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Clearing Assessment Report and Vegetation Management Plan (VMP) – CPS 818

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Western Australia.*

Doley Road Connection
EOS#1598

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Contents

1	PROPOSAL	5
1.1	Purpose and Justification.....	5
1.1.1	Main Roads Approach to Road Safety and the Environment.....	5
1.2	Proposal Scope.....	6
1.3	Proposal Location.....	6
1.4	Clearing Details.....	6
1.5	Alternatives to Native Vegetation Clearing Considered During Proposal Development.....	9
1.6	Measures to Avoid, Minimise, Reduce and Manage Proposal Clearing Impacts	9
1.7	Approved Policies and Planning Instruments.....	11
2	SCOPE AND METHODOLOGY ASSESSMENT OF CLEARING.....	12
2.1	Report Terminology and Sources.....	12
2.2	Desktop Assessment	12
2.3	Surveys and Assessments.....	12
3	SURVEY RESULTS	14
3.1	Summary of the Flora, Vegetation, and Fauna Survey	14
3.1.1	Black Cockatoos	15
4	VEGETATION DETAILS	18
4.1	Proposal Site Vegetation Description.....	18
4.2	Vegetation Complexes and Representation.....	19
5	ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES	20
6	VEGETATION MANAGEMENT	34
7	REHABILITATION, REVEGETATION & OFFSETS	34
7.1	Revegetation and Rehabilitation	34
7.2	Offset Proposal.....	34
8	STAKEHOLDER CONSULTATION	34
9	COMPLIANCE WITH CPS 818.....	35
10	REFERENCES	37
11	APPENDICES	38
	Appendix 1: CPS 818 condition 8 (e) (iii) Biological Survey Report Conclusions.....	38
	Appendix 2: Vegetation Management Plan.....	41

List of Figures

Figure 1. Development Envelope.....	7
Figure 2. Vegetation within Development Envelope.....	8

List of Tables

Table 1. Measures Undertaken to Avoid, Minimise, Reduce and Manage the Proposal Clearing Impacts	10
Table 2. Summary of Biological and Targeted Surveys Relevant to the Proposal	13
Table 3: An assessment of proposed CPS 818 clearing against Bamford Consulting Ecologists (2020) <i>scoring system for the assessment of foraging value of vegetation for Black Cockatoos</i>	17
Table 4. Summary of Vegetation Types within Development Envelope.....	18
Table 5. Pre-European Vegetation Representation	19
Table 6. Vegetation Complexes (Heddle/Mattiske) within the Development Envelope	19
Table 7: Summary of Project Area's Mapped Pre-European Vegetation Associations	26
Table 8: Pre-European Vegetation Representation	26
Table 9: Vegetation Complex (heddle/Mattiske) Representation.....	26
Table 10: Summary of Additional Management Actions Required by CPS 818.....	35

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1 PROPOSAL

1.1 Purpose and Justification

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

Main Roads proposes to modify the Doley Road connection in order to maintain adequate access to individual properties and provide necessary emergency egress routes between Orton Road and Cardup Siding Road in Byford due to proposed changes in existing connections.

1.1.1 Main Roads Approach to Road Safety and the Environment

Main Roads is committed to minimising the environmental impacts of all of its activities and manages the State road network to achieve balanced economic, social, safety and environmental benefits for the community. Main Roads recognises that Western Australia's environment is significant from a global perspective and the unique conservation values that are contained within its road reserve. Main Roads road network often adjoins natural areas and, in some locations, the reserve itself hosts remnant vegetation with high environmental values. Although the reserves were not established for this purpose, Main Roads recognises that it has a responsibility to conserve the environmental values that occur within the State's road network and minimise the impact its proposals have on the environment. In addition to providing a safe and efficient road network for all people using the roads under its control, Main Roads is also committed to protecting and enhancing the natural environment.

In accordance with National and State Government road safety policies, Main Roads is also committed to substantially reducing road trauma on the road network through Safe System principles. The Safe System approach acknowledges that more than two thirds of all serious crashes are due to human error rather than deliberate risk taking (e.g. speeding or drink driving) and seeks to improve behaviour through education and enforcement while managing the safety of vehicles, speeds and the road and road infrastructure. It is shown that improving sub-optimal road formation will substantially reduce the likelihood and severity of road crashes. For example, according to the Road Safety Management Guideline, increasing the sealed shoulder from 0.5 m to 2 m will reduce Killed and Seriously Injured numbers by more than 50%.

As the statutory authority responsible for providing and managing a safe and efficient main road network in Western Australia, Main Roads focuses on improving road safety by thoroughly considering all environmental, economic and community benefits and impacts. It operates on a hierarchy of avoiding, minimising, reducing and then, if required, offsetting our environmental impacts. This has been achieved through changes in proposal scope and design. Main Roads regularly reduces its clearing footprint by restricting earthworks limits for proposals, steepening batters, installing barriers, establishing borrow pits in cleared paddocks and avoiding temporary clearing for storage, stockpiles and turn around bays to avoid and minimise its impacts.

Further details on measures to avoid, minimise and reduce are provided in Section 1.6.

1.2 Proposal Scope

The Proposal involves modification and construction of Doley Road Connection between Orton Road and Cardup Siding Road, which will involve:

- Preliminary works (e.g. geotechnical investigations)
- Vegetation clearing
- Ground disturbance
- Construction of sealed road including the installation of culverts to maintain the flow of Cardup Brook.

1.3 Proposal Location

The Proposal is located on Doley Road (South of Orton Road, Byford) within the Shire of Serpentine Jarrahdale, as shown in Figure 1. The central coordinate of the Proposal is:

- Latitude: -32.2386°
- Longitude: 115.9860°

1.4 Clearing Details

Proposed Clearing to be undertaken using CPS 818

Up to 0.35 ha of native vegetation is required to be cleared. No temporary clearing is required for the proposal.

Areas of Native Vegetation Clearing

The areas of native vegetation to be cleared are displayed in Figure 2.

Type of Native Vegetation

Clearing of native vegetation for the Proposal comprises three vegetation types (GHD 2024):

- Mid open to closed forest of *Eucalyptus rudis*, *Melaleuca raphiophylla* and *Melaleuca preissiana* – 0.15 ha
- Individuals or stands of *Corymbia calophylla* over pasture weeds on various soils and topographic positions – 0.20 ha

