Clearing Assessment Report – CPS 818

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M002 Bindoon-Moora 26.4-30.6 SLK

September 2021

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Contents

Amendments

Report Compilation & Review	Name and Position	Document Revision	Date
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Reviewer:	Environment Officer	Rev 0	20 September 2021
Author:	Environment Officer – Wheatbelt Region	Rev 1	20 September 2021

1 PURPOSE

The purpose of this Clearing Assessment Report (CAR) is to provide a report detailing the assessment of native vegetation clearing that is proposed to be undertaken using the Statewide Clearing Permit CPS 818 issued to Main Roads Western Australia (Main Roads).

The CAR outlines the key activities associated with the project, the existing environment and an assessment of native vegetation clearing. This assessment provides an evaluation of the vegetation clearing impacts associated with the project using the ten Clearing Principles, and the strategies used to manage vegetation clearing.

2 SCOPE

2.1 Project Scope

Project Name: Bindoon-Moora Road (M002) 20.6-30.6 SLK Widening

Project Purpose / Components: The project involves the widening of Bindoon-Moora Road (M002) between 26.4 and 30.6 SLK to accommodate two 3.5 m wide lanes with 1.5 m sealed shoulders. The aim of the project is to improve road user safety by attempting to reduce the frequency and severity of crashes.
The proposed clearing undertaking using CPS 818 is: 2.9 ha

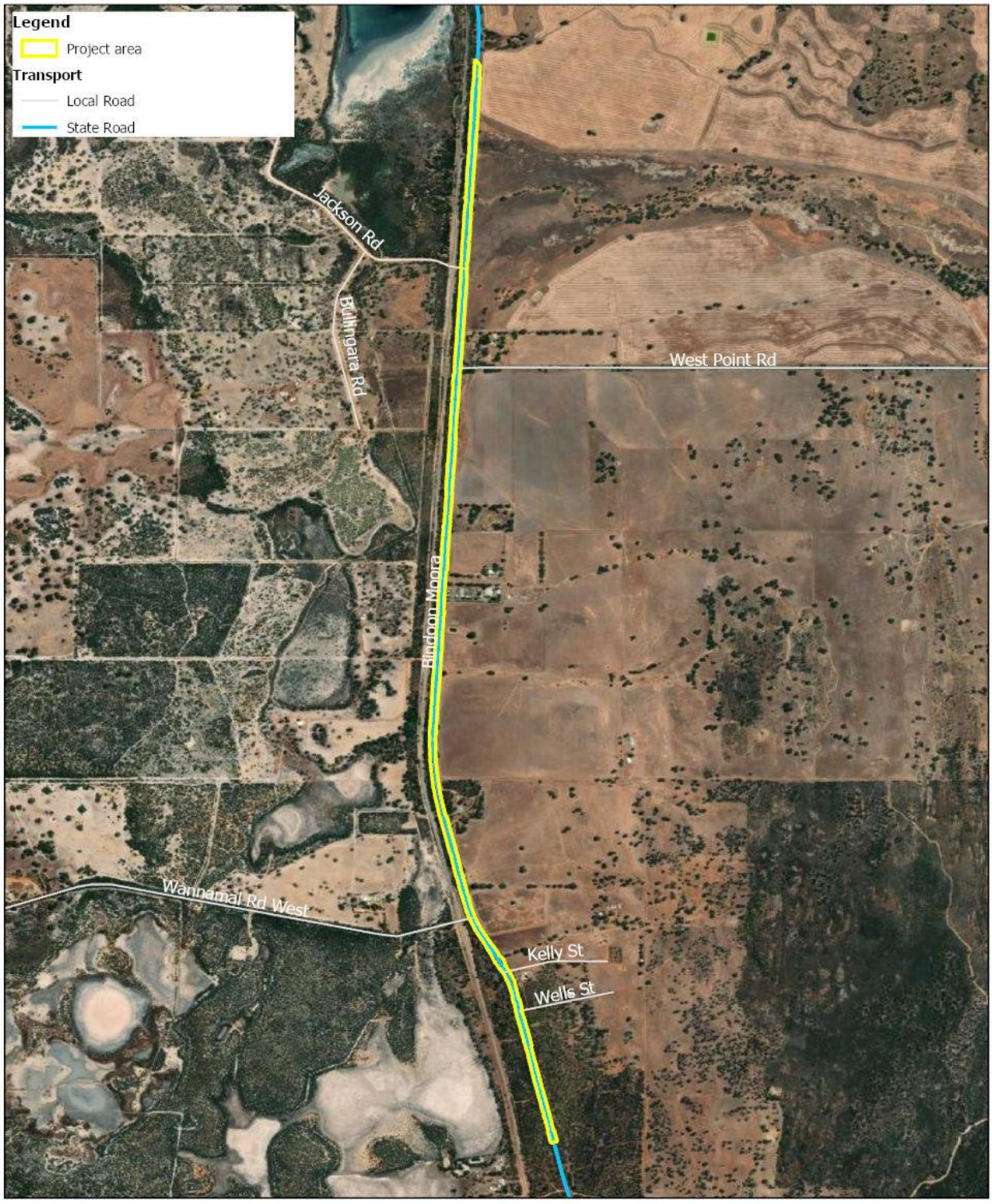
The proposed temporary clearing undertaking using CPS 818 is: Nil

Project Location(s): The proposal area is located 0.2 km east to 4.5 km north-east of Wannamal within the Shire of Chittering. The proposed clearing footprint occurs along the Bindoon-Moora (M002) Road between 26.4 and 30.6 SLK. as shown in Figure 1.

The location of the proposed works is at Figure 1.

2.2 Assessment Report Scope

The assessment area, see Figure 2, is confined to a local area of a 10 km radius.



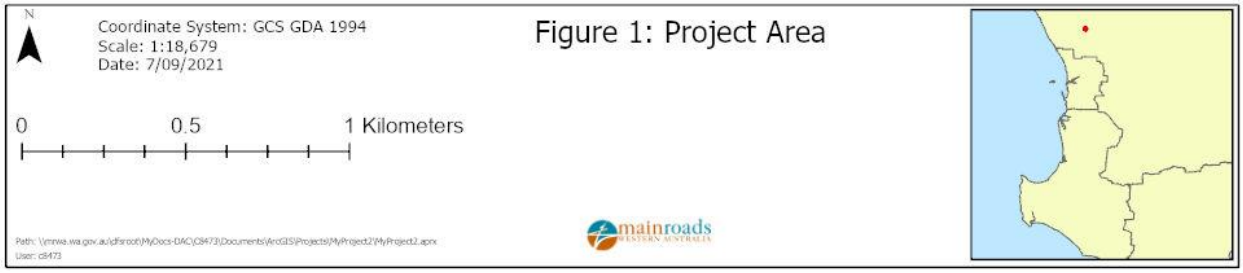
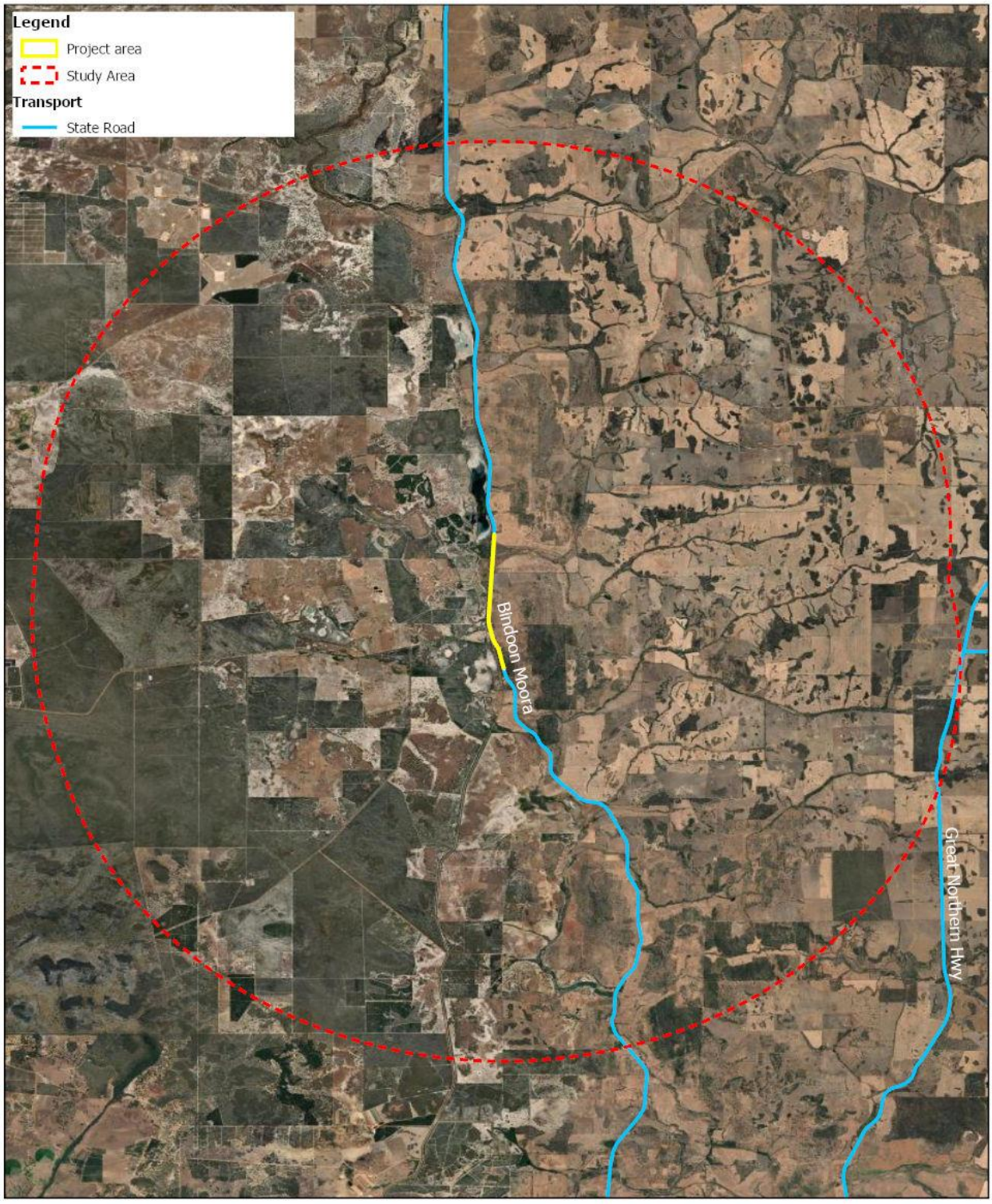


