it is unlikely to interfere with the recovery actions outlined in the recovery plan for the species (DPaW 2013). For Carnaby's these actions include: • Protect and manage important habitat – the Project area has not been identified as important habitat in the recovery plan • Undertake regular monitoring – the Project will not interfere with any monitoring

	actions discussed in the recovery plan • Conduct research to inform management • Manage other impacts • Engage with the broader community • Undertake information and communication activities

Legend for Table 7 - For the purpose of this assessment:

'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to an endangered species, occurrences include but are not limited to:

- a geographically distinct regional population, or collection of local populations, or
- a population, or collection of local populations, that occurs within a particular bioregion (DotE 2013b)

`**invasive species;** is an introduced species, including an introduced (translocated) native species, which out-competes native species for space and resources or which is a predator of native species. Introducing an invasive species into an area may result in that species becoming established. An invasive species may harm listed threatened species or ecological communities by direct competition, modification of habitat or predation (DotE 2013b).

'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- for activities such as foraging, breeding, roosting, or dispersal
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- to maintain genetic diversity and long term evolutionary development, or
- for the reintroduction of populations or recovery of the species or ecological community.

Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act (DotE 2013).

Table 8. Significant Impact Criteria for Forest Red-tailed Black Cockatoo

Significant Impact Criteria	Impact Outcome
An action is likely to have a significant impact on an endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of an important population of a species	**Likely** There is suitable foraging and potential breeding habitat for Forest Red-tailed Black Cockatoo and the species has previously been recorded within 10 km of the Williams Pinjarra Road and Williams Narrogin Road Project areas (DPaW 2007 -). Foraging habitat The proposed Project is likely to result in removal of up to 12.98 ha of suitable foraging habitat. The 12.98 ha of foraging habitat within the Project area probably represents less than 0.1% of the overall area of suitable foraging habitat within the two Shire areas. Roosting habitat There are no known roosting sites within the Project area. Potential roosting habitat was recorded during the field survey. There is potential for the Forest Red-tailed Black Cockatoo to roost in the Eucalyptus trees in the Project area and there is water located within proximity to the Project area (e.g. farm dams) and watercourses intersected by the Project. Given the location of the Project (i.e. within the breeding range of the species), the potential roosting habitat within the Project area is not considered to be important night roosting habitat for the species (because it is part of the species breeding range). Given the availability of foraging (as discussed above) and potential roosting habitat in the local and regional surrounding area (including within the Shires), the loss of this potential night roosting habitat is not considered substantial. Breeding habitat The proposed Project is likely to result in removal of up to 114 potential breeding trees, including one tree containing a potentially suitable breeding hollow, and 113 trees with suitable DBH that may form hollows in the future. There was no evidence of breeding recorded during the field survey, however nine (9) hollows in the survey area (outside the Project area) had evidence of recent / historical use (chew marks – see GHD 2016b). Given that the Project is located within the known modelled range of the species and that there is potential breeding habitat within the Project area, it has been assumed that the species could utilise the habitat within the Project area for breeding in the future. Six Beard (1979) vegetation associations (4, 7, 352, 946, 1023, 1049) mapped within the Project area align with the Black Cockatoo habitats recorded within the Project area that provide

	potential breeding habitat (e.g. Wandoo, Flooded Gum and York Gum trees of suitable DBH, some containing hollows). It is not possible to estimate the density of suitable breeding trees (including trees that do not contain hollows) within each of the mapped Beard (1979) vegetation associations in the locality of the Project area as the number of suitable breeding trees contained in these associations was not assessed. However, the extent of each of six vegetation associations mapped within the Project area is less than 20% within each of the Shires (GHD 2016a – Attachment 3), therefore it is reasonable to assume that the extent of similar potentially suitable breeding habitats within these Shires is low and probably declining. It is therefore likely that the loss of the 114 potential breeding trees for the Project with respect to similar potentially suitable breeding habitat in the local area is likely to be substantial. Clearing of this potentially suitable breeding habitat is also likely to result in loss of hollow recruitment for Forest Red-tailed Black Cockatoo within the Shires. Outcome It is considered that clearing of up to 12.98 ha of habitat; in particular the potential breeding habitat (including 114 potential breeding trees, 1 with hollows suitable for breeding) is likely to result in a shortage of hollows in the local area, thus reducing the availability of potential breeding habitat in the future. This may in turn lead to a long-term decrease in the size of the local populations of Forest Red-tailed Black Cockatoo due to the lack of available breeding resources.
Reduce the area of occupancy of an important population	**Unlikely** The Project is unlikely to substantially reduce the area of occupancy of a population of Forest Red-tailed Black Cockatoo within the local area or region. The Project may reduce the overall area of potentially suitable habitat for Forest Red-tailed Black Cockatoo within the Shires as a result of direct loss of habitat from clearing. Clearing for the Project will probably reduce the area of available habitat for Forest Red-tailed Black Cockatoo in these Shires by less than 0.1%. The removal of this habitat (including foraging and potential breeding habitat) could be considered substantial for a local population of the species, however the removal of up to 12.98 ha of habitat is not considered to be significant for the Forest Red-tailed Black Cockatoo species, due to the availability of potential habitat in the remaining road reserve and in the regional area (i.e. within the two Shires) and small extent of removal compared to the extent of available habitat throughout the species range.
Fragment an existing important population into two or more populations	**Unlikely** The Project is unlikely to fragment the population into two or more populations. The Project proposes to clear small sections (up to 4 m wide) along the edge of an existing road within a roadside reserve. The cleared vegetation is unlikely to impose a physical barrier to the movement of Forest Red-tailed Black Cockatoo from one side of the road to the other, or between areas of remnant vegetation. The species is mobile and capable of traversing gaps (< 100 m) between patches of habitat. Based on the mobility of Forest Red-tailed Black Cockatoo and the occurrence of nearby potential habitat adjacent to the Project area, it is considered unlikely that the Project would fragment an existing population into two or more populations.
Adversely affect habitat critical to the survival of a species	**Likely** The Project is likely to affect habitat critical to the survival the Forest Red-tailed Black Cockatoo species. Up to 12.98 ha of Forest Red-tailed Black Cockatoo habitat in the Project area would be cleared for this Project. The habitat located within the Project area does consist of habitat described by a recovery plan critical for the survival of the Forest Red-tailed Black Cockatoo (DPaW 2008). Feeding evidence of the species was recorded and several groups of individuals were recorded during subsequent field visits (after GHD 2016b). Critical habitat for this species is that described as; • currently occupied by the cockatoos; • not currently occupied by the cockatoos due to recent fire but capable of supporting cockatoo populations when sufficiently recovered; • of natural vegetation in which the cockatoos nest, feed and roost; • of natural vegetation through which the cockatoos can move from one occupied area to another; and • of suitable vegetation within the recorded range in which undiscovered cockatoo populations may exist. The habitat critical to survival and important populations of Forest Black Cockatoos comprises all Marri (*Corymbia calophylla*), Karri (*Eucalyptus diversicolour*) and Jarrah (*Eucalyptus marginata*) forests, woodlands and remnants in the south-west of Western Australia receiving more than 600 mm of annual average rainfall (DPaW 2008).
Disrupt the breeding cycle of an important	**Unlikely** The works associated with the Project, are unlikely to disrupt the breeding cycle of the