Figure 1. Development Envelope

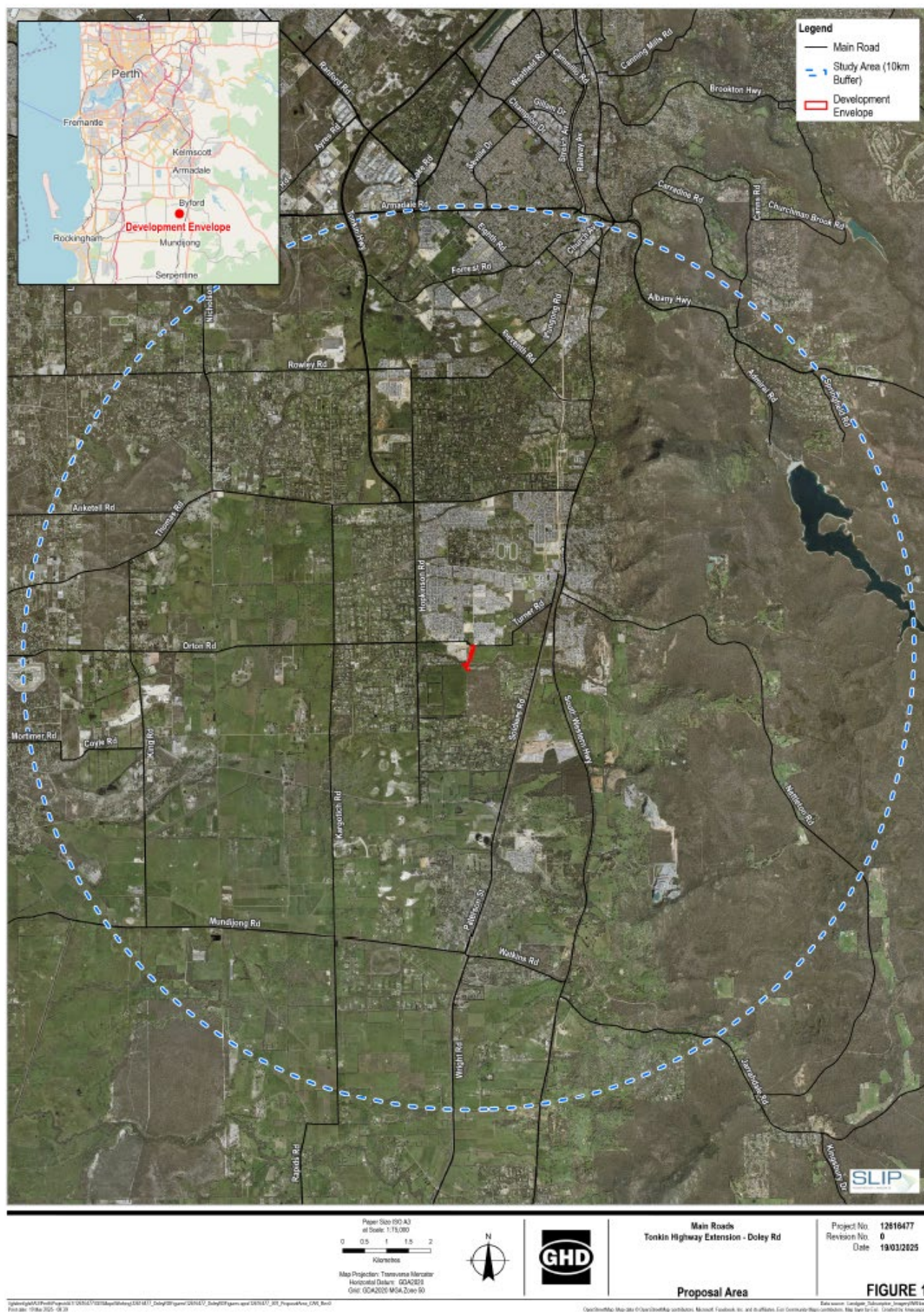


Figure 2. Vegetation within Development Envelope



1.5 Alternatives to Native Vegetation Clearing Considered During Proposal Development

The following alternatives to clearing were considered during the development of the proposal:

- Upgrading other alternative routes; however, these are not suitable due to longer travel times, sensitive local receptors, more environmental impacts or other planning issues
- Do not undertake the modification and construction of Doley Road Connection; however, this will not addressing individual property access requirements and fails to address the required emergency egress route needs between Orton Road and Cardup Siding Road in Byford.
- Main Roads retains frangible vegetation where a clear zone is to be established for road projects. For this project, however, clearing will only be required to accommodate the road formation, with no clear zone being established. Accordingly, the retention of frangible vegetation does not apply to this proposal.
- Reducing the speed limit to minimise clearing requirements, while still balancing safety (driver fatigue). Speed Limits are an essential mechanism to ensure the safe and efficient operation of road networks. The application of appropriate speed limits and other traffic management measures is a key mechanism in managing vehicle speeds to achieve desired safety, mobility, traffic management, local amenity, and road user expectations. There are several factors involved in road safety, including road conditions, driver behaviour and overall road design. As this Proposal is associated with the construction of a new local road connection, speeds will be set accordingly, therefore a reduction of the speed limits will not avoid clearing of native vegetation and is not proposed.

1.6 Measures to Avoid, Minimise, Reduce and Manage Proposal Clearing Impacts

The design and management measures implemented to avoid and minimise the potential clearing impacts of the Proposal are provided in Table 1.

Table 1. Measures Undertaken to Avoid, Minimise, Reduce and Manage the Proposal Clearing Impacts

Design or Management Measure	Applied to Current Design	Discussion and Justification
Alignment to one side of existing road	N/A	Modification and construction of the local road is required to maintain adequate access to individual properties and provide necessary emergency egress routes between Orton and Cardup-siding Road. The alignment connects Orton Road and Cardup Siding Road via predominantly pastured degraded areas, as no existing connecting road exists.
Alternative alignment located within pasture or degraded areas	Yes	The DE has been selected to ensure pastured and cleared areas are utilised to the maximum extent possible, with most of the area comprising pastured/cleared areas, with all native vegetation being of Degraded and Completely Degraded condition.
Simplification of design to reduce number of lanes and/or complexity of intersections	Yes	Design of the new road will be consistent with the existing local road design.
Steepen batter slopes	N/A	The alignment is associated with relatively flat ground, where batters are unlikely to be utilised in the design.
Installation of barriers	N/A	The installation of safety barriers is not required within the design and integration would not reduce the DE or clearing impacts.
Installation of kerbing	Yes	Kerbing has been designed where possible but will have limited impact on the construction footprint (and thus clearing footprint).
Use of existing cleared areas for access tracks, construction storage and stockpiling	Yes	All stockpile locations and access tracks into the site are already cleared. No additional clearing is required at all for these purposes.

1.7 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, Main Roads has also had regard to the below instruments where relevant.

Other Legislation potentially relevant 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).

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 (Government of WA, December 2014)
- Procedure: Native vegetation clearing permits (Government of WA, October 2019)
- Environmental Offsets Guidelines (Government of Western Australia, 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
- Referral guideline for 3 WA threatened black cockatoo species (DAWE, 2022).

2 SCOPE AND METHODOLOGY ASSESSMENT OF CLEARING

Native vegetation will be cleared to accommodate this Proposal. This clearing will be undertaken using the Main Roads Statewide Clearing Permit CPS 818/17. To comply with CPS 818/17, Main Roads must prepare a Clearing Assessment Report (CAR).

The CAR outlines the key activities associated with the Proposal, the existing environment and an assessment of native vegetation clearing. This assessment provides an evaluation of the vegetation clearing impacts associated with the Proposal using the ten Clearing Principles listed under s51 of the *Environmental Protection Act 1986* (EP Act) and strategies used to manage vegetation clearing.