Figure 1: Project Area



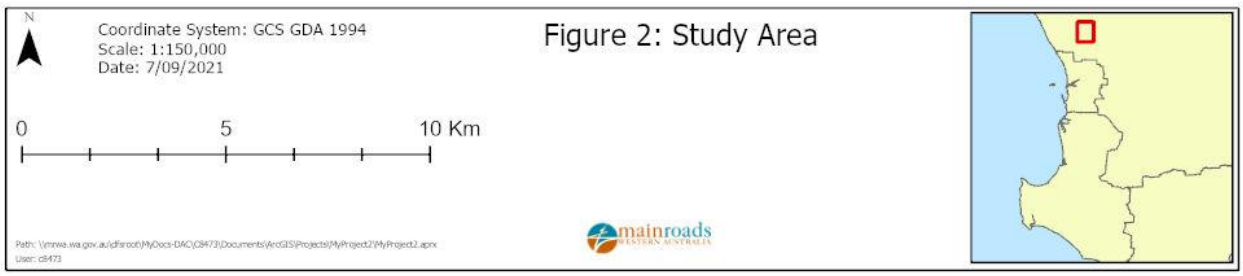


Figure 2: Study Area

2.3 Alternatives to clearing

This section is to be widened on both sides as part of the Blackspot programme following several fatalities and serious crashes along this section in recent years. As the project will require the clearing to achieve a 10 m wide sealed formation on an alignment, no alternatives to clearing exist.

2.4 Measures to Avoid, Minimise, Reduce and Manage Project Clearing Impacts

The design and management measures implemented to avoid and minimise the clearing impacts by the project are provided in Table 1.

In addition, impacts to vegetation will be minimised through the implementation of the following measures:

- The clearing area will be demarcated prior to the commencement of native vegetation clearing;
- Where possible vegetation will be pruned as opposed to removed;
- Further Project clearing will be avoided as the site office, materials storage areas, construction vehicles/machinery and access tracks will be located on previously disturbed or cleared areas; and
- Development and implementation of a site-specific CEMP which will establish the following vegetation management actions including:
  - Clearing and access control measures (such as demarcation of clearing boundaries);
  - Weed and dieback management;
  - Landscaping of earth-worked areas;
  - Erosion and sediment control;
  - Waste and fire management;
  - Topsoil management;
  - Dust control; and
  - Tree and vegetation retention where possible.

Table 1. Measures undertaken to Avoid, Minimise, Reduce and Manage the Project Clearing Impacts

Design or Management Measure	Discussion and Justification
Steepen batter slopes	• 100% design has implemented locally steepened fill batters of 4:1 in order to reduce the design footprint and avoid land take. Where a fill batter of 4:1 was not adequate, the batter was further reduced to 2:1 with implementation of a road safety barrier; and • Cut backslopes have been steepened to 2:1 to reduce the design footprint and avoid land take. Where a cut backslope of 2:1 was not adequate, a kerb and verge condition were applied to further reduce the design footprint; This option has allowed for the reduction of the design footprint for environmental constraints.
Installation of safety barriers	Approximately 1.3 km of safety barrier has been installed for this project, reducing clearing and minimising land take. The use of safety barrier has ensured the reduction of clearing and protection of a known black cockatoo nesting tree.

2.5 Approved Policies and Planning Instruments

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.3), Main Roads has also had regard to the below instruments.

Other Legislation of relevance for assessment of clearing and planning/other matters

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Country Areas Water Supply Act 1947* (WA) (CAWS Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)
- *Soil and Land Conservation Act 1945* (WA)
- *Rights in Water and Irrigation Act 1914*
- *Aboriginal Heritage Act 1972* (WA)
- *Town Planning and Development Act 1928*

Environmental Protection Policies

- Environmental Protection (Peel Inlet - Harvey Estuary) Policy 1992;
- Environmental Protection (Western Swamp Tortoise Habitat) Policy 2011

Other Relevant policies and guidance documents:

- Environmental Offsets Policy (Government of Western Australia, 2011)
- A guide to the assessment of applications to clear native vegetation (DEC, December 2014)
- Procedure: Native vegetation clearing permits (DWER, October 2019)
- Environmental Offsets Guidelines (Government of Western Australia, August 2014)
- Technical guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016)
- Technical guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA, 2020)
- Approved conservation advice under section 266B of the EPBC Act for threatened flora/fauna/vegetation communities
- Approved Recovery Plans for threatened species
- EPBC Act Referral guidelines for the three threatened black cockatoo species
- Strategic advice - EPA

3 SUMMARY OF SURVEYS

3.1 Flora and Vegetation Survey

The Bindoon Moora Road Widening North of Wannamal Biological Survey was conducted between the 9th and 25th of November 2018 by Coterra.

Section 3.1.1 contains the summary of the survey.

3.1.1 Summary of Biological Survey

- Two hundred and fourteen native flowering plant taxa and one native fern taxon were recorded in the survey area. Fifty-two weed species were also recorded in the survey area. Two were Declared Pest species listed under the *Biosecurity and Agriculture Management Regulations 2013* (DPIRD, 2019), **Asparagus asparagoides* and **Moraea flaccida*;
- No Threatened Flora were recorded;
- Two Priority taxa were recorded in the survey area. These were *Synaphea rangiferops* (Priority 2) and *Banksia dallanneyi subsp. pollosta* (Priority 3);
- Nine vegetation units comprised of seven terrestrial vegetation units and two wetland vegetation units were recorded within the proposal area;
- Vegetation condition ranged between 'Completely Degraded' to 'Very Good', with the majority (approximately 76%) in a 'Completely Degraded' to 'Degraded condition'; and
- No TECs or PECs occur within the survey area.

3.2 Fauna Survey

The Bindoon Moora Road Widening North of Wannamal Fauna Survey was conducted on the 5th of December 2018 by Greg Harewood on behalf of Coterra.

Section 3.2.1 contains the summary of the survey.

3.2.1 Summary of Fauna Survey

- Survey area consists of a mosaic of cleared or partly cleared areas and areas of remnant native vegetation. The native remnants are generally dominated by wandoo (Eucalyptus wandoo). Other sections contain marri (*Corymbia calophylla*) woodland, York gum (*Eucalyptus loxophleba*) and sheoak (*Allocasuarina spp*.) woodland, sheoak (*Allocasuarina spp*.) and jam (Acacia acuminata) woodland, sheoak (*Allocasuarina spp*.) low open forest and some wetland areas with paperbark (Melaleuca spp.) low open woodland/scrub;
- The black cockatoo habitat assessment identified a total of 78 trees with a diameter at breast height (DBH) of >50 cm (>30 cm for wandoo) within the 9.4 ha survey area. The majority of these trees were not observed to contain hollows of any size;
- Hollows were present in 28 trees, but most of these hollows were assessed as being unsuitable for black cockatoos to use for nesting (e.g. entrance too small, hollow too small or an unfavourable orientation). However, four (4) were determined at the time to be possibly suitable based on the presence of a hollow or possible hollow of a suitable size and orientation;

- One of these suitable hollows was confirmed as being in use by Carnaby's black cockatoos for breeding with a female perching near the hollow's edge at the time of the survey. This hollow is located in a wandoo on the western side of the highway at SLK 28.92;
- Marri woodland is more common along some sections of the Bindoon-Moora Road survey area and this represents the best quality foraging habitat present but again the extent of this vegetation unit is limited and would also amount to less than 1 ha in total. It is to a certain extent supplemented by areas of sheoak, but overall, this species also is limited in extent and appeared to be poor quality (small stunted specimens with little fruit);
- The only evidence of black cockatoo foraging within the Bindoon-Moora Road widening survey area was a small amount of chewed marri fruit attributed to foraging forest red-tailed black cockatoos;
- No existing roosting trees (trees used at night by black cockatoos to rest) were identified during the survey period;
- No evidence of any other fauna species of conservation significance utilising the survey area was found during the site reconnaissance survey;
- Overall fauna habitat values at the survey area have been severely compromised by the removal of a significant proportion of the original native vegetation and the degradation of remnant patches. Natural attributes have been diminished and much of the survey area would now only be utilised by generally common and widespread fauna species with non-specific requirements which allow them to persist in disturbed/highly disturbed habitats; and
- Despite the lack of biodiversity, the area still retains some value for fauna species, and provides habitat for some species of conservation significance (e.g. black cockatoos) though the extent of habitat suitable for these species is relatively limited in extent and fragmented which limits its overall value.