population	population of Forest Red-tailed Black Cockatoo that occur within the Project area given that there was no evidence of breeding recorded in the hollow-bearing trees deemed potentially suitable for Black Cockatoo breeding (as identified during the field survey). The field survey was conducted within the breeding season for all three species of Black Cockatoos and the species was not recorded in the Project area. The Project area (Williams Pinjarra Road and Williams Narrogin Road) is located within the modelled range for Forest Red-tailed Black Cockatoo. Considering this information and that there has been no known Black Cockatoo breeding records within the Project area, it is unlikely that Forest Red-tailed Black Cockatoo will initiate breeding in the Project area prior to the clearing of the habitat (assuming clearing commences within the next 12 months). Given the lack of breeding evidence within the Project area, it is likely that the breeding cycle of the local population occurs in other locations across the three shires and is not limited to this Project area. As such it is unlikely that the breeding cycle will be disrupted for any individual of the local population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Unlikely** The works associated with the Project, may modify and destroy a proportion of foraging habitat, potential breeding and potential roosting habitat for Forest Red-tailed Black Cockatoo, but not to the point that a species would decline. The clearing of 12.98 ha of habitat for the Project consists of less than 0.1% of the overall area of potentially suitable habitat within the Shires. Given the availability of potential foraging and to a lesser extent potential breeding habitat in the Shires, the impacts of this clearing are not considered significant to the species. The clearing and operational phases of the Project may reduce the functionality of the retained habitat alongside the road. The area of occupancy alongside the new road is likely to reduce, however the affected area is unlikely to be substantial reduced or modified to the extent that the species is likely to decline. However the loss of potential breeding habitat in the form of 114 trees with suitable DBH that may form hollows in the future may be substantial for the local population of the species. Despite these impacts the proposed Project is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	**Unlikely** The Project may potentially exacerbate existing invasive species (such as weeds and introduced honey bees) that already occur within the Project area. The Project may result in the establishment of an invasive weed species within the Project area. However, these weed species are unlikely to be harmful to Black Cockatoo individuals and probably already occur on land surrounding the Project area. The Project is unlikely to result in an invasive species becoming established in the Project area to the extent that Forest Red-tailed Black Cockatoo are substantially impacted.
Introduce disease that may cause the species to decline, or	**Unlikely** The Project is unlikely to introduce a disease (e.g. beak and feather disease virus) that may cause this species to decline. There are no known diseases that may be introduced to the area that may cause the Forest Red-tailed Black Cockatoo population to decline, and it is unlikely that any diseases already exist in the Project area that may be spread by the activities of the Project.
Interfere substantially with the recovery of the species.	**Unlikely** The Project is unlikely to interfere substantially with the recovery of Forest Red-tailed Black Cockatoo as it is unlikely to interfere with the recovery actions outlined in the recovery plan for the species (DPaW 2008). For Forest Red-tailed Black Cockatoo these actions include: • The extent of occurrence of Forest Black Cockatoos in Western Australia remains stable or increases in the next ten years; • The number of breeding pairs of Forest Black Cockatoos in Western Australia remains stable or increases in the next ten years; • The number of Forest Black Cockatoos in each roosting flock remains stable or increases in the next ten years; and • The proportion of juvenile Forest Black Cockatoos in each roosting flock remains stable or increases in the next ten years.

Legend for Table 8 - For the purpose of this assessment:

'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to an endangered species, occurrences include but are not limited to:

- a geographically distinct regional population, or collection of local populations, or
- a population, or collection of local populations, that occurs within a particular bioregion (DotE 2013b)

`**invasive species;** is an introduced species, including an introduced (translocated) native species, which out-competes native species for space and resources or which is a predator of native species. Introducing an invasive species into an

area may result in that species becoming established. An invasive species may harm listed threatened species or ecological communities by direct competition, modification of habitat or predation (DotE 2013b).

'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- for activities such as foraging, breeding, roosting, or dispersal
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- to maintain genetic diversity and long term evolutionary development, or
- for the reintroduction of populations or recovery of the species or ecological community.

Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act (DotE 2013).

Red-tailed Phascogale

The key potential impacts to Red-tailed Phascogale resulting from clearing of the Project area are:

- Loss of an estimated 19.39 ha of suitable habitat including known foraging, nesting and breeding habitat (i.e. hollow bearing trees) within the Pinjarra to Williams Project area. 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. hollows of suitable size for breeding for Carnaby's Black Cockatoo) and additional smaller and medium hollows (see Table 5) provides an indication that suitable hollows for breeding may be present within the Project area.
- Localised temporary disturbance from increased noise from the clearing of the Project.

An assessment of impacts on Red-tailed Phascogale was undertaken against the Significant Impact Guidelines and presented in Table 9. The assessment includes criteria for Endangered species.

The Red-tailed Phascogale has a small home range (1.5 – 8 ha) and is not is not a highly mobile species. It is unlikely that there is a high level of immigration/emigration in the locality considering the level of fragmentation at the local and regional level. The network of roads, including major and minor road networks are already likely to impede dispersal for the Red-tailed Phascogale in the locality of the Project area. Therefore for the purpose of this assessment 'population of a species' in this case for the Red-tailed Phascogale is the population that occurs within the locality (an area general encompassing a 10 km radius of the Project area). Furthermore, given that there is known and potential breeding habitat within the Project area and the species probably breeds throughout its known range, it has been assumed that the species could utilise the habitat within the Project area for breeding.

Outcome – The Project is **Likely** to have a significant impact on Red-tailed Phascogale.

Table 9. Significant Impact Criteria for Red-tailed Phascogale

Significant Impact Criteria	Impact Outcome
An action is likely to have a significant impact on an endangered species if there is a real chance or possibility that it will:	
Lead to a long-term decrease in the size of a population	**Likely** The proposed Project is likely to result in removal of up to 19.39 ha including trees that may include suitable breeding hollows. The species was recorded in the Project area during the field survey (GHD 2016a and b). The loss of the 19.39 ha of habitat containing potential breeding habitat for the Project with respect to similar potentially suitable breeding habitat in the local area is likely to be substantial. The extent of Vegetation Associations 4, 7, 352, 946, 1023, 1049 (mapped within the Project area) is less than 20% within the surrounding three Shires (GHD 2016b). Although it is not possible to estimate the extent of suitable habitat, including densities of hollow-bearing trees within each of the mapped Beard (1979) vegetation associations in the locality of the Project area it is reasonable to assume that the extent of similar potentially suitable breeding habitats within the locality and Shires is low and declining due to agricultural and development pressures. Given the semelparous (male die-off) biology of this species, it is considered more susceptible to local extinction due to stochastic events or threats (DotE 2015). The Project area and the vegetation in the road reserve is likely to support occasional dispersal given the linear nature of

	the road reserve and its partial connectivity to patches of remnant vegetation through a highly cleared landscape. It is likely that clearing in the Project area will reduce the functionality of the road reserve as dispersal habitat and cause increased fragmentation (albeit to a small extent) in the landscape which may reduce the capacity of the population to disperse and further isolate individuals in the population. <u>Outcome</u> The Project is considered likely to lead to a long-term decrease in the size of a local population of Red-tailed Phascogale. It is considered that clearing of up to 19.39 ha of habitat, in particular the potential breeding habitat is likely to result in a shortage of hollows in the local area, thus reducing the availability of breeding habitat in the future. This may in turn lead to a long-term decrease in the size of the local population of Red-tailed Phascogale due to the lack of available breeding resources.
Reduce the area of occupancy of the species	**Unlikely** The Project is unlikely to substantially reduce the area of occupancy of a population of Red-tailed Phascogale within the local area or region. The Project may reduce the overall area of potentially suitable habitat for Red-tailed Phascogale within the Shires as a result of direct loss of habitat from clearing. Clearing for the Project will reduce the area of available habitat for Red-tailed Phascogale in these Shires by less than 0.1%. The removal of this habitat could be considered substantial for a local population of the species, however the removal of up to 19.39 ha of habitat is not considered to be significant for the species, due to the availability of potential habitat in the regional area (i.e. within the Shires) and small extent of removal compared to the extent of available habitat throughout the species range.
Fragment an existing population into two or more populations	**Unlikely** Red-tailed Phascogales can and do occur in isolated patches of remnant vegetation which are not contiguous and restrict recolonisation or movement between populations (DotE 2016c). However, the local population considered for this assessment probably extends over a large area and likely persists as a semi-connected, though highly dispersed, series of smaller localised populations that occasionally disperse though the broader landscape. The population considered here persist in this highly fragmented location and there are likely to be other habitat corridors that occur outside the Project area (e.g. the waterways and tributaries). The Project is unlikely to fragment the population into two or more populations as dispersal though the population may be supported through habitat not impacted by the Project.
Adversely affect habitat critical to the survival of a species	**Unlikely** The Project is unlikely to affect habitat critical to the survival the Red-tailed Phascogale species. Currently there is no recovery plan for this species in Western Australia. The habitat located within the Project area does not consist of habitat described by a recovery plan critical for the survival of the Red-tailed Phascogale, nor is it habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act (DotE 2013, pp10).
Disrupt the breeding cycle of a population	**Likely** Given that the GHD survey recorded a female which appeared to have pouch young it is possible that the Project could disrupt the breeding cycle of a local population of the species within the Pinjarra Williams Road Project area.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Unlikely** The works associated with the Project, may modify and destroy a proportion of foraging habitat and potential breeding habitat for Red-tailed Phascogale, but not to the point that the species would decline. Whilst all known populations are considered essential for the species recovery and long-term survival (Maxwell, Burbidge and Morris 1996), any impacts on a particular population are unlikely to occur to all populations across the species distribution (DotE 2016c). The clearing of 19.39 ha of habitat for the Project consists of less than 0.1% of the overall area of potentially suitable habitat within the Shires. Given the availability of potential foraging and to a lesser extent known and potential breeding habitat in the Shires, the impacts of this clearing are not considered significant to the species. The clearing and operational phases of the Project may also reduce the functionality of the retained habitat alongside the road (albeit to a small extent). Although difficult to estimate, the area of occupancy alongside the new road is likely to reduce, however the affected area is unlikely to be substantial reduced or modified to the extent that the species is likely to decline. Despite these impacts the proposed Project is unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive	**Unlikely**

species that are harmful to an endangered species becoming established in the endangered species' habitat	The Project may potentially exacerbate existing invasive species (such as weeds and introduced predators) that already occur within the Project area. The Project may result in the establishment of an invasive weed species within the Project area. However, these weed species are unlikely to be harmful to the Red-tailed Phascogale. The Project is unlikely to result in an invasive species becoming established in the Project area to the extent that Red-tailed Phascogale are substantially impacted.
Introduce disease that may cause the species to decline	**Unlikely** The Project is unlikely to introduce a disease that may cause this species to decline. There are no known diseases that may be introduced to the area that may cause the Red-tailed Phascogale population to decline, and it is unlikely that any diseases already exist in the Project area that may be spread by the activities of the Project.
Interfere with the recovery of the species.	**Unlikely** The Project is unlikely to interfere substantially with the recovery of Red-tailed Phascogale as it is unlikely to interfere with the recovery actions outlined in the SPRAT profile for this species (DotE 2015).