2.1 Report Terminology and Sources

The following terms are used in this Clearing Report:

- **Native Vegetation Clearing Area (Clearing Area)** – The maximum amount of native vegetation to be cleared for the Proposal that will accommodate the designed earthworks and, typically, a nominal buffer to allow for the safe movement of machinery during construction.
- **Development Area (DE)** - The maximum extent within which the Clearing Area will be located. This envelope larger than the Clearing Area and the Proposal Area to allow for minor changes to the Proposal footprint as the design process continues, and to account for minor and unexpected changes that may occur during construction, such as working to avoid a large tree or encountering buried boulders or services. This flexibility allows the site personnel to make modifications to the Proposal to avoid areas that may contain better environmental values. The CAR has assessed all environmental values within the DE as though all of these values will be impacted, up to the amount specified within the Clearing Area.
- **Study Area** – Area covered by the Desktop Assessment. The Study Area for the Proposal is confined to a local area of a 10km radius for spatial data other than the Protected Matters Search Tool (PMST) which included a 1 km buffer.
- **Survey Area** – Area covered by the Biological Survey, which is typically larger than the DE.

2.2 Desktop Assessment

A desktop assessment of the DE was undertaken by viewing internal datasets and other government agency managed databases and consulting with relevant stakeholders where necessary.

Referencing of the GIS layers accessed is done under the relevant methodology section of each clearing principle. Government managed databases were searched to locate additional information, which are found under References in Section 10.

2.3 Surveys and Assessments

The following survey was undertaken to inform this CAR:

- Flora, fauna, and Black Cockatoo habitat assessment (GHD 2024)

The Biological survey details are outlined in Table 2 and a summary of the findings of the report is presented in Section 3.1.

Table 2. Summary of Biological and Targeted Surveys Relevant to the Proposal

Consultant & Survey Name	Survey Details
GHD (2024) Flora, fauna, and Black Cockatoo habitat assessment	Survey Area: The survey area covered 34.37 ha, including 2.23 ha (96.96%) of the DE for this Proposal. Type: Reconnaissance flora and vegetation survey, basic fauna survey, and Black Cockatoo habitat assessment Timing: The field survey was undertaken from 17 to 18 May 2023 Survey Results Shapefile TRIM Ref: D24#544075 Document TRIM Ref: D24#544082

3 SURVEY RESULTS

In accordance with CPS 818 condition 8 (e) (iii), a copy of the relevant sections of the executive summary and report conclusions from the biological survey and/or field assessments are provided in [Appendix 1](#).

3.1 Summary of the Flora, Vegetation, and Fauna Survey

GHD were commissioned by Main Roads to undertake a Reconnaissance flora and vegetation survey, Basic fauna survey and Black Cockatoo habitat assessment. The survey area consisted of 29 spatial separated polygons that ranged in size from 0.01 ha to 10.81 hectares (ha). The total combined survey extent (i.e. all polygons combined) was 34.37 ha, including 2.23 ha (97%) of the DE.

Of the 0.35ha Native Vegetation Clearing Area within the DE, 0.08ha was not located within the Survey Area. Vegetation and habitat type of this vegetation (located directly adjacent to the surveyed areas) has been extrapolated based aerial and street view imagery.

Four vegetation types, ten Highly Modified Areas and five Revegetated Areas were mapped within the survey area. Most of the survey area was considered Cleared and was represented by either roads or tracks, infrastructure, or pasture (26.28 ha, 76.46%). Highly modified areas covered 4.71ha (13.69%), revegetated areas covered 1.85 ha (5.37%) and vegetation types made up 1.28 ha (3.71%). The vegetation in the survey area ranged from Good to Completely Degraded condition.

One remnant native vegetation type and one highly modified vegetation type was recorded in the DE, not including Cleared areas:

- Vegetation Type 8 (0.15ha) - Mid open to closed forest of *Eucalyptus rudis*, *Melaleuca raphiophylla* and *Melaleuca preissiana* over isolated mid shrubs of mixed species including *Xanthorrhoea preissii* over low grassland and forbland of introduced species including **Ehrharta longiflora*, **Watsonia meriana* var. *bulbillifera*, **Oxalis pes-caprae*, **Juncus usitatus* and **Zantedeschia aethiopica* on brown loam in drainage lines and on adjacent floodplains.
- CC (0.2ha) - Individual or stands of *Corymbia calophylla* over pasture weeds on various soils and topographical positions.

Within the DE Vegetation Type 8 was mapped as being in Degraded condition and the highly modified association CC was mapped in a Completely Degraded condition.

No TECs listed under the EPBC Act or BC Act or PECs listed by DBCA were identified within the survey area, and therefore the DE, during the field survey.

Seventy-nine flora taxa (including subspecies and varieties) representing 29 families and 55 genera were recorded from the survey area during the field survey. This total comprised 34 native taxa and 45 introduced/non-endemic planted flora taxa.

No EPBC Act or BC Act listed flora were recorded within the survey area. One DBCA Priority four (P4) listed species *Grevillea olivacea* was recorded at several locations within the survey area. Although *Grevillea olivacea* is listed as a Priority flora species by DBCA, it is considered to be planted within the survey area and is well outside its natural range.

Three species are listed as a Declared Pests under the Biosecurity and Agriculture Management Act 2007 (BAM Act) were found:

- *Gomphocarpus fruticosus* (Narrowleaf Cottonbush)

- *Zantedeschia aethiopica* (Arum Lily)
- *Asparagus asparagoides* (Bridal Creeper)
- *Asparagus asparagoides* is also listed as a Weed of National Significance.

Notably, Vegetation Type 8 which covers the Cardup Brook was mapped as containing *Gomphocarpus fruticosus* (Narrowleaf Cottonbush) (10% cover) and *Asparagus asparagoides* (Bridal Creeper) (2% cover) along the length of the DE. In addition, several other weed species were located in this area. Quadrat data from this vegetation type within the DE states that total introduced species cover was 53%.

Within the Survey Area, three fauna habitat types were identified and mapped based on existing habitat types identified by Bamford (2019) and include Farmland/Cleared areas (26.28 ha), Remnant and re-planted native vegetation (6.19 ha), and Creeklines with native vegetation (1.50 ha). All three habitats were present in the DE, with Farmland/Cleared areas the most extensive.

Forty-eight fauna taxa representing 35 birds, six mammals, five reptiles and two frogs were recorded from the survey area during the field survey. This total comprised 41 native taxa and 7 introduced/non-endemic fauna taxa.

During the field survey, four significant fauna species were recorded including Quenda, Forest Red-tailed Black Cockatoo, Carnaby's Cockatoo and Baudin's Cockatoo. One Quenda was observed and sightings of scats, digs, and tunnels were recorded. Foraging evidence of all three Black Cockatoo species was observed on Marri nuts, and FRTBC was recorded flying overhead the vicinity.

The Forest Red-tailed Black Cockatoo was recorded from the DE via foraging evidence. The other two listed Black Cockatoos species (Baudin's and Carnaby's) are considered to also occur in the vicinity of the DE. Quenda diggings were recorded in the immediate area but did not occur within the DE.