3.3 Targeted Black Cockatoo Habitat Assessment

Western Ecological were commissioned to undertake a targeted Black Cockatoo Habitat assessment of Bindoon-Moora Road between SLK 26.4 and 30.6 on the 10th of August 2021.

Section 3.3.1 contains the summary of the survey.

3.3.1 Summary of habitat assessment

There was relatively little vegetation within the survey area and even less of that vegetation was considered potential foraging habitat. The most extensive foraging habitat in the survey area was trees of Marri which is considered high quality foraging habitat as the nuts are the preferred food of the FRTBC. Marri and its nuts are also considered high quality foraging habitat for CBC as it is known to forage on what is considered a relatively high energy source of food (Cooper et al. 2002). The remaining potential foraging habitats in the survey area are considered low quality and in addition are represented by very small areas.

3.4 Black Cockatoo hollow assessment

Tony Kirkby was commissioned to undertake an assessment of a known nesting tree, last surveyed in 2017, at Bindoon-Moora Road between SLK 26.4 and 30.6. The assessment was undertaken on the 5 September 2021.

Section 3.4.1 contains the summary of the assessment.

3.4.1 Summary of Black Cockatoo hollow assessment

The tree contains two hollows, both of which show chewing at the entrance. The hollows are approximately 1 m apart and are likely to lead to the same nest chamber. Judging from the chewing at the entrances the hollow is still viable and was probably used in the last breeding season 2020 - 2021.

3.5 Dieback Survey

Glevan Consulting were commissioned to undertake a Phytophthora Dieback occurrence assessment of Bindoon-Moora Road between SLK 26.4 and 30.6.

Section 3.3.1 contains the summary of the survey.

3.5.1 Summary of dieback survey

- No Phytophthora Dieback infestations were observed during the assessment. A protectable uninterpretable area comprising 3.2 ha and one unprotectable uninterpretable area, comprising 9 ha were identified and mapped. An unprotectable uninfested area comprising 0.3 ha was also identified and mapped. The remaining 20.6 ha was excluded from the assessment due to being degraded or void of vegetation;
- Several areas exhibiting evidence of vegetation decline were observed within the study area. The decline was characterised by clustered or scattered *Banksia sessilis* and *Banksia squarrosa* deaths and was not consistent with that typically associated with Phytophthora Dieback. Two of these areas were sampled and both produced a negative result;
- The majority of the study area was classified as excluded and unprotectable due to being degraded or devoid of vegetation. This includes the section adjacent to Lake Wannamal Nature Reserve, which featured vegetation dominated by *Allocasuarina huegeliana* with little or no understorey (Figure 2). It was also noted that there is a train line running parallel to Bindoon-Moora Road which effectively acts as a barrier and would almost certainly prevent the spread of disease (should it be present) from the proposal area into the nature reserve;
- An unprotectable uninfested area and an unprotectable uninterpretable area were mapped during the assessment (Appendix, Maps 1 &2). The uninfested area was only 0.3 ha in size and not contiguous with a larger area of uninfested vegetation. The uninterpretable area was too narrow to be considered protectable; and
- There are 2 Clean on Entry (COE) points, associated with protectable uninterpretable area located within the study area. Vehicles and machinery will need to be inspected and cleaned where necessary, prior to entering the protectable areas.

4 VEGETATION DETAILS

4.1.1 Regional Vegetation Description

The proposal area lies within the Mogumber System of the Dale Botanical Subdistrict and was mapped as 'Marri and/or Wandoo woodland (E. *calophylla-E. wandoo*)' (Beard, 1981), where Marri-Wandoo woodland occupied the plateau and upper slopes, with York Gum (*Eucalyptus loxophleba*) on the lower slopes. On lateritic ridges and breakaways, woodlands tend to open out with the development of a dense sclerophyllous understorey, mostly dominated by Banksia spp. (formerly Dryandra spp.).

The proposal area comprises of approximately 2.9 ha of native vegetation. Coterra (2020) identified nine vegetation units comprised of seven terrestrial vegetation units and two wetland vegetation units, described below and shown in Figure 3:

- AhAa - *Allocasuarina huegeliana*, *Acacia acuminata* low open forest over *Grevillea endlicheriana* tall open shrubland over *Acacia pulchella* var. *goadbyi*, *Hypocalymma angustifolium*, *Banksia fraseri var. fraseri*, *Hibbertia acerosa* low open shrubland over *Lepidobolus preissianus*, (*Desmocladus asper*) sedgeland
- AhBh – *Allocasuarina huegeliana* low open woodland over *Banksia hewardiana* open scrub over *Daviesia preissii*, *Calothamnus quadrifidus* subsp. *angustifolius*, *Acacia pulchella* var. *goadbyi*, *Ericomyrtus tenuior* shrubland over *Grevillea pilulifera* scattered low shrubs
- Cc - *Corymbia calophylla* open forest over *Acacia saligna* tall open shrubland over *Xanthorrhoea preissii* open shrubland.
- Cq - *Calothamnus quadrifidus*, *Banksia sessilis var. sessilis*, *Acacia saligna*, *Leptospermum erubescens*, *Banksia hewardiana* mixed tall open shrubland to closed scrub over *Acacia pulchella* var. *goadbyi*, *Ericomyrtus tenuior*, *Daviesia preissii*, *Verticordia densiflora* var. *densiflora*, *Xanthorrhoea?preissii* open shrubland over *Hypocalymma angustifolium* low open shrubland over *Caustis dioica* sedgeland.
- El - *Eucalyptus loxophleba* subsp. *loxophleba* low woodland with *Melaleuca viminea* subsp. *viminea* scattered shrubs
- ElAa - *Eucalyptus loxophleba* subsp. *loxophleba* woodland over *Acacia acuminata*, *Allocasuarina huegeliana* low woodland over *Acacia pulchella* var. *goadbyi* scattered shrubs over *Phyllanthus calycinus*, *Astroloma pallidum* scattered low shrubs.
- Ew - *Eucalyptus wandoo* woodland over *Allocasuarina huegeliana* scattered low trees over open shrublands of *Grevillea bipinnatifida* subsp. *bipinnatifida*, over low shrublands of *Hypocalymma angustifolium*, *Daviesia preissii*, *Verticordia densiflora* var. *densiflora*
- ErCo - *Eucalyptus rudis* subsp. *rudis* scattered trees over *Casuarina obesa* low closed forest over *Melaleuca viminea* subsp. *viminea* scattered tall shrubs **Ehrharta longiflora, *Bromus diandrus* closed grassland.
- Mv - *Melaleuca viminea* subsp. *viminea* open to closed scrub over *Verticordia densiflora* var. *densiflora* scattered shrubs over *Leptocarpus decipiens*, *Schoenus subfascicularis*, *Isolepis cernua* var. *setiformis* open sedgeland.

Condition of the units listed above ranged from 'Completely Degraded' to 'Very Good', with the majority (2.2 ha) assessed as 'Completely Degraded' to 'Degraded' (Coterra, 2020, Figure 4).

Tables 2 and 3 provide details of the Pre-European Vegetation Associations with the proposal area and the remaining extents of these associations.

Table 2. Summary of Proposal area's Mapped Pre-European Vegetation Associations

Pre-European Vegetation Association(s)	Clearing Description	Vegetation Condition	Comments
Vegetation Association 4 described as a Medium woodland; marri & wandoo' (Government of Western Australia, 2017).	Clearing of up to 2.9 ha for road widening on Bindoon-Moora.	'Completely Degraded' to 'Degraded' condition – 2.2 ha; 'Good' to 'Good to Degraded' condition – 0.6 ha; 'Very Good' condition – 0.1 ha (EPA 2016)	Vegetation description and condition determined from Coterra (2020).

Table 3. Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre–European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
Veg Assoc No. 4	**Statewide**	1,054,279.89	284,102.41	26.96	23.85
	IBRA Bioregion Jarrah Forest	1,022,712.69	277,087.18	27.09	23.81
	IBRA Sub-region Northern Jarrah Forest	614,200.82	197,903.81	32.22	30.56
	Local Government Authority Shire of Chittering	54,209.63	13,971.91	25.77	4.88

4.1.2 Vegetation Complexes and Representation

Vegetation Complexes within the Proposal area have been defined by Heddle et al. (1980) and are based on vegetation in association with landforms and underlying geology. Native vegetation complexes as described by Heddle et al. (1980) within the Proposal area comprise:

- **Wannamal Complex**: Dandaragan Plateau- Lateritic Uplands: ('Mixture of low shrubland of *Melaleuca* spp. and open woodland of *Eucalyptus wandoo – E. loxophleba*').
- **Michibin Complex**: Darling Plateau ('Open woodland of Eucalyptus wandoo over Acacia acuminata with some Eucalyptus loxophleba on valley slopes, with low woodland of Allocasuarina huegeliana on or near shallow granite outcrops in arid and perarid zones).