Legend for Table 9- For the purpose of this assessment:

'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to an endangered species, occurrences include but are not limited to:

- a geographically distinct regional population, or collection of local populations, or
- a population, or collection of local populations, that occurs within a particular bioregion (DotE 2013b)

`**invasive species;** is an introduced species, including an introduced (translocated) native species, which out-competes native species for space and resources or which is a predator of native species. Introducing an invasive species into an area may result in that species becoming established. An invasive species may harm listed threatened species or ecological communities by direct competition, modification of habitat or predation (DotE 2013b).

'Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- for activities such as foraging, breeding, roosting, or dispersal
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- to maintain genetic diversity and long term evolutionary development, or
- for the reintroduction of populations or recovery of the species or ecological community.

Such habitat may be, but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act (DotE 2013b).

3.1 (e) Listed migratory species

Description

The EPBC Act Protected Matters Search Report identified five migratory species as potentially occurring within a 10 km radius of the survey area (see GHD 2016b – Attachment 3). One terrestrial migratory species (Rainbow Bee-eater, *Merops ornatus*) was recorded within the survey area during the GHD field investigation (see GHD 2016b – Attachment 3) and it was determined that there was approximately 15.65 ha of foraging and roosting habitat for the species across the three Project areas. This includes woodlands, shrublands, riparian areas and scattered natives. An additional 69.75 ha of mostly cleared or disturbed area will also provide habitat for the Rainbow Bee-eater but may not be impacted.

This species is widespread throughout Australia and occurs in a wide range of habitat types and is a reasonably common bird in the south-west of Western Australia. This species will utilise a large variety of habitat types and may potentially occur throughout the entire Project area on an opportunistic basis. There are numerous records of the species scattered throughout the Wheatbelt, and it is mostly likely that the species would utilise the Project area for foraging and during dispersal. While Rainbow Bee-eaters will utilise a wide-range of habitats to nest, there was no habitat recorded during the current assessment (GHD 2016b – appendix in Attachment 3) within the Project area suitable for the species to breed.

The remaining migratory species are not considered likely to occur within the Project area due to the lack of suitable habitat.

Nature and extent of likely impact

The Rainbow Bee-eater is known to occur locally and is a common and wide spread species. Impacts are not expected to be significant as there is alternative habitat available in adjacent areas. Therefore the Rainbow Bee-eater is unlikely to rely on the habitats present within the Project area and clearing of habitat for the Project is unlikely to significantly impact on individuals or a population of this species as it is unlikely to:

- Substantially modify, destroy or isolate an area of important habitat
- Result in an invasive species becoming established in an area of important habitat
- Seriously disrupt the lifecycle of an ecologically significant proportion of the population.

3.1 (f) Commonwealth marine area

(If the action is <u>in</u> the Commonwealth marine area, complete 3.2(c) instead. This section is for actions taken outside the Commonwealth marine area that may have impacts on that area.)

Description

The Project area is not located within or in proximity to a Commonwealth marine area.

Nature and extent of likely impact

Not applicable.

3.1 (g) Commonwealth land

(If the action is on Commonwealth land, complete 3.2(d) instead. This section is for actions taken outside Commonwealth land that may have impacts on that land.)

Description

The Project area is not located within or in proximity to Commonwealth land.

Nature and extent of likely impact

Not applicable.

3.1 (h) The Great Barrier Reef Marine Park

Description

The Project area is not located within or near the Great Barrier Reef Marine Park.

Nature and extent of likely impact

Not applicable.

3.1 (i) A water resource, in relation to coal seam gas development and large coal mining development .

Description

The Project area is not a water resource, in relation to coal seam gas development and large coal mining.

Nature and extent of likely impact

Not applicable.

3.2 Nuclear actions, actions taken by the Commonwealth (or Commonwealth agency), actions taken in a Commonwealth marine area, actions taken on Commonwealth land, or actions taken in the Great Barrier Reef Marine Park

3.2 (a)	**Is the proposed action a nuclear action?**	✓	No
		X	Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment

3.2 (b)	**Is the proposed action to be taken by the Commonwealth or a Commonwealth agency?**	✓	No
		X	Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment

3.2 (c)	**Is the proposed action to be taken in a Commonwealth marine area?**	✓	No
		X	Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(f))

3.2 (d)	**Is the proposed action to be taken on Commonwealth land?**	✓	No
		x	Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(g))

3.2 (e)	Is the proposed action to be taken in the Great Barrier Reef Marine Park?	✓	No
		x	Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(h))

3.3 Other important features of the environment

3.3 (a) Flora and fauna

GHD completed a biological survey of three road sections to identify and map key flora, fauna, soil, groundwater and surface water values and potential sensitivity to impact from the proposed works (GHD 2016b, appendix in Attachment 3). The survey areas consisted of:

- Toodyay Goomalling Road (M060) 93.7 ha
- Williams Narrogin Highway (H053) 63.15 ha
- Pinjarra Williams Road (M053) 67.32 ha.

Key results - Pinjarra to Williams - Williams to Narrogin study areas

- One plant of *Pultenaea pauciflora*, listed under the EPBC Act as Vulnerable and under the Wildlife Conservation Act (WC Act) as Threatened, was recorded growing in the Williams to Narrogin survey area in a highly disturbed area consisting of Eucalyptus wandoo open forest vegetation. Approximately 0.11 ha of this habitat occurs within this survey area.
- One plant of DPaW listed *Xanthorrhoea brevistyla* Priority 4 was recorded within the Pinjarra to Williams survey area.
- A flora likelihood of occurrence determined that one species is known to occur within the Pinjarra to Williams survey area (*Xanthorrhoea brevistyla* Priority 4), one species is likely to occur (*Caladenia hopperiana* Threatened) and three species could possibly occur (*Acacia horridula*, Priority 3, *Stylidium rubricalyx* Priority 3 and *Goodenia katabudjar* Priority 3) within this survey area.
- A flora likelihood of occurrence determined that one species is known to occur within the Williams to Narrogin survey area (*Pultenaea pauciflora* Threatened and Vulnerable) and two species could possibly occur (*Stylidium rubricalyx* Priority 3 and *Acacia horridula* Priority 3) within this survey area.
- Three conservation significant fauna species were identified during the field survey within the Pinjarra to Williams Road survey area: Forest Red-tailed Black Cockatoo, Rainbow Bee-eater and Red-tailed Phascogale. Two conservation significant fauna species were identified during the field survey within the Williams to Narrogin Road survey area: Carnaby's Black Cockatoo and Forest Red-tailed Black Cockatoo.
- The likelihood of occurrence assessment concluded that the conservation significant Peregrine Falcon is likely to occur within both survey areas and the Forest Red-tailed Black Cockatoo, Rainbow Bee-eater and Red-tailed Phascogale are likely to occur with the Williams to Narrogin Road survey area.
- The following habitat was recorded for conservation significant fauna species within the Pinjarra to Williams Road survey area:
  - Approximately 15.42 ha of foraging habitat for Carnaby's Black Cockatoo and Forest Red-tailed Black Cockatoo.
  - Potential breeding habitat including 614 trees (>300 mm and >500 mm DBH) for Carnaby's Black Cockatoo and Forest Red-tailed Black Cockatoo.
  - Approximately 19.05 ha of known habitat for the Red-tailed Phascogale.
- The following habitat was recorded for conservation significant fauna species within the Williams to Narrogin Road survey area:
  - Approximately 13.86 ha of foraging habitat for Carnaby's Black Cockatoo and Forest Red-tailed Black Cockatoo.
  - Potential breeding habitat including 800 trees (>300 mm and >500 mm DBH).
  - Approximately 15.06 ha of potential habitat for the Red-tailed Phascogale.
- Seven fauna habitat types were recorded in the survey areas during the field survey, which broadly aligned with the vegetation associations. These habitats are: Wandoo woodland, Wandoo/Allocasuarina Shrubland, mixed Eucalyptus woodland, low shrubland, rivers, creeks and drainage lines, planted shrub species within road verge, cleared or disturbed area.