3.1.1 Black Cockatoos

Vegetation within the Survey Area was assigned Black Cockatoo habitat value based on the Bamford Scoring System (Bamford 2020). The Bamford system provides a method of calculating Black Cockatoo habitat value based on the type, density and condition of trees and shrubs in an area and can be influenced by the context such as the availability of foraging habitat nearby. As each of the Black Cockatoo species have different preferred forage species, the Bamford system assigns different values for each of the species. Analysis of each of the two vegetation types within the DE has been provided based on the foraging value to relevant species of Black Cockatoo as presented in Table 3.

In summary, 26.44 ha (76.91%) of the survey area was valued as having 'no foraging value' for the three species of Black Cockatoos. In isolated areas throughout the survey area, it was determined that 1.38 ha (4.02%) had 'moderate to high foraging value'. These isolated patches of 'moderate to high foraging value' consisted predominantly of DBH-suitable *Corymbia calophylla* trees which provide potential Black Cockatoo breeding habitat. Moderate foraging value consisted of 0.85 ha (2.46%), Low to Moderate foraging value of 1.37 ha (3.99%) and low foraging value of 4.34 ha (12.62%).

Within the DE the following Black Cockatoo habitat values were recorded:

- 0.15 ha (43.77%) as 3/10, and
- 0.20 ha (56.23%) as 4/10.

A total of 236 suitable DBH trees for Black Cockatoo breeding were located within the survey area. Nine hollows were recorded within five trees, consisting of Flooded Gum and Jarrah. Of these, one hollow (Jarrah) was considered potentially suitable for Black Cockatoo nesting but showed no signs of previous use.

The DE contains 16 suitable DBH trees, and no trees with suitable hollows.

No Black Cockatoo roosting sites were recorded within the survey area.

Table 3: An assessment of proposed CPS 818 clearing against Bamford Consulting Ecologists (2020) scoring system for the assessment of foraging value of vegetation for Black Cockatoos

Aspect	Description of proposed clearing	
A. Site condition (out of 6)		
Description of clearing Two vegetation types will be impacted by project implementation: - Vegetation Type 8 - Mid open to closed forest of <i>Eucalyptus rudis</i>, <i>Melaleuca raphiophylla</i> and <i>Melaleuca preissiana</i> over isolated mid shrubs of mixed species including <i>Xanthorrhoea preissii</i> over low grassland and forbland of introduced species including <i>*Ehrharta longiflora</i>, <i>*Watsonia meriana</i> var. <i>bulbillifera</i>, <i>*Oxalis pes-caprae</i>, <i>*Juncus usitatus</i> and <i>*Zantedeschia aethiopica</i> on brown loam in drainage lines and on adjacent floodplains (0.15 ha). - CC - Individual or stands of <i>Corymbia calophylla</i> over pasture weeds on various soils and topographical positions. (0.2 ha).	Analysis Vegetation Type 8 provides limited foraging value for Black Cockatoo Species. Of the species listed within this vegetation type the overstory species are not considered foraging species and only <i>Xanthorrhoea preissii</i> is considered a secondary foraging species for Carnaby's Cockatoo and Baudin's Cockatoo. None of the species within this vegetation are known foraging species for Forest Red Tail Black Cockatoo. Individuals of this species provides a 'Low' foraging value.	Score: 2
	Analysis Vegetation Type CC comprises a Parkland Cleared environment comprising <i>Corymbia calophylla</i> over pasture weeds. <i>Corymbia calophylla</i> is a primary foraging resource for all three black cockatoo species; however, when located in a parkland cleared habitat is congruent with a 'Low to Moderate' foraging value.	Score: 3
B. Site context (out of 3)		
Description of clearing Within the local area (15 km radius of the Clearing Area), there are 28,827.78 ha of vegetation which may be available foraging habitat for Black Cockatoo species. Total clearing of vegetation that represents suitable foraging habitat for Black Cockatoo species is 0.35 ha. The closest known breeding site is approximately 6.5 km to the east of the proposed clearing, and thus the Development Envelope is within an area where breeding is known/likely.	Analysis Vegetation proposed to be cleared represents 0.0012 % of existing native vegetation within the local area, where breeding is likely to occur.	
	Score: 0	
C. Species stocking rate (out of 1)		
Description of clearing Forest Red Tail black Cockatoo was observed flying overhead in the survey and foraging evidence of Carnaby's Cockatoo and Baudins Cockatoo was located.	Analysis Within the nearby area, all three Black Cockatoo species are seen or reported regularly and/or there is abundant foraging evidence.	
	Score: 1	
Total Score (out of 10)		
Vegetation Type 8 (0.15 ha)	3	
Vegetation Type CC (0.2 ha)	4	

4 VEGETATION DETAILS

4.1 Proposal Site Vegetation Description

The Proposed DE consists of a clearing area of 0.35 ha of native vegetation in Degraded or Completely Degraded condition with the remaining extent cleared (1.95 ha).

A small section of the DE (0.08 ha) was not mapped during the GHD (2024) survey. Based on satellite imagery and Google Earth Pro street view, the majority of this portion is cleared, with small areas of 'individual or stands of *Corymbia calophylla* over pasture weeds on various soils and topographical positions'. These areas have been inferred for the DE to determine the maximum extent of native vegetation present.

The native vegetation types identified within the DE are summarised in Table 4, including descriptions, condition and mapped extent in the wider survey area (GHD 2024).

Table 4. Summary of Vegetation Types within Development Envelope

Vegetation Type	Vegetation Condition within DE	Extent within DE (ha)	Total Extent Mapped (ha) within Survey Area
Individuals or stands of <i>Corymbia calophylla</i> over pasture weeds on various soils and topographic positions	Completely Degraded	0.20	1.36
Mid open to closed forest of <i>Eucalyptus rudis</i> , <i>Melaleuca raphiophylla</i> and <i>Melaleuca preissiana</i> over isolated mid shrubs of mixed species including <i>Xanthorrhoea preissii</i> over low grassland and forbland of introduced species including <i>*Ehrharta longiflora</i> , <i>*Watsonia meriana</i> var. <i>bulbillifera</i> , <i>*Oxalis pes-caprae</i> , <i>*Juncus usitatus</i> and <i>*Zantedeschia aethiopica</i> on brown loam in drainage lines and on adjacent floodplains.	Degraded	0.15	0.54
Farmland/Cleared areas	NA	1.95	26.28

The DE is located within the Swan Coastal Plain Interim Biogeographic Regionalisation of Australia (IBRA) region and the Perth Subregion (SWA2) (GoWA 2024).

There is one pre-European Vegetation Association within the DE – 968, which is described as – Medium woodland: *Eucalyptus marginata*, *Corymbia calophylla*, and *Eucalyptus wandoo*. Table 5 provides details of the Vegetation Association within the DE and the remaining extent of this association.