Table 4. Vegetation Complexes (Heddle/Mattiske) within the Proposal area

Heddle/Mattiske Veg Complex	Pre-European Extent (ha)	2013 Vegetation Extent	% Remaining
Wannamal Complex	2,492.00	1,263.49	50.70
Michibin Complex	168,040.13	42,996.09	25.59

5 ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

In assessing whether the project's proposed clearing is likely to have a significant impact on the environment, the project was assessed against the ten Clearing Principles (Environmental Protection Act 1986, Schedule 5).

Each principle has been assessed in accordance with DWER's 'A Guide to the Assessment of Applications to Clear Native Vegetation' and other relevant CPS Decision Reports prepared by DWER.

The proposed clearing is at or may be at variance with one or more of the 10 Clearing Principles.

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

Proposed clearing is not likely to be at variance to this Principle

Vegetation Units and Condition

The project requires the clearing of 2.9 ha of native vegetation along both sides of Bindoon-Moora Road in Shire of Chittering. Coterra (2020) identified nine vegetation units comprised of seven terrestrial vegetation units and two wetland vegetation units, described as follows and shown in Figure 3:

- AhAa - *Allocasuarina huegeliana*, *Acacia acuminata* low open forest over *Grevillea endlicheriana* tall open shrubland over *Acacia pulchella* var. *goadbyi*, *Hypocalymma angustifolium*, *Banksia fraseri var. fraseri*, *Hibbertia acerosa* low open shrubland over *Lepidobolus preissianus*, (*Desmocladus asper*) sedgeland
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Coterra (2020) assessed the condition of these vegetation units (Figure 4), with the majority considered to be in a 'Completely Degraded' to 'Degraded' condition (2.2 ha; 76%). The results of the assessment are summarised below:

- 2.2 ha of vegetation in a 'Completely Degraded' to 'Degraded' condition;
- 0.6 ha of vegetation in a 'Good' to 'Good to Degraded' condition; and
- 0.1 ha of vegetation in a 'Very Good' condition

Threatened and Priority Ecological Communities and Flora Species

Five Threatened and Priority Ecological Communities were identified during the desktop study area, which consisted of:

- Banksia Dominated Woodlands of the Swan Coastal Plain – BC Act (Priority 3) EPBC listed (Endangered);
- Banksia ilicifolia woodlands – BC Act (Priority 3) EPBC listed (Endangered);
- Claypans with mid dense shrublands of *Melaleuca lateritia* over herbs – BC Act (Priority 1) EPBC listed (Endangered);
- Herb rich saline shrublands in clay pans – BC Act (Vu) EPBC listed (Endangered); and
- Swan Coastal Plain *Banksia attenuata - Banksia menziesii* woodlands – BC Act (Priority 3) EPBC listed (Endangered).

Coterra (2020 did not identify any vegetation representative of a TEC or PEC within the proposal area. The project is not expected to impact on any TEC or PEC occurrence within the local area.

The desktop assessment identified 89 significant flora species were likely to occur within a 10 km study area. A detailed flora and vegetation survey, including targeted searches for significant species was undertaken by Coterra (2020) and identified two priority species, *Synaphea rangiferops* (P2) and *Banksia dallanneyi* subsp. *Pollosta* (P3) in the wider survey area, while two individuals of *Synaphea rangiferops* were recorded within the proposal area.

This species is known from 18 populations across a 60 km linear distribution. While no accurate count data exists from these populations, review of DBCA records indicates at least 150 individuals have been recorded. The removal of two individuals represents a reduction in population of 1.3%. It is considered unlikely that removal of two individuals and clearing of narrow strips of largely degraded vegetation adjacent to an existing road will significantly impact the species or its associated habitat.

No threatened flora species were recorded within the proposal area and based on the survey effort and assessment of habitats present, none are considered likely or possible to occur.

Reserves and Linkages

There are six nature reserves within 12 km the project, these reserves are (Figure 5):

- Betts Nature Reserve – located 60 - 80 m to the west of the proposal area;
- Boonanarring Nature Reserve - located 10 -13 km to west and south west of the proposal area;
- Lake Wannamal Nature Reserve - located 79 m west of the proposal area;
- Mogumber Nature Reserve - located 4.7 km north-west of the proposal area;
- Mogumber West Nature Reserve - located 12 km north-west of the proposal area;
- Udumung Nature Reserve - located 10.5 km south-east of the proposal area.

It is considered likely that the vegetation within these reverses is in a better condition than that within the proposal area and is representative of higher quality remnant native vegetation within the local area.

Coterra (2020) identified that Bindoon-Moora Road provides a north-south linkage through an area that has been subject to clearing for farmland. The project will necessitate the removal of up to 2.5 m of vegetation from the road reserve, which in context of the western reserve represents 10% of the vegetated reserve. Considering the relatively small strips of vegetation to be removed, and noting the presence of both Betts and Lake Wannamal Nature Reserve, it is unlikely that the project will significantly impact the function of Bindoon-Moora Road reserve as a linkage within the regional area.

Fauna

The desktop assessment identified 22 significant fauna species as potentially occurring within the Proposal area. Overall fauna habitat values within the survey area have been severely compromised by the removal of a significant proportion of the original native vegetation and the degradation of remnant patches

(Harewood 2018). Black Cockatoos, specifically Forest Red-tailed Black Cockatoo and Carnaby's Cockatoo, were the only conservation significant species recorded within the proposal area (Harewood, 2018).

The proposal area is within the modelled distribution and breeding range of Carnaby's Cockatoo, but outside of the modelled distribution of Forest Red-tailed Black Cockatoo.

The Proposal area contains up to 41 suitable DBH trees (those greater than 500 mm DBH), of which 26 will be removed (Figure 6). Harewood (2018), assessed one tree (wandoo) with a large hollow supporting a breeding pair of Carnaby's Cockatoo and the proposed clearing area has been modified to avoid removal of this tree. No other trees within the proposal area were assessed as containing suitable hollows due to the presence of bees. Within the wider survey area, Harewood (2018) recorded an additional 37 suitable DBH trees, of which two had hollows assessed as suitable for use by black cockatoos. One of these hollows was observed to contain galahs, while the other had no signs of use.

The large hollow supporting a breeding pair of Carnaby's Cockatoo during the 2018 survey was re-assessed to confirm that it was still viable by Tony Kirkby (2021). The assessment identified the tree as containing two hollows, likely leading to the same nesting chamber and was likely utilised last breeding season. As outlined above, this tree will not be cleared as part of proposed works.

The project will require the clearing of 0.8 ha and 0.3 ha of moderate quality foraging habitat for Carnaby' Cockatoo and FRTBC, respectively. The foraging habitat is shown in Figure 7 and comprises of:

- 0.3 ha of marri (*Corymbia calophylla*),
- 0.3 ha of wandoo (*Eucalyptus wandoo), and*
- 0.2 ha of York gum (*Eucalyptus loxophleba*).

Foraging evidence was observed only within the small occurrences (0.3 ha) of marri and were attributed to Forest Red-tailed Black Cockatoo (Harewood, 2018). No foraging evidence was recorded by Western Ecological (2021).

Consideration of potential impacts to Black Cockatoos are further discussed in Principle B.

No evidence of any other fauna species of conservation significance utilising the survey area was recorded during the site reconnaissance survey.

Overall fauna habitat values within the proposal area have been severely compromised by the removal of a significant proportion of the original native vegetation and the degradation of remnant patches. Natural attributes have been diminished and much of the proposal area would now only be utilised by generally common and widespread fauna species, with the exception of black cockatoos, with non-specific requirements which allow them to persist in disturbed/highly disturbed habitats.

Assessed Outcome:

Project clearing is not likely to be at variance to this Principle.

Methodology

Coterra (2020)

Harewood (2018)

Government of WA (2013)

GIS Database:

- Threatened and Priority Ecological Communities (Buffered)
- Threatened and Priority Fauna
- Threatened and Priority (DBCA)

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

Proposed clearing is at variance to this Principle

Harewood (2018) identified a broad mix of fauna habitats comprised of a mosaic of wandoo (*Eucalyptus wandoo*, marri (*Corymbia calophylla*) woodland, York gum (*Eucalyptus loxophleba*) and sheoak (A*llocasuarina* spp.) woodland, sheoak (*Allocasuarina* spp. and jam (*Acacia acuminata*) woodland, sheoak (*Allocasuarina* spp.) low open forest and some wetland areas with paperbark (*Melaleuca* spp.) low open woodland/scrub.

Desktop assessment identified 203 fauna species occurring within the wider study area, comprised of; 18 mammals (including six bat species), 111 bird, 63 reptile and 11 frog species. Of these species identified, 22 are of conservation significance. Of the species identified only Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo (FRTBC) were recorded in the proposal area (Harewood, 2018; Western Ecological, 2021) and these are discussed further below. No evidence of any other fauna species of conservation significance utilising the survey area was found during the site reconnaissance survey.

Overall fauna habitat values within the proposal area have been severely compromised by the removal of a significant proportion of the original native vegetation and the degradation of remnant patches. Natural attributes have been diminished and much of the proposal area would now only be utilised by generally common and widespread fauna species, with non-specific requirements which allow them to persist in disturbed/highly disturbed habitats (with the exception of black cockatoos discussed below) (Harewood, 2018).