- The Wandoo woodland and Allocasuarina/Wandoo woodland with mixed Eucalypt habitat is the dominant habitat type within the survey area and is the primary habitat area for the identified conservation significant species. Cleared or disturbed areas were recorded throughout the survey area. Each habitat type varied with minor variations in structure (e.g. number of large mature trees and density of shrubs) resulting from the level of historical disturbance (e.g. clearing for clearing of roads, infrastructure and paddocks and grazing).

Key results -Toodyay to Goomalling survey area

-
- No EPBC Act or Threatened (Declared Rare) flora listed by DPaW or DPaW Priority-listed flora was recorded from the survey area during the field survey.
- A flora likelihood of occurrence determined that 15 conservation significant species could possibly occur within the survey area, including three Endangered species, 1 Priority 2 Priority 2, 5 Priority 3 and 4 Priority 4 species.
- One conservation significant fauna species was identified during the field survey within the survey area: Rainbow Bee Eater.
- The likelihood of occurrence assessment concluded that the three conservation significant fauna species are likely to occur in the survey area: Carnaby's Black Cockatoo, Red-tailed Phascogale and Peregrine Falcon.
- The following habitat was recorded for conservation significant fauna species within the Toodyay to Goomalling Road survey area:
  - Approximately 19.71 ha of foraging habitat for Carnaby's Black Cockatoo.
  - Potential breeding habitat including 528 trees (>300 mm and >500 mm DBH).
  - Approximately 21.41 ha of potential habitat for the Red-tailed Phascogale habitat.
- Seven fauna habitat types were recorded in the survey area, which broadly align with the vegetation associations. These habitats are: Wandoo woodland, Wandoo/Allocasuarina shrubland, mixed Eucalyptus woodland, low shrubland, rivers, creeks and drainage lines, planted shrub species within road verge, cleared or disturbed area.
- The Wandoo woodland with mixed Eucalypt habitat is the dominant habitat type within the survey area and is the primary habitat area for the identified conservation significant species. Cleared or disturbed areas were recorded throughout the survey area. Each habitat type varied with minor variations in structure (e.g. number of large mature trees and density of shrubs) resulting from the level of historical disturbance (e.g. clearing for clearing of roads, infrastructure and paddocks and grazing).
- The habitats within the survey area have been fragmented by clearing for agriculture and transport infrastructure (e.g. highways, minor roads and dirt tracks). The habitat has been largely isolated and is surrounded by agriculture, providing little connectivity to bushland blocks. However the vegetation is significant to the species utilising the site and to habitat remaining within the Wheatbelt, particularly birds, small mammals and reptiles as little other habitat is connected to the survey area. Additionally any habitat within the Wheatbelt with good diversity is significant due to the limited amount of remnant vegetation remaining in the Wheatbelt.

3.3 (b) Hydrology, including water flows

Key results - Pinjarra to Williams - Williams to Narrogin survey areas

- Surface water areas proclaimed under the Rights in Water and Irrigation Act 1914 (RIWI Act) occur within both study areas.
- One small wetland occurs approximately 7 km south west of the western end of the Pinjarra to Williams survey area.
- One major watercourse, the Williams River, is present within the Williams to Pinjarra study area. Eight minor non-perennial watercourses occur within this study area and include Marling Gully.
- There are no major watercourses occur within the Williams to Narrogin study area. Nine minor non-perennial watercourses occur within this study area and include Fitts Creek, Williams River and Macdermott Brook.

Key results -Toodyay to Goomalling survey area

- Surface water areas proclaimed under the RIWI Act occur within the study area.

- One major drainage system is present within the survey area – the Avon River at the western end and the Mortlock River system, which feeds into the Avon. A number of named, ephemeral watercourses cross the survey area.

3.3 (c) Soil and Vegetation characteristics

- The survey areas are primarily located within the Avon Province of the southwest of Western Australia, which mostly overlies the South West Terrane of the Yilgarn Craton. This is composed of Archaean granitic rocks, predominantly monzogranite with significant area of gneiss, granulite and migmatite. These rocks contain numerous faults, shear zones and dolerite dykes. The Archaean granitiod rocks of the Youanmi Terrane are in the north-east (Murchison Domain) and south-east (Southern Cross Domain). Within the Avon Province, greenstones form only a minor component of this terrane. The Archaean basement has been subject to deep weathering (to 50 m depth) and laterite formation. There are also extensive Tertiary and Quaternary alluvial deposits (Tille 2006).
- According to the Australian Soil Resource Information System database (Australian Land Collaborative Evaluation Program (ALCEP) 2014), the Pinjarra to Williams survey area occurs in an area:
    - Of valley plains in which some salinity is usually present. Chief soils are hard neutral and also alkaline, yellow mottled soils. Associated are small areas of many other soils including minor areas of sands.
    - Generally rolling to hilly country with tors, lateritic mesas and buttes on some interfluve areas. Chief soils are hard neutral and acidic yellow mottled soils, sometimes containing ironstone gravels. Associated are variable areas of hard acidic and neutral red soils on slopes; soils containing moderate to large amounts of ironstone gravels on ridges, crests of hills, and upper slopes; and many small areas of other soils.
    - Rolling to hilly with some steep slopes; gneissic rock outcrops common; some lateritic mesas and buttes on drainage divides. Chief soils are hard neutral red soils and acidic red soils and possibly similar related soils. Associated are soils containing ironstone gravels; and smaller areas of other soils including those of the lateritic mesas and buttes.
    - According to the Australian Soil Resource Information System database (ALCEP 2014), the Williams to Narrogin survey area occurs in an area:
    - Rolling to hilly with some steep slopes; gneissic rock outcrops common; some lateritic mesas and buttes on drainage divides. Chief soils are hard neutral red soils and acidic red soils and possibly similar related soils. Associated are soils containing ironstone gravels; and smaller areas of other soils including those of the lateritic mesas and buttes.
    - Generally rolling to hilly country with tors, lateritic mesas and buttes on some interfluve areas. Chief soils are hard neutral and acidic yellow mottled soils, sometimes containing ironstone gravels. Associated are variable areas of hard acidic and neutral red soils on slopes; soils containing moderate to large amounts of ironstone gravels on ridges, crests of hills, and upper slopes; and many small areas of other soils.

3.3 (d) Outstanding natural features

No outstanding natural features were identified.

3.3 (e) Remnant native vegetation

Key results - Pinjarra to Williams - Williams to Narrogin survey areas

- An assessment of vegetation extents remaining indicates that the vegetation within the survey area is not well represented in the locality and region. These vegetation associations are considered significant vegetation, as defined by the EPA (2004a) and include:
    - Pre-European vegetation association 7: Medium woodland; York gum (*Eucalyptus loxophleba*) & wandoo, is below the 30% threshold at all levels (Pinjarra to Williams study area and Williams to Narrogin study area).
    - Pre-European vegetation association 4: Medium woodland; marri & wandoo, which is mapped within the Pinjarra to Williams study area, is below the 30% threshold at the State, Interim Biogeographic Region of Western Australia (IBRA) region and Local Government Area (LGA) levels (Pinjarra to Williams study area).