Table 5. Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre-European Extent (ha)	Current Extent (ha)	% Remaining	% Current Extent in DBCA Managed Land (proportion of pre-European Extent)
Veg Assoc No. 968	Statewide WA	296,877.84	95,048.82	32.02	18.45
	IBRA Bioregion Swan Coastal Plain	136,188.20	9,017	6.62	1.43
	IBRA Sub-region Perth	136,188.20	9,017.32	6.62	1.43
	Local Government Authority Shire of Serpentine Jarrahdale	24,351.49	1,121.13	4.60	0.57

4.2 Vegetation Complexes and Representation

Vegetation Complexes within the DE have been defined by Heddle et al. (1980) and are based on vegetation in association with landforms and underlying geology. Only one native vegetation complex as described by Heddle et al. (1980) occurs within the DE, as follows:

- **Guildford Complex** – A mixture of open forest to tall open forest of *Corymbia calophylla* - *Eucalyptus wandoo*– *Eucalyptus marginata* and woodland of *Eucalyptus wandoo* (with rare occurrences of *Eucalyptus lane-poolei*). Minor components include *Eucalyptus rudis* - *Melaleuca raphiophylla*.

The current remaining extent of this vegetation complex is detailed in Table 6. The remaining extent of the Guildford complex is below the minimum threshold of 10% that is the target for retention in constrained areas (DER 2014).

Table 6. Vegetation Complexes (Heddle/Mattiske) within the Development Envelope

Heddle/Mattiske Veg Complex	Pre-European Extent (ha)	Current Extent (ha)	% Remaining
Guildford Complex	90,513.13	4,522.01	5.09

Vegetation within the Development Envelope is in a Degraded to Completely Degraded condition with the two vegetation types comprising Parkland cleared areas and a riparian environment dominated by introduced species significantly altering the structure. Subsequently, the vegetation is no longer representative of the pre-European Guildford complex within the DE.

5 ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

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

Each principle has been assessed in accordance with the former Department of Environment Regulation (now Department of Water and Environmental Regulation (DWER) '[A Guide to the Assessment of Applications to Clear Native Vegetation](#)' (Department of Environment Regulation, 2014) and other relevant clearing permit application decision reports prepared by DWER.

The proposed clearing is at or may be at variance with one or more of the ten 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.

Assessment

Vegetation

The vegetation to be cleared within the DE consists of individuals or stands of *Corymbia calophylla* over pasture weeds (0.20ha) and a small area of *Eucalyptus rudis*, *Melaleuca raphiophylla* and *Melaleuca preissiana* (0.15ha) all of which is in a Degraded to Completely Degraded condition due to lack of native understory and an abundance of introduced species (Table 4). The native vegetation to be cleared is consistent and contiguous with the native vegetation in the surrounding area with the vegetation types expected to be represented within nearby conservation tenure including the adjacent Cardup Nature Reserve (GHD 2024).

The DE intersects Bush Forever site (Site No.351) which is the Cardup Brook Bushland of which 0.20ha of native vegetation is proposed to be cleared; however, the clearing will not break any linkages associated with the Bush Forever site and not significantly impact the environmental values of the conservation area.

Threatened and Priority Ecological Communities

Desktop searches and review of previous literature indicate the DE intersects the buffers of two ecological communities, namely SCP20b: *Banksia attenuata* and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain and SCP3b: *Corymbia calophylla* – *Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain. The GHD 2024 biological survey confirmed the vegetation types within the DE are not representative of any Threatened Ecological Communities listed under the EPBC Act or BC Act or Priority Ecological Communities listed by DBCA.

Significant flora

Desktop searches and a review of previous literature identified 45 significant flora taxa within the study area (DBCA, PMST, WAHERB). This included:

- The PMST search identified the potential presence of two Critically Endangered, nine Endangered, and three Vulnerable species under the EPBC Act
- The DBCA database search identified the potential presence of 10 Threatened species under the BC Act and two Priority 1 (P1), six P2, 15 P3, and five P4 flora species listed by the DBCA.

No EPBC Act or BC Act listed flora were recorded within the DE during the field survey (GHD 2024). A likelihood of occurrence assessment conducted by Umwelt (2021), of the surrounding areas, for which the GHD (2024) survey supplemented, concluded no additional significant flora taxa were likely to occur.

The DE is located amid agricultural lands, rendering the surrounding landscape fragmented. Given the small area of clearing and that all the native vegetation recorded in the DE is highly modified with no intact mid- or understory (GHD 2024), it is unlikely to support significant flora.

Fauna habitat

Three broad fauna habitats were recorded within the DE (GHD 2024) consisting of:

- Farmland/cleared areas (no vegetation) – 1.95ha
- Remnant and replanted native vegetation – 0.19 ha
- Creeklines with native vegetation – 0.16 ha

The 0.35 ha of native vegetation to be cleared provides negligible to low-value Black Cockatoo foraging habitat (see clearing principle B). Low-lying areas in 'creeklines with native vegetation' may support aquatic species and waterbirds when they are flooded (Bamford 2019). However, the fauna habitat is in poor condition as a result of historical clearing, surrounding infrastructure and high levels of weed invasion and is not considered likely to provide habitat that supports a high diversity of native fauna.

The native vegetation to be cleared is:

- comprised of vegetation types and taxa typical to the region.
- well represented outside of the Proposal Area, with areas of conservation tenure in close proximity.
- is a narrow linear patch of vegetation located immediately adjacent to an existing road in a highly fragmented landscape amid agricultural and residential lands
- in a Degraded to Completely Degraded condition
- contains no threatened or priority flora, no threatened ecological communities,

Based on the above, the 0.35ha of vegetation to be cleared is not considered to comprise a high level of biodiversity and is not likely to be at variance to this principle.

Methodology

- Biological Survey (Bamford 2019)
- Biological Survey (GHD 2024)
- DCCEEW Protected Matters Search Tool Report
- Government GIS Shapefiles:
 - DBCA Threatened and Priority Ecological Community database search (Accessed August 2024)
 - DBCA Threatened and Priority flora database search (Accessed August 2024)
 - DBCA Threatened and Priority fauna database search (Accessed August 2024)
 - WA Herbarium Threatened and Priority flora (Accessed August 2024)
- Statewide Vegetation Statistics (Government of Western Australia)

(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.

Proposed clearing is at variance to this Principle.

Assessment

The vegetation to be cleared within the DE consists of two fauna habitats consisting of:

- Creeklines with native vegetation – 0.16 ha
- Remnant and replanted native vegetation – 0.19 ha

The remainder of the DE contains no vegetation (GHD 2024).

All vegetation is in a Degraded to Completely Degraded condition and been subject to historical clearing and high levels of weed invasion consistent with the surrounding infrastructure and agricultural land (GHD 2024).

Fauna

Desktop searches identified the potential presence of 47 significant fauna species within the study area (DBCA and PMST). Of the 47 species identified four were considered likely to occur (described below) and the remaining species unlikely to occur due to lack of suitable habitat (Umwelt, 2021).

Black Cockatoos

The DE is located within the known distribution range of Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*), Baudin's Cockatoo (*Zanda baudinii*) and Carnaby's Cockatoo (*Zanda latirostris*). The GHD (2024) field survey did not record any evidence of Baudin's or Carnaby Cockatoos; however, Forest Red-tailed Black Cockatoo foraging evidence was recorded at two locations within the DE (GHD 2024). GHD (2024) concluded that the proposal area may provide potential suitable foraging habitat for Baudin's and Carnaby Cockatoos. Subsequently, GHD (2024) undertook a foraging habitat assessment utilising the Bamford Consulting Ecologists scoring method to determine the fauna habitat values for Black Cockatoo foraging within the Native Vegetation Clearing Area and determined the following values:

- 0.15 ha (43.77%) as 3/10, and
- 0.20 ha (56.23%) as 4/10.