Black Cockatoo

The Proposal area contains up to 41 suitable DBH trees (those greater than 500mm DBH), of which 26 will be removed (Figure 6). Harewood (2018), assessed one tree (wandoo) with a large hollow supporting a breeding pair of Carnaby's Cockatoo and the proposed clearing area has been modified to avoid removal of this tree. No other trees within the proposal area were assessed as containing suitable hollows due to the presence of bees. Within the wider survey area, Harewood (2018) recorded an additional 37 suitable DBH trees, of which two had hollows assessed as suitable for use by black cockatoos. One of these hollows was observed to contain galahs, while the other had no signs of use.

Following the black cockatoo assessment, the road design was modified to ensure the one confirmed nesting tree, located approximately 2 m from edge of seal, was retained and protected by safety barrier. Another 15 trees, all marri, have also been retained through the use of safety barrier along sections of the alignment.

The project will require the clearing of 0.8 ha and 0.3 ha of moderate quality foraging habitat for Carnaby's Cockatoo and FRTBC[1] respectively, with foraging habitat comprised of:

- 0.3 ha of marri (*Corymbia calophylla*) (Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo),
- 0.3 ha of wandoo (*Eucalyptus wandoo)* (Carnaby's Cockatoo)*, and*
- 0.2 ha of York gum (*Eucalyptus loxophleba*) (Carnaby's Cockatoo).

Foraging habitat was described by Coterra (2018) as native vegetation remnants comprised of wandoo (*Eucalyptus wandoo*) with occurrences of marri (*Corymbia calophylla*) woodland, York gum (*Eucalyptus loxophleba*)). Native understory and ground cover are largely absent due to significant historical disturbances with introduced grasses dominating.

[1] The attribution of specific foraging species to Black Cockatoos is based on the literature of Saunders *et al*. 1982; Johnstone and Kirkby 1999, 2008; Groom 2011 and DEE 2018.

The EPA (2019) identifies the importance of retaining foraging habitat which occurs in proximity to identified roosting and nesting habitat, noting individuals of Carnaby's Cockatoo may forage in areas up to 12 km from identified roosting and nesting habitats. When considered at the regional contest, remnant native vegetation mapping (DPIRD, 2019) intersected with DBCA (2018) Carnaby's Cockatoo foraging areas data, indicates that a total of 3,179 ha and 18,867 ha of potential Carnaby Cockatoo foraging habitat occurs within 6 km and 12 km of the Proposal area (Figure 8). The majority of the vegetation occurs within six nature reserves surrounding the project, these reserves are:

- Betts Nature Reserve – located 60 - 80 m to the west of the proposal area;
- Boonanarring Nature Reserve - located 10 -13 km to west and south west of the proposal area;
- Lake Wannamal Nature Reserve - located 79 m west of the proposal area;
- Mogumber Nature Reserve - located 4.7 km north-west of the proposal area;
- Mogumber West Nature Reserve - located 12 km north-west of the proposal area;
- Udumung Nature Reserve - located 10.5 km south-east of the proposal area.

Clearing as a result of the Project represents a 0.02% and 0.004% reduction in available foraging habitat within 6 km and 12 km, respectively. It is considered likely that higher quality foraging habitat occurs within the six reserves in proximity to and within the local area of the project. Furthermore, large areas of banksia woodland exist approximately 5 km north of the proposal area, adjacent to Mogumber Road. A number of these sites have been utilised as offset sites. Considering this, the loss of 0.8 ha of moderate quality foraging habitat, and 26 suitable DBH trees with no known suitable hollows, will not lead to a significant decrease in the local Carnaby's Cockatoo population. It should be noted that no foraging evidence attributable to Carnaby's Cockatoo was recorded by either Harewood (2018) or Western Ecological (2021).

With regards to FRTBC, foraging residue attributable to this species has been recorded within the proposal area (Harewood, 2018). While noting this, it is considered that the clearing of 0.3 ha of vegetation is unlikely to result in a significant impact to the species. No known breeding for Forest Red-tailed Black Cockatoos was recorded within the proposal area. The closest known breeding site is approximately 13 km west of the proposal area in the Boonanarring Nature Reserve (DPaW, 2015). While it is accepted that the proposal area contains habitat suitable for foraging for FRTBC, its removal will not result in significant impact to the population.

Regional data records held by DBCA (2018) identify the closest roosting site for Black Cockatoos occurring 23 km east from the proposal area, on the northern edge of the Department of Defence Bindoon Training Area (Figure 8). The next closest confirmed roosting site is approximately 35 km north west of the proposal area, in Red Gully. Furthermore, Harewood (2018) in their assessment of the site did not observe any evidence of roosting within the proposal area. Noting this, the project will not impact on a night roosting site.

Regional data records held by DBCA (2018) identify the nearest confirmed roosting site for Carnaby's Cockatoo is located 23 km east from the proposal area, on the northern edge of the Department of Defence Bindoon Training Area. Harewood (2018) in their assessment of the site did not observe any evidence of roosting within the proposal area. Noting this, the project will not impact on a night roosting site. Furthermore, given the distance of the proposal area from the closest known roost site, the project is unlikely to contain significant habitat supporting a roost.

In considering the above, foraging habitat to be cleared is not considered to be high quality or abundant. Regardless of this, the presence of a confirmed nesting tree makes any foraging habitat surrounding that tree and within 6 km important in potentially supporting breeding success of Carnaby's Cockatoo. As a result, clearing associated with the project is at variance with this Principle.

Assessed Outcome:

Project clearing is at variance to this Principle.

Methodology

Coterra (2020) Harewood (2018) DBCA Shapefiles DBCA website EPA (2016, 2019)

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

Proposal is not at variance to this Principle
No threatened flora species were recorded within the proposal area and based on the survey effort and assessment of habitats present, none are considered likely or possible to occur. **Assessed Outcome:** **Project clearing is not variance to this Principle.**
Methodology Coterra (2020) DBCA shapefiles EPA (2016)

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Proposed clearing is not at variance to this Principle
Comment Coterra (2020) did not identify any vegetation in the proposal area considered representative of a State listed Threatened Ecological Community. **Assessed Outcome:** **Project clearing is not variance to this Principle.**
Methodology Coterra (2020) DBCA shapefiles - Threatened and Priority Ecological Communities (Buffered)

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

Proposed clearing may be at variance to this Principle

Comment

The project is located within the north-western boundary of the Northern Jarrah Forest subregion of the Jarrah Forest biogeographic region in the Mogumber System. The proposal area coincides with Vegetation Association 4, of which 22.0% of the pre-European vegetation extent remains for this association in the Mogumber System (Government of Western Australia, 2019). The National Objectives and Targets for Biodiversity Conservation recognise that the retention of 30 per cent or more of the pre-clearing extent of each ecological community is necessary if Australia's biological diversity is to be protected (Commonwealth of Australia, 2001). As evident in the tables below, Vegetation Association is less than 30% at all scales, except for the IBRA subregion. At the local scale (10 km), approximately 36.8% of remnant native vegetation remains.

Summary of Proposal area's Mapped Pre-European Vegetation Associations

Pre-European Vegetation Association(s)	Clearing Description	Vegetation Condition	Comments
Vegetation Association 4 described as a Medium woodland; marri & wandoo' (Government of Western Australia, 2017).	Clearing of up to 2.9 ha for road widening on Bindoon-Moora.	'Completely Degraded' to 'Degraded' condition – 2.2 ha; 'Good' to 'Good to Degraded' condition – 0.6 ha; 'Very Good' condition – 0.1 ha (EPA 2016)	Vegetation description and condition determined from Coterra (2020).

Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre–European (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA reserves
Veg Assoc No. 4	**Statewide**	1,054,279.89	284,102.41	26.96	23.85
	IBRA Bioregion Jarrah Forest	1,022,712.69	277,087.18	27.09	23.81
	IBRA Sub-region Northern Jarrah Forest	614,200.82	197,903.81	32.22	30.56
	Local Government Authority Shire of Chittering	54,209.63	13,971.91	25.77	4.88

The vegetation within the application area is further mapped as Heddle vegetation complexes 'Wannamal' and 'Michibin' which retain approximately 50.7 and 25.6 per cent of their pre-European vegetation extent.

Previous granted clearing permits where the application area supported vegetation that retained less than 30% of its extent but was not considered to be a significant remnant by DWER are as follows:

- CPS 7978 – Approximately 10 ha of vegetation in Good to Degraded condition was not considered to be a significant remnant as the majority of the application area was in a Degraded condition.
- CPS 6851 – Approximately 5ha of vegetation in Degraded to Completely Degraded condition in a linear shape was not considered to be a significant remnant

The condition of the mapped Vegetation Association 4 in the proposal area is Completely Degraded to Very Good, with the majority (approximately 76%) assessed as Completely Degraded to Degraded. Vegetation in the proposal area is not considered likely to comprise significant habitat for any ecological communities, but may comprise significant habitat for Carnaby's Cockatoo. Given the minor extent of clearing, comprising narrow strips adjacent to an existing road, it is also considered unlikely that clearing of 2.9 ha will significantly impact connectivity within other remnant vegetation in the local area or reduce the capacity of the remaining vegetation within the local area to act as an ecological linkage. While the application area is not considered to be a significant remnant of vegetation within the local area, clearing may be at variance given the presence of a Carnaby's Cockatoo nesting tree adjacent to the proposed clearing area.