    - Pre-European vegetation association 1023: Medium woodland; York gum, wandoo and salmon gum (*Eucalyptus salmonophloia*), is below the 30% threshold at all levels, except within the town of Narrogin (Williams to Narrogin study area).
    - Pre-European vegetation association 947, within the Williams to Narrogin study area, is present at greater than 30% of their pre-European extent remaining at all levels and is considered 'Least Concern'.
- The Pinjarra to Williams survey area is comprised of both native vegetation and area already cleared for the existing Pinjarra Williams Road, local roads and paddocks. The soil type is generally brown sandy loams, with a small area of brown loam associated with the Williams River. The native vegetation within the survey area consists of eight vegetation associations as well as highly disturbed/cleared area and planted trees. The predominant vegetation association is *Eucalyptus rudis* open forest.
- The Williams to Narrogin survey area is comprised of both native vegetation and areas already cleared for the existing Williams Kondinin Road, local roads and paddocks. The soil type is brown sandy loam, with a small area of brown clayey loam associated with the river. The native vegetation within the survey area consists of ten vegetation associations as well as highly disturbed/cleared area and planted trees. The predominant vegetation association is revegetated areas (which includes some remnant isolated native trees such as *Eucalyptus loxophleba* and *E. wandoo*).
- The vegetation condition within both survey areas was rated as between condition 2 and 7. The majority of vegetation throughout the Williams to Narrogin survey area was rated as condition 7 and as condition 6 for the Pinjarra to Williams survey area. Within both surveys area the vegetation structure showed signs of impact from various current and historical disturbances such as clearing for the road and farming.
- Riparian vegetation associated with watercourses was recorded within both survey areas and include:
- *Eucalyptus rudis* open forest (4.34 ha) – Pinjarra to Williams survey area
- *Eucalyptus rudis* woodland (0.44 ha) – Williams to Narrogin survey area
- Approximately 2.14 ha of the EPBC Act listed, Critically Endangered Threatened Ecological Communities (TECs), Eucalypt Woodlands of the Western Australian Wheatbelt was recorded within the Williams to Narrogin survey area and 8.85 ha of the TEC was recorded within the Pinjarra to Williams survey area. No State-listed TEC or PEC was recorded during the field survey of the survey areas.

Key results -Toodyay to Goomalling survey area

- An assessment of vegetation extents remaining indicates that the vegetation within the survey area is not well represented in the locality and region. These vegetation associations are considered significant vegetation, as defined by the EPA (2004a) and include:
- Pre-European vegetation association 1049: Medium woodland; wandoo, York gum, salmon gum, morrel & gimlet, is below the 30 % threshold at the LGA level and below the 10% threshold at the IBRA Bioregion, and sub-region levels and is considered 'Endangered' at those levels.
- Pre-European vegetation association 352: Medium woodland; York Gum, is below the 30 % threshold at the State, IBRA Bioregion and sub-region levels and below the 10% threshold at the LGA level and is considered 'Endangered' at that level.
- Pre-European vegetation association 946: Medium woodland; Wandoo, is below the 30 % threshold at all levels.
- Pre-European vegetation association 988: Wand Succulent steppe with thicket; Melaleuca thyoides over samphire, is below the 30 % threshold at the IBRA Bioregion level.
- Pre-European vegetation associations 1049, 988 and 128 are present at greater than 30 %of their pre-European extent remaining at the State level and are above the threshold level and considered 'Least Concern'.
- No Commonwealth or State listed TECs or PECs have been previously recorded within the survey area. However, six occurrences of community 74, Eucalypt woodlands of the Western Australian Wheatbelt, have been recorded within 10 km of the survey area, with the nearest being approximately 2 km to the north of the eastern end. This community is a Priority 3 State listed community and a Critically Endangered community under the EPBC Act.
- Approximately 8.49 ha of the EPBC Act listed, Critically Endangered TEC, Eucalypt Woodlands of the Western Australian Wheatbelt was recorded from the survey area. This TEC predominantly aligns with the DPaW listed, Priority 3 PEC Eucalypt woodlands of the Western Australian Wheatbelt, of which 6.98 ha was recorded from within the survey area. This PEC differs from the TEC in that it does not include *Eucalyptus wandoo* and is not defined by patch or strip width, and all relevant vegetation types cleared are therefore considered to be PEC. None of this PEC was recorded in the Pinjarra to Williams Project area.
- The study area is comprised of both native vegetation and areas already cleared for the existing Toodyay to Goomalling road, local road and farm road junctions. The vegetation is primarily *Eucalyptus loxophleba* woodland and the majority of the understorey in these woodlands consists of scattered shrubs or patches

of shrubs with a moderately dense grassy groundcover layer, often with introduced grasses. Areas of *Casuarina obesa* forest occur in low lying, saline or brackish river flats, with tall shrublands of *Acacia acuminata* or *Acacia microbotrya and/or Allocasuarina huegeliana* on slopes and granite outcrops.
- The vegetation condition of the survey area ranged from 2 to 7. The majority of the survey area comprised of native vegetation in condition 6. Most degraded areas have been affected by previous roadside clearing, followed by weed infestation over many years.
- Riparian vegetation associated with watercourses was recorded within the survey area and includes *Eucalyptus rudis* woodland and Casuarina obesa forest.
-

3.3 (f) Gradient (or depth range if action is to be taken in a marine area)

Not applicable

3.3 (g) Current state of the environment

Pinjarra to Williams - Williams to Narrogin survey areas

- The Pinjarra to Williams survey area is comprised of both native vegetation and area already cleared for the existing Pinjarra Williams Road, local roads andfarm road junctions. The soil type is generally brown sandy loams, with a small area of brown loam associated with the Williams River. The native vegetation within the survey area consists of eight vegetation associations as well as highly disturbed/cleared area and planted trees. The predominant vegetation association is *Eucalyptus rudis* open forest.
- The Williams to Narrogin survey area is comprised of both native vegetation and areas already cleared for the existing Williams Kondinin Road, local roads and paddocks. The soil type is brown sandy loam, with a small area of brown clayey loam associated with the river. The native vegetation within the survey area consists of ten vegetation associations as well as highly disturbed/cleared area and planted trees. The predominant vegetation association is Revegetated areas (which includes some remnant isolated native trees such as *Eucalyptus loxophleba* and *E. wandoo*).
- The vegetation is consistent with vegetation associations identified in the vegetation mapping for the area (Beard 1979 and 1980).

Key results -Toodyay to Goomalling survey area

- The survey area is comprised of both native vegetation and areas already cleared for the existing Toodyay to Goomalling road, local road and farm junctions and other totally degraded areas. The vegetation is primarily Eucalyptus woodland, including dominants of *Eucalyptus loxophleba, Eucalyptus wandoo* and *Eucalyptus rudis* with scattered patches of *Eucalyptus salmonophloia* in the eastern half of the survey area. The majority of the understorey in these woodlands consists of scattered shrubs or patches of shrubs with a moderately dense grassy groundcover layer, often with introduced grasses. Areas of *Casuarina obesa* forest occur in low lying, saline or brackish river flats, with tall shrublands of *Acacia acuminata* or *Acacia microbotrya*.
- The vegetation is consistent with vegetation associations identified in the vegetation mapping for the area (Beard 1980).

3.3 (h) Commonwealth Heritage Places or other places recognised as having heritage values

No Commonwealth heritage-listed places or National Heritage Places were identified within 10 km of the Project area.

3.3 (i) Indigenous heritage values

The Project has the potential for minor impacts on Registered sites of Aboriginal heritage significance. A Regulation 10 approval, which allows minor ground disturbance within Registered sites, has been sought from the Department of Aboriginal Affairs (DAA).

A summary of the potential impacts is provided below:

Pinjarra to Williams Road

- Axle Grease Reserve No. 500 (artefacts/scatter, mythological, skeletal material/burial, camp, ochre) - Two trees are proposed for clearing on the northern boundary of the Aboriginal site, within the northern side of the road reserve.

Williams to Narrogin Highway

- Geeralying No. 15139 (Modified tree; camp) - This site has a 1 km wide buffer, with only the south-eastern corner intersecting the Project area. One tree is proposed to be cleared in this area and may not impact the features of the site as it is on the boundary or the site and unlikely to be the tree that has been modified. The DAA Regulation 10 approval will confirm this assumption.
- Geeralying No. 5888 (Skeletal material/burial; artefacts/scatter) - No trees are proposed to be cleared within this site.
- Manaring Road No. 5826 (Modified tree) - Two or three trees are proposed to be cleared within the buffer of the site. The trees to be removed are on the boundary of the site and unlikely to be the tree that has been modified. The DAA Regulation 10 approval will confirm this assumption.

Toodyay to Goomalling Road

- Bolgart: Boolegin. No. 4045 (Mythological) - includes the Avon River through Toodyay, but does not include tributaries.

No impacts will occur as the road is on a major bridge over this site and no trees will be cleared.

3.3 (j) Other important or unique values of the environment

The Project will not impact any nearby DPaW managed reserves.

3.3 (k) Tenure of the action area (eg freehold, leasehold)

The Project area is currently road reserve. There will be no changes to tenure. The road reserve is a designated State road reserve and is therefore managed by Main Roads and under the control of the Commissioner for Main Roads.

3.3 (l) Existing land/marine uses of area

The Project area is located within the road reserve. The majority of the land use surrounding the Project area consists of private land primarily used for cropping and grazing. Some sections of the Project area are within the road reserve within the townsites of Narrogin, Williams, Toodyay and Goomalling and are therefore adjacent to small rural holdings and residential areas. A small portion of the surrounding land includes State and local government reserves.