All vegetation to be cleared is determined to provide negligible to low-value Black Cockatoo foraging habitat, with the clearing of up to 0.35 ha of low-value Black Cockatoo habitat required representing a 0.0012% reduction in potential foraging habitat for the species within a 15 km radius (based on an extent of 28,827.78 ha) (GoWA 2024).

Sixteen trees were recorded in the DE with suitable DBH (≥ 500 mm) for Black Cockatoo breeding but none with suitable hollows (GHD 2024). These trees consisted of seven Marri (*Corymbia calophylla*) and nine Flooded gum (*Eucalyptus rudis*). The nearest previously recorded breeding area for all three Cockatoos is approximately 6.5 km east of the Proposal Area in the Wungong Catchment. Furthermore, chewing at hollow entrances at Cardup Nature Reserve located immediately adjacent to the south of the Proposal Area have been attributed to the FRTBC (Kirkby 2019).

The Proposal is unlikely to significantly impact Forest Red-tailed Black, Baudin's or Carnaby's Cockatoo, considering:

- the small area of clearing, which is narrow and adjacent to the existing road
- the absence of known breeding habitat or suitable DBH trees with hollows
- no trees will be removed that are known roosting sites
- Black Cockatoos are highly mobile with suitable habitat immediately adjacent to the Proposal Area in the Cardup Nature Reserve.
- Clearing of up to 0.35 ha of low-value Black Cockatoo habitat represents a <0.01% reduction in potential foraging habitat for the species, within a 10 km radius.

The removal of up to 0.35 ha of low quality foraging habitat over a short linear strip adjacent to an existing road, and given the presence of similar habitat surrounding the DE that likely provides a higher quality habitat in the adjacent Cardup Nature Reserve, the vegetation to be cleared is not likely to be necessary for the maintenance of the species and will not have a significant impact on any populations of Carnaby Cockatoos, or more broadly, the persistence of these species.

Mammals

Quenda diggings were recorded in the immediate area, approximately 40m north of the DE from Cardup Siding Road, and approximately 90m west of the southern end of the Proposal but did not occur within the DE. The Quenda occurs in wet or dry sclerophyll forest through to open woodland and scrubby, dense vegetation on sandy soils but also inhabits urban backyards, parklands and bush fragments. The vegetation condition within the DE is Degraded to Completely Degraded condition located immediately adjacent to highly disturbed (residential and agricultural land) and not considered likely to be necessary for the maintenance of the species.

The fauna habitat comprises thin areas alongside existing road and around the Cardup Brook, located amid agricultural lands, rendering the surrounding landscape fragmented. The fauna habitat is in poor condition as a result of historical clearing, surrounding infrastructure and high levels of weed invasion. Given the small extent of the clearing required for the Proposal (0.35ha) and the proximity of the clearing to existing disturbed areas, it is considered unlikely the DE represents key habitat for significant fauna species. The scale of the proposed clearing is also small on a regional and local level when compared to the available habitat in the surrounding area.

Based on the above information, the vegetation proposed to be cleared is not likely to be necessary for the maintenance of native fauna species; however, the clearing of 0.35ha of low quality black cockatoo foraging habitat is at variance to this principle.

Methodology

- Biological Survey (GHD 2024)
- Biological Survey (Umwelt 2021)
- Biological Survey (Bamford 2019)
- DCCEE Protected Matters Search Tool Report
- Government GIS Shapefiles:
 - Black Cockatoo Breeding Sites (DBCA 063) (Accessed August 2024)
 - Black Cockatoo Roosting Sites (DBCA 064) (Accessed August 2024)
 - DBCA Threatened and Priority fauna database search
- Referral guideline for 3 WA threatening Black Cockatoo species (DAWE 2022)
- Species specific conservation listing advice and recovery plans

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

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

Assessment

GHD (2024) identified 10 threatened flora species as possibly occurring within the study area based on the database searches (DBCA). No BC Act or EPBC Act listed flora were recorded within the survey area during the field survey (GHD 2024) and the results are further supplemented by a previous Detailed flora and vegetation survey and likelihood of occurrence conducted by Umwelt in 2021 of the surrounding areas which concluded no additional significant flora taxa were likely to occur (Umwelt 2021).

Clearing of vegetation for this Proposal will not impact on any known Threatened flora. The DE is limited in extent, with the native vegetation present associated with existing road verges and pastoral areas. Given almost all the native vegetation recorded in the DE is highly modified with no intact mid- or understory and no significant flora were identified in the field survey, it is unlikely the vegetation to be cleared contains or supports significant flora (GHD 2024). Therefore, clearing is not likely to be at variance to this principle.

Methodology

- Biological Survey (GHD 2024)
- Biological Survey (Umwelt 2021)
- Government GIS shapefiles:
 - DBCA Threatened flora database search (DBCA) (Accessed September 2024)
 - WA Herbarium Threatened and Priority flora (WAHERB) (Accessed September 2024)

(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.

Assessment

Desktop searches and review of previous literature indicate the DE intersects the buffers of two ecological communities, namely:

- SCP20b: *Banksia attenuata* and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain (EPBC Endangered, DBCA Endangered)
- SCP3b: *Corymbia calophylla* – *Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (DBCA Vulnerable)

The GHD 2024 biological survey confirmed the vegetation types within the DE are not representative of any Threatened Ecological Communities listed under the EPBC Act or BC Act or Priority Ecological Communities listed by DBCA, with all native vegetation types to be cleared containing no intact mid- or understory and in Degraded or Completely Degraded condition.

The proposed clearing is not at variance to this Principle.

Methodology

- Biological Survey (GHD 2024)
- Biological Survey (Umwelt 2021)
- DCCEE Protected Matters Search Tool Report
- Government GIS shapefiles:
 - DBCA Threatened Ecological Community database search (Accessed September 2024)

(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 is not likely to be at variance to this Principle.

Assessment

There is one vegetation association within the DE proposed to be cleared:

- Vegetation Association 968 described as: Medium woodland; jarrah, marri & wandoo (GoWA 2017).

Table 7: Summary of Project Area's Mapped Pre-European Vegetation Associations

Pre-European Vegetation Associations	Clearing Description	Vegetation Condition	Comments
Vegetation Association 968 described as a Medium woodland; jarrah, marri & wandoo (GoWA 2017)	Clearing of up to 0.35 ha for Doley Road Connection between Orton Road and Cardup Siding Road	Degraded to Completely Degraded condition (EPA 2016)	Vegetation description and condition determined from Flora and Vegetation Survey (GHD 2024)

Approximately 4.60% of Vegetation Association 968 remains at a Local Government Authority scale (Shire of Serpentine Jarrahdale) with 32.02% remaining at a Statewide scale of which 18.45% is located in the DBCA reserve system (Table 8).