Assessed Outcome:
Project clearing may be at variance to this Principle.

Methodology
Aerial photography
Coterra (2020)
EPA (2016)
Government of Western Australia (2017)

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Proposed clearing is at variance to this Principle

The proposal area intersects vegetation associated with a mapped non perennial watercourse and a Resource Enhancement Palusplain wetland (UFI12745), Coterra (2020) assessed all associated vegetation to be in a degraded condition.
Proposed clearing includes up to 0.45 ha of vegetation associated with a watercourse or wetland, comprising the following two vegetation units:

- ErCo - *Eucalyptus rudis* subsp. *rudis* scattered trees over *Casuarina obesa* low closed forest over *Melaleuca viminea* subsp. *viminea* scattered tall shrubs **Ehrharta longiflora, *Bromus diandrus* closed grassland.
- Mv - *Melaleuca viminea* subsp. *viminea* open to closed scrub over *Verticordia densiflora* var. *densiflora* scattered shrubs over *Leptocarpus decipiens*, *Schoenus subfascicularis*, *Isolepis cernua* var. *setiformis* open sedgeland.

As shown in Plates 1 and 2 below, the water course is heavily degraded and traverses through active farming land before intersecting the project and ultimately flowing into Lake Wannamal Nature Reserve

Plate 1: Looking upstream, RHS of Bindoon-Moora Road

Plate 2: Looking downstream, LHS Bindoon Moora Road

Clearing within the watercourse is minor, localised, will not result in appreciable land degradation and will not significantly impact upon the water quality or any other environmental areas.

Assessed Outcome:
Project clearing is at variance to this Principle.

Methodology
Coterra (2020_
DWER and DBCA shapefiles
- Watercourses
- Geomorphic Wetlands Database

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Proposed clearing is not likely to be at variance to this Principle

Aspect	Risk
Flood Risk	Three sections with <3%, 10-30% and >70% of map unit showing a moderate to high flood risk
Phosphorous Export	Three sections with <3%, 10-30% and >70% of map unit showing a moderate to high phosphorus export risk
Salinity	Three sections with <3%, 3-10% and 10-30% of map unit showing a moderate to high salinity risk
Waterlogging	Three sections with <3%, 3-10% and >70% of map unit showing a moderate to high flood risk
Water Erosion	Three sections with <3%, 10-30% and >70% of map unit showing a moderate to high phosphorus export risk
Wind Erosion	Three sections with <3%, 10-30% of map unit showing a moderate to high phosphorus export risk
Acid Sulphate Soils (ASS)	Extremely Low Probability of Occurrence

The Natural Resource Management risk mapping indicates the project is at moderate risk of degradation factors. Given the small size of the proposed clearing, the linear shape of the proposal area, its location adjacent to an existing road and that the presence of bare soils will be minimal due to the construction of the road, the proposed clearing is not likely to cause appreciable land degradation.

Assessed Outcome:
Project clearing not likely to be at variance to this Principle

Methodology
DPIRD Datasets (Accessed 2021)

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

Proposed clearing is not likely to be at variance to this Principle

Comment
The proposal area is within 50 m of the Lake Wannamal Nature Reserve and Betts Nature Reserve. The proposal area and the reserves are separated by an adjoining rail corridor that is vegetated on each side. It is unlikely that clearing associated with the project will have either a direct or indirect impact on these reserves.

Glevan Consulting, in their assessment of dieback risk within the proposal area stated that "*It was also noted that there is a train line running parallel to Bindoon-Moora Road which effectively acts as a barrier*

and would almost certainly prevent the spread of disease (should it be present) from the project area into the nature reserve."

In considering the above and noting that the project will be subject to Main Roads standard management actions to ensure any risks to adjacent vegetation (via dust emissions or introduction/spread of weeds or dieback) are minimised as far as practicable, it is not likely that the proposed clearing will be at variance to this Principle.

Assessed Outcome:
Project clearing not likely to be at variance to this Principle.

Methodology
DBCA shapefiles

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

Proposed clearing is not likely to be at variance to this Principle

Comment
The proposal area intersects a mapped non perennial watercourse. The project will require clearing of up 2 m along the western edge of the proposal area and 4 m for culvert works on the eastern side

Given the degraded nature of the vegetation present, the clearing of this small section is unlikely to cause a deterioration in the quality of surface or underground water. In addition, the CEMP will incorporate management actions to ensure potential indirect and short-term impacts, such as sedimentation and erosion, are managed.

Assessed Outcome:
Project clearing not likely to be at variance to this Principle.

Methodology
DWER and DBCA shapefiles
Google Earth Imagery (2021)

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Proposed clearing is not likely to be at variance to this Principle

This project proposes to clear up to 2.9 ha of vegetation over an approximately 4 km stretch of road. The removal of such a small area of vegetation makes it unlikely that the incidence or intensity of flooding will increase. NRM SLIP identifies that the majority of the proposal area has <3% risk of flooding.

A small section (0.59 ha) associated with the watercourse and resource enhancement wetland has a >70% risk of flooding, as shown in Plate 3. The clearing of 2 m (RHS) and 4 m (LHS) from the edge of the road will not result in an increase the incidence or intensity of flooding events.

Assessed Outcome:
Project clearing not likely to be at variance to this Principle.

Methodology
Natural Resource Management SLIP Soil Systems (Accessed 2021)

6 ADDITIONAL ACTIONS REQUIRED

Table 5 summarises what further pre-clearing impact assessment and vegetation management is required in accordance with CPS 818.

Table 5. Summary of Additional Management Actions Required by CPS 818

Impact of Clearing	Yes/No or NA	*Further Action Required*
1. The CAR indicates that the clearing is 'At Variance' or 'May be at Variance' with one or more of the Clearing Principles. Where the clearing is at variance or may be at variance to Clearing Principle (f) and no other Clearing Principle, and the area of the proposed clearing is less than 0.5 hectares in size and the Clearing Principle (f) impacts only relate to: (i) a minor non-perennial watercourse(s); (ii) a wetland(s) classed as a multiple use management category wetland(s); and/or (iii) a wetland that is not a defined wetland; the preparation of an Assessment Report, as required by condition 6(e), is not required.	**Yes**	**1.** Submissions will be sought from relevant parties, including the LGA and Wildflower Society in accordance with Condition 8 of CPS 818/15 published on the website. **2.** VMP has been completed, refer to Appendix 2. **3.** An offset proposal for approval by DWER is required where clearing is 'at variance'. The offset proposal must be approved prior to undertaking clearing of the area to which the offset is related.
2. Clearing is at variance or may be at variance with Clearing Principle (g) land degradation, (i) surface or underground water quality or (j) the incidence of flooding.	**No**	No further action required.
3. The project involves clearing for temporary works (as defined by CPS 818).	**No**	No further action required.
4 a. Project is within Region that:	**Yes**	Comply with the Dieback Management Process D20#56909.

Impact of Clearing	Yes/No or NA	*Further Action Required*
- Has rainfall greater than 400mm and - Is South of the 26th parallel and - Works are in 'Other than dry conditions' and - Works have potential for **uninfested** areas to be impacted		
4b. Does the proposed works require clearing within or adjacent to DBCA estate in non-dry conditions?	**No**	No further action required.
5. Main Roads has been notified by DWER or an environmental specialist that the area to be cleared is susceptible to a pathogen other than dieback	**No**	Glevan Consulting (2021) has undertaken a dieback assessment. No known occurrences of dieback where observed. The findings of this assessment have been incorporated into the VMP.
6. The vegetation within the area to be cleared and/or the surrounding vegetation in a good or better condition and weeds likely to spread to and result in environmental harm to adjacent areas of native vegetation that are in good or better condition	**No**	No further action required.

7 STAKEHOLDER CONSULTATION

Main Roads will undertake stakeholder consultation in accordance with CPS 818/15 Condition 8.

8 VEGETATION MANAGEMENT

Main Roads will avoid clearing native vegetation where possible. Where clearing cannot be avoided then this clearing is kept to a minimum. A Vegetation Management Plan (VMP) has been developed to manage and minimise vegetation clearing for the project (refer to Appendix 2).