Key results - Pinjarra to Williams - Williams to Narrogin survey areas

- No conservation estates managed by the Department of Parks and Wildlife (DPaW) or Environmentally Sensitive Areas (ESAs) were identified within the Williams to Pinjarra study area. The Williams Nature Reserve is situated approximately 1 kilometre (km) north of the Williams to Pinjarra survey area and Lavender Nature Reserve 2 km to the south of the survey area.
- The Williams to Narrogin study area has one DPaW managed estate adjacent to the survey area. This is a category 5(1)(g) reserve and holds the DPaW offices, nurseries and infrastructure. The majority of the site is native vegetation and comprises approximately 20 ha. The buffer of one ESA just ajoins the survey area and is in place for a population of Threatened flora - *Pultenaea pauciflora*. The population is within a small reserve (Reserve 31110) which is positioned between the road reserve and the golf course.

Key results -Toodyay to Goomalling survey area

- No conservation estate managed by DPaW or ESAs was identified within or adjacent to the Toodyay to Goomalling survey area. The Wongamine Nature Reserve is located approximately 1.1 km north of the survey area. Three ESAs are within 10 km of the survey area (the nearest at 1.9 km to the east).

3.3 (m) Any proposed land/marine uses of area

Not applicable

4 Environmental outcomes

Based on Environmental Impact Assessment (GHD 2016a – Attachment 3) the Project will achieve the following environmental outcomes:

- Clearing of no more than 0.32 ha of the Critically Endangered Ecological Community, Eucalypt Woodlands of the Western Australian Wheatbelt within the Project area
- Removal of one plant of *Pultenaea pauciflora* from within the Williams to Narrogin Project area
- Clearing of no more than 19.39 ha of Black Cockatoo habitat
- Removal of no more than 181 potential habitat trees, including up to two trees containing suitable hollows for breeding
- Clearing of no more than 19.39 ha of Red-tailed Phascogale habitat
- No clearing outside the Project area and minimal indirect impacts outside the Project area.

5 Measures to avoid or reduce impacts

The aim of these species-specific avoidance and management measures area is to minimise the environmental impacts associated with the proposed works to the Red-tailed Phascogale and Black Cockatoo as well as to identify areas of responsibilities required for the implementation of management measures.

5.1 Avoidance measures

Refinement of disturbance footprint

Main Roads has modified the original extent of clearing to avoid and minimise clearing impacts as far as practicable, while still achieving the road safety objectives. Main Roads will continue to explore opportunities to further reduce the Project area by positioning the disturbance footprint directly adjacent to the road within the more degraded areas where possible when clearing vegetation and only removing trees when completely necessary for safety reasons.

Delineation of disturbance footprint

One of the key strategies to avoid impacts to native vegetation, fauna and habitat during the clearing 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 after clearing. These measures have been outlined in Table 10 below.

Early education

An environmental pre-start meeting for staff and contractors will be undertaken for the project which will include a presentation for minimising indirect and direct impacts to Black Cockatoo and Phascogale animals and habitat.

Timing of clearing

As far as practical clearing and disturbance of Black Cockatoo and Red-tailed Phascogale habitat will be timed to prevent coinciding with the breeding season (July – January[3]). Where this is not possible additional mitigation measures will be implemented.

5.2 Mitigation measures

The mitigation measures proposed in Table 10 have been designed to assist all parties involved in the Project to manage the identified potential impacts that may result from the Project actions, particularly during the

[3] For Carnaby's Cockatoo July is the beginning of the move back out to the Wheatbelt in search of suitable nesting hollows. The nesting season lasts from late winter through spring and into early summer - http://www.environment.gov.au/biodiversity/threatened/publications/carnabys-black-cockatoo-calyptorhynchus-latirostris
For Red-tailed Phascogale – the mating period ends during winter with young generally born during August with young remaining dependent through to the end of summer when young are weaned and start to disperse http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=316#life_cycle

clearing phase of the Project. The mitigation measures will be included in the project EMP, which will be complied with by all staff and contractors.

Objectives and performance

The two key objectives of the avoidance and mitigation management measures are to:

1. Avoid, then minimise the clearing of Carnaby's Black Cockatoo and Red-tailed Phascogale habitats
2. Avoid direct impacts (e.g. injury or death) to individual Carnaby's Black Cockatoos and Red-tailed Phascogale during the clearing process

In order to gauge the success of these key objectives, relevant management targets and key performance indicators have been identified (Table 10).

Table 10. Objectives & Key Performance Indicators for avoidance and mitigation measures

Objective	Target	Key Performance Indicator
Avoid, then minimise the clearing of habitat	No clearing or disturbance to habitat during clearing phase outside of the disturbance footprint, as delineated in the field and outlined in plans.	• Presence of delineating fencing or tape and signage around areas of retained habitat outside the approved clearing area. • 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 after clearing. • Number of reported incidents of delineating fencing or tape missing or not installed around fauna habitat outside the approved clearing area. • Number of reported incidents of clearing or disturbance exceeding area marked in field and design plans. • Clearing area inspections and reports to assess clearing operations.
	No damage has occurred to habitat outside of approved clearing areas during clearing.	Number of reported incidents (including the area of) habitat or feeding area damaged, or number of potential nesting trees lost or damaged during clearing.
Avoid direct impacts (e.g. injury or death) to individual Carnaby's Black Cockatoo and Red-tailed Phascogale during the clearing process	Area in which Phascogale was recorded searched for evidence of use shortly prior to clearing.	No impact to Phascogales.
	No trees outside the approved disturbance footprint to be disturbed.	Number of reported incidents of disturbance to trees outside the approved area.
	No individuals injured or killed during clearing.	Fauna encounter records – number of injured or killed as a result of clearing activities.

Implementation

The avoidance and mitigation measures listed in Table 11 will be implemented by Main Roads and /or the clearing contractor(s) during the design, clearing and post clearing phases of the Project. Areas of responsibility are likely to include the following organisations and/or personnel:

- Main Roads Project management team - will provide the necessary information needed regarding the implementation of the mitigation measures.
- Clearing contractor(s) and their staff –will provide the necessary information needed regarding the timing of the project and/or implementation of the mitigation measures.
- Environmental Officer- the Wheatbelt Environment Officer will ensure all record keeping is maintained and provided to Main Roads and the relevant authorities where appropriate
- Ecologist – suitably qualified ecologist with experience undertaking pre-clearing fauna surveys, fauna relocation, and handling of Red-tailed Phascogale. The ecologist would hold all appropriate licences with Department of Parks and Wildlife (DPaW) (Ethics approval, regulation 15 and/or regulation 17) and be able to operate safely with the clearing team. The ecologist would be the only person responsible for the handling of any fauna.

Table 11 identifies the person/s responsible for implementing the avoidance and mitigation measures during the various phases of the Project. The responsibility of particular measures can be delegated, though overall responsibility will remain with the listed person. The proposed measures assume two scenarios:

- Scenario 1 - Clearing to be undertaken during the breeding season (non-preferred)
- Scenario 2 - Clearing to be undertaken outside the breeding season (preferred)

If clearing or disturbance of Red-tailed Phascogale habitat is required during the breeding season (July – January) the following mitigation will be applied:

- Survey of the habitat area on Pinjarra Williams Road by a qualified ecologist
- Relocation of any Phascogales found to adjacent vegetation outside the clearing area.
- Each section of the project will be surveyed by a qualified ecologist prior to clearing to identify if any Black Cockatoo or Red-tailed Phascogale are breeding within the area proposed to be cleared
- A relocation protocol will be established including relocation procedures for when eggs are found and / or young and adults are found
- Any trees where breeding Black Cockatoos are identified will be left until the chick has vacated the nest, where possible

The clearing phase measures listed in Table 11 are relevant regardless of the assumed scenario, however, relocation protocols will only be applied if species are found.

Reporting, review and updates

Reporting of incidents which are considered non-compliant or for monitoring purposes will be completed pursuant to the CEMP or equivalent environmental management plan developed by Main Roads and/or the Clearing Contractor. Any relevant changes or updates to knowledge, standards, policies and procedures will be incorporated wherever possible prior to the commencement of clearing.