Table 8: Pre-European Vegetation Representation

Pre-European Vegetation Association	Scale	Pre-European Extent (ha)	Current Extent (ha)	% Remaining	% Remaining in DBCA managed lands
Veg Assoc No. 968	Statewide WA	296,877.84	95,048.82	32.02	18.45
	IBRA Bioregion Swan Coastal Plain	136,188.20	9,017.32	6.62	1.43
	IBRA Sub-region Perth	136,188.20	9,017.32	6.62	1.43
	Local Government Authority Shire of Serpentine Jarrahdale	24,351.49	1,121.13	4.60	0.57

One vegetation complex, the Guildford Complex, occurs within the DE, and is summarised as: a mixture of open forest to tall open forests of Marri, Wandoo, Jarrah, and woodland of wandoo with rare occurrences of Flooded Gum and paperbark. The Guildford Complex is considered to be under-represented as there is 5.09% of its pre-European extent remaining (Havel and Matiske 2000) (Table 9).

Table 9: Vegetation Complex (Hedde/Matiske) Representation

Hedde/Matiske Veg Complex	Pre-European Extent (ha)	Current Extent (ha)	% Remaining
Guildford Complex	90,513.13	4,522.01	5.09

The National Objectives and Targets for Biodiversity Conservation recognise that the retention of 30% 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) except in constrained areas (Perth & Peel) where 10% representation should be maintained (EPA 2016).

The proposal area is located on the Swan Coastal Plain, an area that has been cleared primarily for agriculture and some urban development. There is approximately 5.09% of the Guildford complex remaining and 0.57% of Vegetation Association 968 within DBCA Managed Land within the Shire of Serpentine Jarrahdale. Statewide there is 32.02% of Vegetation Association 968 remaining, 18.45% of which is located in the DBCA reserve system.

The percentage of vegetation remaining does fall below the regional threshold of 10% (in a constrained and fragmented area); however, the native vegetation in the DE is not considered significant as a remnant due to:

- The Degraded to Completely Degraded nature of the vegetation, consisting primarily of trees over highly modified ground cover strata dominated by weed species to the exclusion of native species, significantly changing the structure of the vegetation (see plates 1 and 2 below). It is considered that the structure and condition of the vegetation within the DE has been modified to the extent that it no longer represents the Guildford complex.
- The small area proposed to be cleared lacks biological diversity and is located in and immediately adjacent to an existing road
- The vegetation complex is expected to be represented and in better condition within the Cardup Nature Reserve, which is adjacent to the DE.

To provide context to the nature and scale of the likely impact and to illustrate the degraded nature of the vegetation, Google street view images of the proposed vegetation to be impacted are provided below with an overlay of the clearing area as a red polyline. Vegetation ranged from Degraded to Completely Degraded condition with a high cover of weeds.

Plate 1: Southeast extent of Development Envelope on Cardup Siding Road (looking west)



Plate 2: Southwest extent of Development Envelope on Cardup Siding Road (looking west)



Given the above, the vegetation within the DE is not considered significant as remnant in an area that has been extensively cleared, and the proposed works are not likely to be at variance with this Principle.

Methodology

- Biological Survey (GHD 2024)
- Government GIS shapefiles:
 - Pre-European vegetation (Accessed September 2024)
 - Vegetation complexes (Accessed September 2024)
- Statewide Vegetation Statistics (Government of Western Australia)
- Google Earth Pro Streetview imagery

(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.

Assessment

The DE is not located within and does not intersect:

- An Internationally Important Wetland (Ramsar)
- A Nationally Important Wetland
- A surface water area that is proclaimed under the RiWI Act.

The vegetation to be cleared within the DE consists of individuals or stands of *Corymbia calophylla* over pasture weeds (0.20ha) and a small area of *Eucalyptus rudis*, *Melaleuca raphiophylla* and *Melaleuca preissiana* over low grassland and forbland of introduced species in drainage lines and on adjacent floodplains (0.15ha) all of which is in a Degraded to Completely Degraded condition

The DE is located within a Palusplain that is characterised as a multiple use wetland according to the Geomorphic Wetlands Swan Coastal Plain dataset of which 0.22ha of native vegetation associated with this Palusplain is proposed to be cleared. Multiple Use Wetlands are characterised as wetlands with few remaining important attributes and functions. The Palusplain within which the Proposal area is located is highly modified from the long history of agricultural and residential activities. The modification and construction of Doley Road Connection between Orton Road and Cardup Siding Road will not change any natural wetland functions.

The DE intersects 0.13 ha of the mapped occurrence of Cardup Brook classified as a resource enhancement wetland. This proposal will disturb a small extent (0.15 ha) of the *Eucalyptus rudis*, *Melaleuca raphiophylla* and *Melaleuca preissiana* native vegetation that is growing in association with the watercourse. The proposed clearing is minor in nature and scale, and linear in extent, with extensive vegetation remaining along the brook to the east and west.

Cardup Nature Reserve is adjacent to the DE and is mapped as Conservation Category Wetland. No clearing will be undertaken within Cardup Reserve and the area will not be impacted by the native vegetation clearing.

The native vegetation in the DE is Degraded to Completely Degraded in condition and clearing this will not have a significant impact on the environmental values of the palusplain or Cardup Brook. Given the relatively small extent of clearing, the impact to the Mid open to closed forest of *Eucalyptus rudis*, *Melaleuca raphiophylla* and *Melaleuca preissiana* over low grassland and forbland of introduced species is not expected to be significant; however, the clearing of this vegetation is at variance to this principle.

Methodology

- Biological Survey (GHD 2024)
- Government GIS shapefiles:
 - Geomorphic Wetlands (DBCA-019) (Accessed September 2024)
 - Ramsar Wetlands (DBCA-010) (Accessed September 2024)
 - Important Wetlands (DBCA-045) (Accessed September 2024)
 - Hydrography Linear (DWER-031) (Accessed September 2024)
 - RIWI Act Rivers (DWER-036) (Accessed September 2024)
 - RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037) (Accessed September 2024)
 - RIWI Act, Groundwater Areas (DWER-034) (Accessed September 2024)

(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.

Assessment

The soil within the DE is mapped as (DPIRD-027):

- Pinjarra P1e phase – Flat to very gently undulating plain with deep acidic mottled yellow duplex soils. Shallow pale sand to sandy loam over very gravelly clay; moderately well drained
- Pinjarra P3 phase – Flat to very gently undulating plain with deep, imperfect to poorly drained acidic gradational yellow or grey-brown earths and mottled yellow duplex soils, with loam to clay loam surface horizons
- Pinjarra P9 phase – Shallowly incised stream channels of minor creeks and rivers with deep acidic mottled yellow duplex soils
- Bassendean B2 – Flat to very gently undulating sandplain with well to moderately well drained deep bleached grey sands with a pale yellow B horizon or a weak iron-organic hardpan 1-2 m.