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10 APPENDICES

Appendix	Title
Appendix 1	Constraints Mapping
Appendix 2	Vegetation Management Plan

Appendix 1: Constraints Mapping

Figure 1a: Vegetation Units and Flora

Figure 1c: Vegetation Units and Flora

Figure 1c: Vegetation Units and Flora

Figure 2a: Vegetation Condition

Figure 1d: Vegetation Units and Flora

Figure 2a: Vegetation Condition

Figure 2b: Vegetation Condition

Legend

Proposal Area

Vegetation Condition

Completely Degraded

Degraded to Completely Degraded

Degraded

Good to Degraded

Good

Good to Very Good

Very Good

Notes:

mainroads WESTERN AUSTRALIA

0 25 50 100 150 200 m

Scale: 1:3,500

N

A3 scale:

Date: 16/09/2021 Version: 1

Coordinate System: GDA 1994 MGA Zone 50

M002 Bindoon-Moora Upgrade Project

Figure 2c: Vegetation Condition

Figure 2d: Vegetation Condition

Figure 5: Regional Reserves

Figure 6a: Black Cockatoo Potential Breeding Trees

Figure 6b: Black Cockatoo Potential Breeding Trees

Figure 6c: Black Cockatoo Potential Breeding Trees

Figure 7a: Black Cockatoo Potential Foraging Habitat

Figure 7b: Black Cockatoo Potential Foraging Habitat

Figure 7b: Black Cockatoo Potential Foraging Habitat

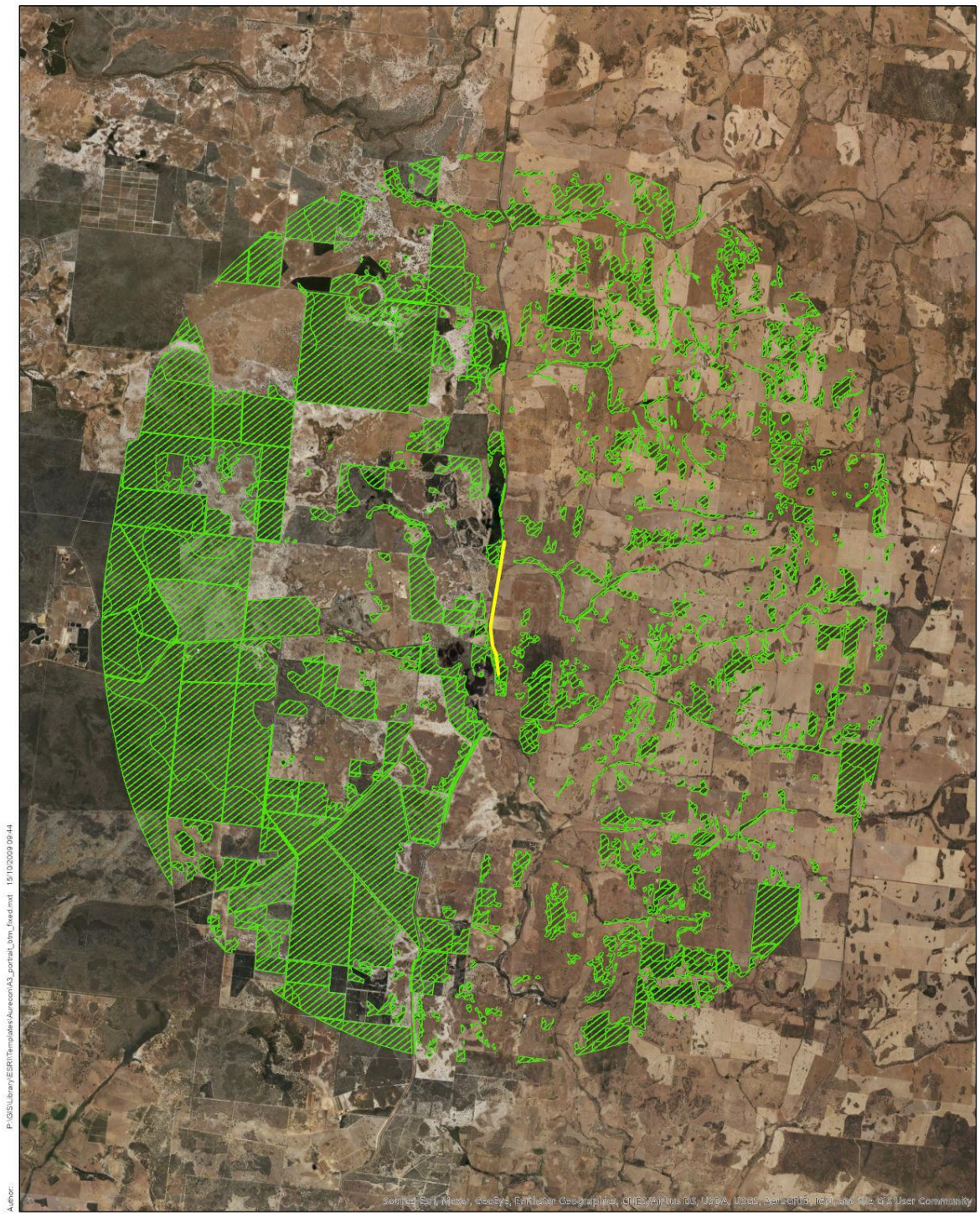

Figure 8: Regional Black Cockatoo Habitat

Appendix 2: Vegetation Management Plan

BINDOON-MOORA ROAD 26.4-30.6 SLK
WIDENING PROJECT

Purpose and Scope

This Vegetation Management Plan (VMP) has been prepared by Main Roads for the purpose of managing native vegetation clearing impacts associated with the Bindoon-Moora Road 26.4-30.6 SLK widening project.

The project involves the widening of Bindoon-Moora Road (M002) between 26.4 and 30.6 SLK to accommodate two 3.5 m wide lanes with 1.5 m sealed shoulders. The aim of the project is to improve road user safety by attempting to reduce the frequency and severity of crashes.

In specified circumstances, a VMP is required to be approved by Department of Water and Environmental Regulation (DWER) as a condition of Main Roads Statewide Clearing Permit CPS 818.

Action

Appendix 2.1 references the standard Principal Environmental Management Requirements (PEMRs) (Table's 1 to 9) that will be utilised for all projects that involve clearing to avoid, mitigate and manage the environmental impacts of the project.

Project Specific Environmental Management Requirements are contained in Table 1.

Timeframes

Actions shall be undertaken in accordance with those described in the relevant PEMR and the Project Specific Environmental Management Requirements.

Responsibilities

It is the responsibility of the Superintendent's Contract Management Team to ensure that the requirements are implemented by the Contractor. This shall be done by adhering to the Environmental Measurement and Evaluation Checklist.

Appendix 2.1: Vegetation Management

VMP Requirement	Standard Management Action	Specific Management Action
Clearing	Refer to Table 1: Clearing PEMR • Specification 204 Environmental Management • Construction Environmental Management Plan • Specification 301 Vegetation Clearing and Demolition • Environment Measurement and Evaluation Checklist (for release of HOLD POINTS) Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/	Carnaby's Cockatoo nesting tree at 28.92 SLK to be retained and protected through use of safety barrier. Works are excluded within 10 m of this tree between September and March to avoid disruptions during the breeding season. It is noted that the tree is located within 2 m of the existing Bindoon-Moora Road.
Dieback Management	Refer to Table 2: Dieback PEMR • Specification 204 Environmental Management • Construction Environmental Management Plan Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/	Clean on entry points have been identified by Glevan Consulting, to maintain the integrity of an area identified as 'Uninterpretable' 'Protectable'. 'Clean on Entry' is required between SLK 26.4 and 27.3
Erosion and Sedimentation Control	Refer to Table 3: Erosion and Sedimentation Control PEMR • Specification 204 Environmental Management • Construction Environmental Management Plan Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/	Not Applicable

VMP Requirement	Standard Management Action	Specific Management Action
Fauna	Refer to Table 4: Fauna PEMR • Specification 204 Environmental Management • Construction Environmental Management Plan Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/	Carnaby's Cockatoo nesting tree at 28.92 SLK to be retained and protected through use of safety barrier
Machinery and Vehicle Management	Refer to Table 5: Machinery and Vehicle Management PEMR • Specification 204 Environmental Management • Construction Environmental Management Plan Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/	Not Applicable
Mulch and Topsoil Management	Refer to Table 6: Mulch and Topsoil Management • Specification 204 Environmental Management • Construction Environmental Management Plan • Specification 301 Vegetation Clearing • Specification 304 Revegetation and Landscaping Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/	Not Applicable
Pegging and Flagging	Refer to Table 7: Pegging and Flagging PEMR • Specification 204 Environmental Management • Construction Environmental Management Plan	Not Applicable

VMP Requirement	Standard Management Action	Specific Management Action
	• Specification 301 Vegetation Clearing and Demolition Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/	
Water Drainage Management	Refer to Table 8: Water Drainage PEMR • Specification 204 Environmental Management • Construction Environmental Management Plan	Not Applicable
Weed Management	Refer to Table 9: Weed Management PEMR • Specification 204 Environmental Management • Construction Environmental Management Plan Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/	Not Applicable
Monitoring	• Specification 204 Environmental Management • Construction Environmental Management Plan • Superintendent's Contract Management Plan & Environmental Measurement and Evaluation Checklist. Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/	Not Applicable
Auditing	• Specification 204 Environmental Management • Superintendent's Contract Management Plan & Environmental Measurement and Evaluation Checklist. Contract Tender Documents available at https://www.mainroads.wa.gov.au/technical-commercial/tender-preparation/	Not Applicable

Principal Environmental Management Requirements (PEMR's)

Table 1: Clearing PEMR

STANDARD MANAGEMENT ACTIONS

STANDARD MANAGEMENT REQUIREMENTS
PRE WORKS 1. The Contractor must prepare, implement and maintain processes to ensure that the movement of all vehicles, plant and machinery does not occur outside of the Limits of Vegetation Clearing. This must include all turnaround areas. 2. The Contractor must minimise vegetation clearing and the area of disturbance on ground by utilising existing cleared area where possible.
DURING WORKS 1. The Contractor must report any damage to vegetation beyond the Limits of Vegetation Clearing as an Environment Incident. 2. The Contractor must ensure Movements are confined to the Limits of Vegetation Clearing during the works 3. The Contractor must undertake the clearing in accordance with the Fauna PEMR.
POST WORKS 1. NIL