Table 11. Avoidance and mitigation measures

Project phase	Objective	Avoidance and mitigation measure	Timing	Responsibility
Scenario 1 - Clearing to be undertaken during the breeding season				
Pre-clearing	Avoid direct impacts to individuals during the clearing process	Survey of the habitat area on Pinjarra Williams Road by a qualified ecologist to relocate any phascogale in the clearing area.	Surveys to be undertaken one week prior to commencement of clearing.	Ecologist and Environmental Officer
		Check two trees with hollows suitable for Black Cockatoos prior to clearing	Prior to commencement of clearing	Roadside Management Officer or Environment Officer
Scenario 2 - Clearing to be undertaken outside the breeding season				
Clearing	Avoid, then minimise	Clearly delineate the extent of	Prior to clearing	Main Roads Site

	the clearing of habitat	the disturbance footprint (clearing footprint) with coloured pegs. Prior to clearing/ clearing 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.		Supervisor Clearing Contractor Environmental Officer
		All project clearing 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.	Prior to clearing and during clearing (at first toolbox meeting of each week)	Main Roads Site Supervisor Clearing Contractor Environmental Officer or Roadside Management Officer
		Regular review of the disturbance footprint boundary to ensure 'No Go Areas' are clearly delineated	During clearing – checked each day prior to commencement of clearing	Main Roads Site Supervisor Clearing Contractor
		Restrict clearing personnel to the disturbance footprint including designated access routes and parking areas.	Entire clearing phase	Main Roads and/or Clearing Contractor
		Fauna encountered during the clearing process shall be given the chance to move on if there is no threat to the person's safety in doing so.	Entire clearing phase	Main Roads and/or Clearing Contractor Site Environmental Officer

Assessment of residual impacts

Residual impacts are those unavoidable impacts that remain after avoidance and mitigation measures have been implemented. The avoidance and mitigation measures outlined in Section 5 aim to minimise the potential impacts to the Black Cockatoo and Red-tailed Phascogale as a result of the Project, however, it is unlikely that the level of impact will be reduced so as to avoid a significant impact due to the loss of habitat. Therefore it is still considered likely that the loss of the potential breeding trees for the Project with respect to similar potentially suitable breeding habitat in the local area is significant.

The clearing of habitat for the Red-tailed Phascogale and Black Cockatoo, in particular the potential breeding habitat is likely to reduce the availability of breeding habitat in the future. This may in turn lead to a long-term decrease in the size of the local populations of Carnaby's Black Cockatoos and Red-tailed Phascogale due to the lack of available breeding resources; therefore the Project is likely to have significant residual impacts to the Carnaby's Black Cockatoos and Red-tailed Phascogale.

6 Conclusion on the likelihood of significant impacts

6.1 Do you THINK your proposed action is a controlled action?

	No, complete section 6.2
✓	Yes, complete section 6.3

6.2 Proposed action IS NOT a controlled action.

N/A

6.3 Proposed action IS a controlled action

	Matters likely to be impacted
	World Heritage values (sections 12 and 15A)
	National Heritage places (sections 15B and 15C)
	Wetlands of international importance (sections 16 and 17B)
✓	Listed threatened species and communities (sections 18 and 18A)
	Listed migratory species (sections 20 and 20A)
	Protection of the environment from nuclear actions (sections 21 and 22A)
	Commonwealth marine environment (sections 23 and 24A)
	Great Barrier Reef Marine Park (sections 24B and 24C)
	A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
	Protection of the environment from actions involving Commonwealth land (sections 26 and 27A)
	Protection of the environment from Commonwealth actions (section 28)
	Commonwealth Heritage places overseas (sections 27B and 27C)

The Project may be a controlled action due to the clearing of vegetation and fauna habitat suitable for foraging and breeding for the Red-Tailed Phascogale and Carnaby's Black Cockatoo.

7 Environmental record of the responsible party

		Yes	No
7.1	**Does the party taking the action have a satisfactory record of responsible environmental management?** **Provide details** Main Roads are a State agency and have a sound record of responsible environmental management and environmental management systems. Main Roads seeks to achieve balanced and sustainable outcomes for the community with responsible environmental stewardship in developing and maintaining the road network critical to its success. Main Roads is committed to: • Protecting and enhancing the environmental values of road reserves • Minimising the impact on the natural environment of roads and road use • Conserving natural resources and minimising energy consumption and waste. A corporate Environmental Management System facilitates management of environmental risks and performance improvement. The independently certified and audited system is integrated into all key processes including planning, delivery, maintenance, network operations and supporting services. Main Roads holds Certificate No. EMS 530437 and operates an Environmental Management System which complies with the requirements of ISO 14001:2004 for the following scope: Main Roads Total Management System comprising Planning, Delivery, Maintenance, Network Operations and Supporting Services. Officially registered since 14 July 2005 under Certificate 149459.	✓	
7.2	**Has either (a) the party proposing to take the action, or (b) if a permit has been applied for in relation to the action, the person making the application - ever been subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources?** **If yes, provide details**		✓
7.3	**If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework?**	✓	

	If yes, provide details of environmental policy and planning framework Although not a corporation Main Roads operates under an Environment Policy and Sustainability Policy, as well as an Environmental Assessment and Approvals Guideline. Main Roads also has an ISO 14001 accredited Environmental Management System. Main Roads Environmental Policy Statement (2004): Main Roads manages the State's road network to provide safe and efficient road access that will enhance community lifestyles and support economic prosperity. Main Roads seeks to achieve balanced and sustainable outcomes for the community. Responsible environmental stewardship in developing and maintaining the road network is critical to the success of Main Roads. <u>Principles</u> Main Roads is committed to: • Protecting and enhancing the environmental values of road reserves • Minimising the impact on the natural environment of roads and road use • Conserving natural resources and minimising energy consumption and waste <u>Objectives</u> In applying these principles, Main Roads aims to: • Fully satisfy all environmental legislation, Government Policy and, where specific legislation is lacking, uphold the spirit of the law • Implement, maintain and continually improve an effective environmental management system across Main Roads planning, business, project and management processes • Apply an approach of "avoid, minimise and mitigate", in order of preference, to the management of environmental impacts associated with road construction projects • Develop awareness of environmental management processes, standards and responsibilities among Main Roads' employees and contractor partners • Listen and be responsive to community and stakeholder views on environmental issues Set specific environmental objectives and targets relating to the key environmental aspects of Main Roads' activities, and measure and report progress in achieving these targets		
7.4	**Has the party taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?**	✓	

Provide name of proposal and EPBC reference number (if known)

The table below provides a list of recent referrals to the Department of the Environment:

Reference Number	Title of referral	Date received
2014/7257	York Merredin Road Widening SLK 51-66 and Dangin Mears Intersection Upgrade	19 June 2014
2014/7171	Main Roads Western Australia/Transport - land/555.85 - 560.4 SLK Great Eastern Highway/WA/Focus, Greenfields and Carins Intersection Upgrade	2 April 2014
2014/7149	Main Roads Western Australia/Transport - land/ between Maida Vale Rd & Buttercup Cres, High Wycombe/WA/Roe Highway Noise Wall	5 March 2014
2014/7141	Main Roads Western Australia/Transport - land/Reserve 30 088, Karridale/WA/Vlam Road Gravel Pit, Vlam Road, Karridale, WA	27 February 2014
2014/7129	Main Roads Western Australia/Transport - land/Great Northern Hway (GNH) 200km north of Perth/WA/to upgrade & realign a section of GNH between Batty Bog Rd & Walebing	10 February 2014
2013/7094	Main Roads Western Australia/Transport - land/Albany Highway, 30 km north of Albany, WA/WA/Construct passing lanes on Albany Hwy between Settlement Rd & Jackson Rd 30km N of Albany	19 December 2013
2013/7091	Main Roads Western Australia/Transport - land/Mitchell Freeway -Burns Beach Rd to Hester Av Neerabup/WA/Mitchell Freeway Extension between Burns Beach Rd and Hester Av, Neerabup	13 December 2013
2013/7082	Main Roads Western Australia/Transport - land/Ravensthorpe/WA/Ravensthorpe Heavy Haulage Route Project, WA	6 December 2013
2013/7073	Main Roads Western Australia/Transport - land/City of Stirling/WA/Reid Highway duplication project (Erindale Rd-Duffy Rd) WA	29 November 2013
2013/7062	Main Roads Western Australia/Transport - land/City of Cockburn/WA/Kwinana Freeway southbound widening Roe Hwy to Armadale Rd and construction of Farrington Rd off-ramp	22 November 2013
2013/7042	Main Roads Western Australia/Transport - land/Between Tonkin Highway & Reid Highway junction to Muchea/WA/Perth-Darwin National Highway alignment (Swan Valley Section)	31 October 2013

8 Information sources and attachments

(For the information provided above)

8.1 References

Beecham, B 2002, A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions in 2002. "Avon Wheatbelt 2 (AW2 - Re-juvenated Drainage subregion)", The Department of Conservation and Land Management, November 2001.

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Cockerill, A., Lambert, T, Conole, L. and Pickett, E. 2013. Carnaby's Cockatoo Population Viability Analysis Model Report. Report funded by the Department of Sustainability, Environment, Water, Population, and Communities through the Sustainable Regional Development Program. Parsons Brinckerhoff, Perth.