Table 2: Dieback PEMR

STANDARD MANAGEMENT ACTIONS

STANDARD MANAGEMENT REQUIREMENTS
PRE WORKS 1. Contractor's Pre-starts must detail the requirements from the DMP/HMP, where relevant, dieback management areas and the requirements of each area, maps of infested and uninfected locations, and hygiene requirements 2. Where relevant a copy of the DMP/HMP must be onsite. This plan will include maps of management areas and obligatory control actions 3. Prescribe where vehicles, machinery and plant are going to be stored/parked during the works. 4. Use the Plant, Vehicle and Equipment Hygiene Checklist or equivalent Hygiene form to check that all machinery and vehicles are clean on entry (i.e. free of soil and vegetation).
DURING WORKS 1. If required, locations of dieback infested or dieback free areas and hygiene control locations marked on site in accordance with contract HMP or DMP. 2. Hygiene works to be undertaken as per the HMP or DMP, where required. 3. Restrict movement of machines and other vehicles to the Limits of Vegetation Clearing. 4. Ensure no known weed affected soil, mulch, fill or other material is brought into the Limits of Vegetation Clearing. 5. Ensure cleared materials are stockpiled or disposed at waste at the locations approved by the Superintendent.
POST WORKS 1. Record that the project was undertaken in dry soil conditions (unless an approved DMP authorises otherwise). 2. Use the Plant, Vehicle and Equipment Hygiene Checklist to check that all machinery and vehicles are clean on exit (i.e. free of soil and vegetation).

Table 3: Erosion and Sedimentation

PRE WORKS

1. The Contractor must develop, implement and maintain processes and procedures to ensure that:
   - The Contractor is responsive to and addresses incidents of erosion and sedimentation within and adjacent to the work areas.
   - Prevent water and wind soil erosion within and adjacent to the works areas.
   - Prevent the sedimentation and siltation of watercourses located within and adjacent to the works area.
   - Ensure that sedimentation and siltation of drainage lines due to the removal of riparian vegetation is avoided, minimised and mitigated.
   - Ensure that loose surfaces and recently cleared areas are protected from wind and soil erosion.
   - Minimise exposed soil working surfaces or protect them from stormwater erosion.
   - Ensure material such as gravel, crushed rock and excavated material is stockpiled away from drainage paths and covered to prevent erosion.
   - Ensure that water quality monitoring is undertaken when turbidity and sedimentation is an issue.

DURING WORKS

1. Implement, monitor and adhere to the sedimentation and erosion processes developed to address the requirements in the pre-works.

POST WORKS

1. If required, the Contractor must continue to monitor water quality until the turbidity/sedimentation dissipates.
2. The Contractor must ensure that disturbed areas are stabilised as soon as is practicable after construction activities are completed.

Table 4: Fauna

PRE WORKS

1. The Contractor must ensure that fauna management requirements are communicated to the crew undertaking the clearing works during the induction and pre-start meeting.
2. Where active nests, burrows or dens are identified, works must not proceed until the Contractor obtains the Superintendents approval of the management of active nests, burrows or dens adheres to the Superintendents advice.

DURING WORKS

1. The Contractor must undertake the clearing in the following manner to allow fauna to move out of the clearing area;
   i. Prior to the clearing activities commencing, use machinery to tap large trees with habitat hollows to encourage any animals evacuate.
   ii. Undertake the clearing in one direction and towards areas of native vegetation to allow the animals to escape to adjacent habitat.
2. The Contractor must ensure that all onsite personnel undertake visual monitoring and are vigilant to the presence of fauna. Any sightings of fauna, including injury or fatality, must be reported as an Environmental Incident.
3. The Contractor must ensure that;
   i. No pets, traps or firearms are brought into the proposal area.
   ii. Fauna are not fed
   iii. Fauna are not intentionally harmed or killed
   iv. Fauna that venture into the work area are encouraged to leave in a manner that does not harm the animal or operator (loud noise, slowly approaching in a vehicle etc.)
4. The Contractor must ensure that in the event that sick, injured or orphaned native wildlife are located on the project site, the WILDCARE Helpline ((08) 9474 9055) will be contacted for assistance. The Contractor must maintain records of any animal taken to a wildlife carer.

POST WORKS

1. The Contractor must provide any records of fauna impact to the Superintendent.

Table 5: Machinery and Vehicle Management

PRE WORKS

1. The Contractor must ensure that all areas associated with the storage, parking, servicing, wash down and refuelling of all vehicles, plant and machinery is located within the Limits of Clearing and approved by the Superintendent.
2. The Contractor must ensure that all vehicles, machinery and plant are clean on entry (i.e. free of all soil and vegetation material) and comply with the requirements of 204.B.32.
3. The Contractor must ensure that vehicle servicing and refuelling will be undertaken at designated areas approved by the Superintendent.
4. The Contractor must ensure that all staff suitably qualified and competent to undertake works, especially refuelling activities.

DURING WORKS

1. The Contractor must maintain records of checking all vehicles, machinery and plant are clean on entry.

POST WORKS

Table 6: Mulch and Topsoil Management

PRE WORKS

1. The Contractor must ensure that the movement of soil and vegetation is only undertaken in dry conditions unless otherwise approved and / or directed by the Superintendent.
2. The Contractor must ensure that poor quality topsoil and mulched vegetation does not contaminate the good quality topsoil and vegetation.

DURING WORKS

1. The Contractor must ensure that all machinery used in the removal of weed-infested topsoil must be cleaned down before and between operations to prevent the introduction and spread of weeds.
2. The Contractor must ensure the movement of large equipment over topsoil materials is avoided to minimise compaction.
3. The Contractor must ensure that Dieback and weed infected topsoil and mulch vegetation must be handled separately to minimise the risk of spreading dieback and weed species across the site and stockpiles.
4. The Contractor must ensure that stockpiling operations must occur in a manner to ensure that the properties of the topsoil are not degraded and the topsoil made unsuitable for use in revegetation.

POST WORKS

Table 7: Pegging and Flagging

PRE WORKS

1. Pegging must be done in accordance with the requirements detailed in Specification 301.
2. The Contractor must clearly communicate, either at the pre-start meeting or equivalent, to the crew undertaking the clearing works, through clear maps and other additional means, what the Pegging represents.

DURING WORKS

1. The Contractor must peg the Limits of Clearing by PINK flagging tape.
2. The Contractor peg/demarcate vegetation proposed to be retained is demarcated by WHITE flagging tape.
3. The Contractor must ensure that the vegetation demarcated with PINK and WHITE flagging tape is consistent with the approved clearing areas.

POST WORKS

1. The Contractor remove and dispose of appropriately any demarcation, pegging or flagging once project works are completed.

Table 8: Water Drainage

PRE WORKS

1. Use pollution control and containment strategies for project activities in Public Drinking Water Source Areas (PDWSAs) / Underground Water Pollution Control Areas (UWPCAs) and liaise with the DWER where necessary

DURING WORKS

1. Existing natural drainage paths and channels along the road or the vicinity of the proposal area will not be unnecessarily blocked or restricted.
2. Temporary drainage systems may be installed to carry surface water away from the areas where excavation and foundation construction work is taking place or from any other area where the accumulation of water could cause delay or damage to the work.
3. Maintain these drainage systems in proper working order at all times.
4. Runoff from disturbed areas must be managed to minimise adverse impacts on surrounding vegetation, watercourses and properties.
5. Booms and silt fences must be used when working over or adjacent to areas of surface water in order to protect the quality of surface water from construction impacts.

POST WORKS

1. Water quality monitoring to be undertaken (if turbidity/ sedimentation is an issue).

2. Prior to backfilling the completed pipe work certify that the entire system is flushed clean and tested
3. Disturbed areas will be stabilised soon after construction activities are completed.
4. Culvert and drainage structures will be free of all grass, weeds, silt and debris

Table 9: Weed Management

PRE WORKS

1. The Contractor must remove or kill any weeds growing in proposal area that are likely to spread and result in environmental harm to adjacent areas of native vegetation that are in good or better condition.
2. The Contractor must develop, implement and maintain procedures to identify and control declared and invasive weed species within the Contract areas, to the satisfaction of the Superintendent.
3. The Contractor must prepare a weed control program, for nominated weed species for control and disposal, to the satisfaction of the Superintendent.
4. The Contractor must undertake weed management in Stockpiles as directed by the Superintendent.

DURING WORKS

1. The Contractor must implement the weed control procedures and management plan and record and manage records of its implementation.
2. The Contractor must treat nominated weed infestations as many times as necessary to control and eradicate the weed species in accordance with the approved weed control program
3. The contractor must ensure that no known weed, pest or diseased affected soil, mulch, fill or other material is brought into the Site.

POST WORKS

1. The relevant Vegetation Maintenance Record Sheets available at: https://www.mainroads.wa.gov.au/BuildingRoads/Contracting/Pages/ReportingForms.aspx must be completed and sent to the Superintendent.