Department of Environment and Conservation (Western Australia) (DEC) 2007. Records held in DEC's Threatened Fauna Database and rare fauna files. Perth: Department of Environment and Conservation.

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Department of Parks and Wildlife 2008. Forest Black Cockatoo (Baudin's Cockatoo Calyptorhynchus baudinii and Forest Red-tailed Black Cockatoo Calyptorhynchus banksii naso) Recovery Plan. Department of Parks and Wildlife, Perth, Western Australia.

Department of the Environment (DotE) 2013. Matters of National Environmental Significance 'Significant Impact Guidelines 1.1' Commonwealth of Australia

Department of the Environment (DotE) 2016a Protected Matters Search Tool - accessed March 2016 at http://www.environment.gov.au/epbc/pmst/

Department of the Environment (DotE) 2016b 2016 Species profile and threats data base; Carnaby's Black Cockatoo – Threatened species fact sheet - accessed March 2016 at http://www.environment.gov.au/biodiversity/threatened/publications/carnabys-black-cockatoo-calyptorhynchus-latirostris

Department of the Environment (DotE) 2016c 2016 Species profile and threats data base; Phascogale calura — Red-tailed Phascogale accessed March 2016 at http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=316

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 2012, *Environmental Protection and Biodiversity Conservation Act 1999* referral guidelines for three threatened black cockatoo species, Canberra, DSEWPaC.

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Gibson, N Keighery, GJ, Lyons, MN and Webb, A 2004, Terrestrial flora and vegetation of the Western Australian wheatbelt, Records of the Western Australian Museum Supplement No. 67: 139-189.

Johnstone, R.E. and Storr, G.M. 1998. Handbook of Western Australian Birds, Volume I, Non-passerines (Emu to Dollarbird). Western Australian Museum, Perth.

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Saunders DA 1989, Changes in the avifauna of a region, district and remnant as a result of fragmentation of native vegetation: the wheatbelt of Western Australia, A case study, Biological Conservation 50, 99-135.

Saunders, D.A. 1990. Problems of survival in an extensively cultivated landscape: the case of Carnaby's cockatoo *Calyptorhynchus funereus latirostris*. Biological Conservation. 54: 277-290.

Saunders DA, Smith GT, Ingram JA and Forrester RI 2003, '*Changes in a remnant of salmon gum Eucalyptus salmonophloia and York gum E. loxophleba woodland, 1978 to 1997, Implications for woodland conservation in the wheat-sheep regions of Australia*', Biological Conservation 110: 245-256.

Threatened Species Scientific Committee (TSSC), 2015 Approved Conservation Advice (including listing advice) for the Eucalypt Woodlands of the Western Australian Wheatbelt, retrieved January 2016, from http://www.environment.gov.au/biodiversity/threatened/communities/pubs/128-conservation-advice.pdf

8.2 Reliability and date of information

A flora field survey was undertaken by a qualified and experienced botanist and the fauna survey was undertaken by qualified and experienced ecologists at the survey area, including the Project area.

The flora survey involved an assessment of the vegetation types and condition of the vegetation, noting or collecting all flora species visible at the time of survey. The survey methodology GHD (2016b, Attachment 3) employed was consistent with the EPA guidelines for flora surveys as outlined in Guidance Statement No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia and Terrestrial Biological Surveys as an Element of Biodiversity Protection, Position Statement No. 3.

The GHD fauna assessment (GHD 2016b) was consistent with the EPA Guidance Note for the Assessment of Environmental Factors for Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia (Guidance Statement No. 56).

8.3 Attachments

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the project locality (section 1)	✓	Attachment 1 – Project area location
	GIS file delineating the boundary of the referral area (section 1)		Attachment 2 – GIS co-ordinates
	figures, maps or aerial photographs showing the location of the project in respect to any matters of national environmental significance or important features of the environments (section 3)	x	
If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.5)	x	
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 2.6)	✓	Attachment 3– GHD 2016a - Environmental Impact Assessment Attachment 4 – PMST March 2016
	copies of any flora and fauna investigations and surveys (section 3)	✓	Attachment 3 – GHD 2016A - Biological assessment (within EIA report) Attachment 4 – PMST March 2016
	technical reports relevant to the assessment of impacts on protected matters that support the arguments and conclusions in the referral (section 3 and 4)	✓	Attachment 3 – GHD 2016b - Biological assessment (within EIA report) Attachment 4 – PMST March 2016
	report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)	x	

9 Contacts, signatures and declarations

Project title: Maintenance Zone Establishment.

9.1 Person proposing to take action

1. Name and Title:	Roy Engelbrecht (PM).
2. Organisation	MRWA - Wheatbelt Region Main Roads Western Australia
3. EPBC Referral Number	N/A
4: ACN / ABN:	N/A
5. Postal address	PO Box 6202 East Perth WA 6892
6. Telephone:	(08) 9622 4762
7. Email:	roy.engelbrecht@mainroads.wa.gov.au.
8. Name of proposed proponent (if not the same person at item 1 above and if applicable): 9. ACN/ABN of proposed proponent (if not the same person named at item 1 above):	

I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

- □ an individual; OR
- □ a small business entity (within the meaning given by section 328-110 (other than subsection 328-119(4)) of the *Income Tax Assessment Act 1997*); OR
- □ not applicable.

If you are small business entity you must provide the Date/Income Year that you became a small business entity:

I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations. Under sub regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made:

- □ not applicable.

Declaration

I declare that to the best of my knowledge the information I have given on, or attached

to this form is complete, current and correct.
I understand that giving false or misleading information is a serious offence.
I agree to be the proponent for this action.
I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.

Signature [signature] Date 2/05/2016.

9.2 Person preparing the referral information (if different from 8.1)

Individual or organisation who has prepared the information contained in this referral form.

Name CRAIG GRABHAM

Title SENIOR ECOLOGIST

Organisation
Organisation name should match entity identified in ABN/ACN search

ACN / ABN (if applicable) GHD Pty Ltd.

Postal address

Telephone 0862228081

Email

Declaration

I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct.
I understand that giving false or misleading information is a serious offence.

Signature [signature] Date 29/4/16

REFERRAL CHECKLIST

NOTE: This checklist is to help ensure that all the relevant referral information has been provided. It is not a part of the referral form and does not need to be sent to the Department.

HAVE YOU:

- ❑ Completed all required sections of the referral form?
- ❑ Included accurate coordinates (to allow the location of the proposed action to be mapped)?
- ❑ Provided a map showing the location and approximate boundaries of the project area?
- ❑ Provided a map/plan showing the location of the action in relation to any matters of NES?
- ❑ Provided a digital file (preferably ArcGIS shapefile, refer to guidelines at Attachment A) delineating the boundaries of the referral area?
- ❑ Provided complete contact details and signed the form?
- ❑ Provided copies of any documents referenced in the referral form?
- ❑ Ensured that all attachments are less than three megabytes (3mb)?
- ❑ Sent the referral to the Department (electronic and hard copy preferred)?

Geographic Information System (GIS) data supply guidelines

If the area is less than 5 hectares, provide the location as a point layer. If the area greater than 5 hectares, please provide as a polygon layer. If the proposed action is linear (eg. a road or pipline) please provide a polyline layer.

GIS data needs to be provided to the Department in the following manner:

- Point, Line or Polygon data types: ESRI file geodatabase feature class (preferred) or as an ESRI shapefile (.shp) zipped and attached with appropriate title
- Raster data types: Raw satellite imagery should be supplied in the vendor specific format.
- Projection as GDA94 coordinate system.

Processed products should be provided as follows:

- For data, uncompressed or lossless compressed formats is required - GeoTIFF or Imagine IMG is the first preference, then JPEG2000 lossless and other simple binary+header formats (ERS, ENVI or BIL).
- For natural/false/pseudo colour RGB imagery:
    - If the imagery is already mosaiced and is ready for display then lossy compression is suitable (JPEG2000 lossy/ECW/MrSID). Prefer 10% compression, up to 20% is acceptable.
    - If the imagery requires any sort of processing prior to display (i.e. mosaicing/colour balancing/etc) then an uncompressed or lossless compressed format is required.

Metadata or 'information about data' will be produced for all spatial data and will be compliant with ANZLIC Metadata Profile. (http://www.anzlic.org.au/policies_guidelines#guidelines).

The Department's preferred method is using ANZMet Lite, however the Department's Service Provider may use any compliant system to generate metadata.

All data will be provide under a Creative Commons license (http://creativecommons.org/licenses/by/3.0/au/)