The DE intersects an area associated with the Cardup Brook that is mapped as having and moderate to high flood risk (DPIRD-007) and high to extreme water erosion risk (DPIRD-013). The native vegetation to be cleared within the DE is minor and linear nature, with the exposed soils from areas from the native vegetation clearing being sealed and/or stabilised as part of the planned road upgrade, and hence appreciable land degradation from erosion is not likely. Furthermore, the removal of a 0.35ha of native vegetation landscape is unlikely to significantly increase the intensity or frequency of waterlogging.

According to risk mapping the DE is within a moderate to low risk area for acid sulfate soil occurrence (DWER-055) and as such the removal of 0.35 ha of native vegetation will not result in acidification of the DE or surrounding local environment.

The clearing will occur in a previously disturbed, roadside environment and includes drainage to maintain surface water flow. The proposed clearing is very minor in scale and located in a highly modified environment and is therefore not likely to cause appreciable land degradation. Given this the proposed clearing of native vegetation is not likely to be at variance with this Clearing Principle.

Methodology

- Government GIS Shapefiles:
 - Soil Landscape Mapping (DPIRD-027) (Accessed September 2024)
 - Flooding Risk (DPIRD-007) (Accessed September 2024)
 - Water Erosion Risk (DPIRD-013) (Accessed September 2024)
 - Acid Sulfate Soil Risk Map (DWER-055) (Accessed September 2024)
- Biological Survey (GHD 2024)

(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 may be at variance to this Principle.

Assessment

The DE lies adjacent to Cardup Nature Reserve (Class A, R2457), which is vested with the Conservation Commission of WA for the purpose of flora and fauna conservation; however, no clearing will be undertaken within Cardup Reserve and the conservation area will not be impacted by clearing activities. Cardup Nature Reserve is classified as a Conservation Category Wetland and minor clearing of disturbed roadside vegetation will occur in ESA 17218 which comprises the 50m buffer of the boundary of this wetland.

The DE intersects ESA (18508) which represents a Bush Forever site (Site No.351) along Cardup Brook. Minor clearing (0.20ha) of native vegetation associated with the Bush Forever site is proposed to be cleared. Main Roads will lodge and obtain Development Application under the Planning and Development Act 2005 for the acquisition of the 0.2 ha area within Site No 351 for the road development.

The DE also sits within Environmentally Sensitive Areas 10014 associated with the buffer of TEC vegetation within Cardup Nature Reserve. Conservation values will not be impacted by the clearing as there is no vegetation representative of TECs within the DE as identified during field survey (GHD 2024).

The removal of vegetation within the DE is considered unlikely to impact on nature reserves or conservation areas as:

- The clearing entails removal of 0.35 ha of native vegetation in a Degraded to Completely Degraded condition consisting of primarily of trees over highly modified ground cover strata dominated by weed species.
- No direct or indirect impact will occur to Cardup Nature Reserve (Class A, R2457).
- The clearing of 0.2ha within bush forever site No 351 is unlikely to impact the environmental values of the site due to the Degraded to Completely Degraded condition of the vegetation.
- Appropriate hygiene measures and construction timing will manage the potential introduction and spread of weeds and dieback to adjacent vegetation, including Cardup Nature Reserve

Noting the native vegetation clearing will have a minor impact on a bush forever location, the proposed clearing of native vegetation may be at variance with this Clearing Principle.

Methodology

- Biological Survey (GHD 2024)
- Government GIS Shapefiles:
 - DBCA Legislated Lands and Waters & Lands of Interest (DBCA-011) (Accessed September 2024)
 - Geomorphic Wetlands (DBCA-019) (Accessed September 2024)
 - Environmentally Sensitive Areas (DWER-046) (Accessed September 2024)
 - Perth Regional Ecological Linkages (Accessed September 2024)

(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.

Assessment

The DE is not located within a public drinking water source area or surface water area that is proclaimed under the RiWI Act; however, it is located within the Serpentine Groundwater Area (Proclaimed) and within the Murray River basin of the South West catchment division.

There are no Ramsar or Nationally Important Wetlands within the DE, but the DE does intersect the Cardup Brook. The native vegetation to be cleared along Cardup Brook is small in size (0.35ha) and construction works and project design will maintain the surface water hydrology in its current regime. Culverts will be installed to maintain the flow of Cardup Brook.

Given that the wetland areas within and adjacent to the DE have been significantly altered due to urban, infrastructure and agricultural development and the proposed clearing is relatively small in relation to the size of the palusplain wetlands, the proposed clearing of native vegetation is unlikely to cause deterioration in the quality of surface or underground water.

The proposed clearing is not likely to be at variance to this principle.

Methodology

- Biological Survey (GHD 2024)
- Government GIS Shapefiles:
 - RiWI Act Surface Water and Irrigation Districts (DWER-037) (Accessed September 2024)
 - RiWI Act Groundwater Areas (DWER-034) (Accessed September 2024)
 - Public Drinking Water Source Areas (DWER-033) (Accessed September 2024)
 - Soil Landscape Mapping (DPIRD-027) (Accessed September 2024)
 - Flooding Risk (DPIRD-007) (Accessed September 2024)
 - Water Erosion Risk (DPIRD-013) (Accessed September 2024)
 - Acid Sulfate Soil Risk Map (DWER-055) (Accessed September 2024)

(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.

Assessment

The soil within the DE is mapped as Pinjarra P1e phase, Pinjarra P3 phase, Pinjarra P9 phase, and Bassendean B2. Pinjarra phase soils are generally described as poorly draining, whereas the Bassendean soil is well to moderately well drained. Much of the DE is not mapped within an area or soils which are at risk of flooding, although the DE intersects an area associated with the Cardup Brook that is mapped as having and moderate to high flood risk (DPIRD-007).

The proposal will require the removal of up to 0.20 ha of linear native vegetation along an established road, and a small area of degraded vegetation within a creek line. Exposed soils from areas where native vegetation has been cleared will be sealed and/or stabilised as part of the planned road upgrade and surface water drainage infrastructure implemented to ensure surface water flows remain unaltered. Given the minor (0.35ha) and linear nature of the clearing in a highly disturbed landscape (agricultural), the clearing is not considered to be of a scale that will cause or exacerbate the incidence or intensity of flooding.

Therefore, the proposed clearing is not likely to be at variance to this principle.

Methodology

- Biological Survey (GHD 2024)
- Government GIS Shapefiles:
 - Soil Landscape Mapping (DPIRD-027) (Accessed September 2024)
 - Flooding Risk (DPIRD-007) (Accessed September 2024)

6 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 proposal (refer to Appendix 2).

7 REHABILITATION, REVEGETATION & OFFSETS

7.1 Revegetation and Rehabilitation

No temporary clearing will be undertaken as part of the Proposal activities.

7.2 Offset Proposal

In accordance with CPS 818/17 condition 11(a), to offset the residual impacts from clearing 0.35 ha, Main Roads is developing an offset proposal which will be submitted and approved by DWER.

8 STAKEHOLDER CONSULTATION

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

9 COMPLIANCE WITH CPS 818

Table 10 summarises what further pre-clearing impact assessment is required in accordance with CPS 818.

Table 10: 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.	Yes	1. Clearing Report to be published on website and submissions sought for 21 days. 2. Submissions invited from relevant parties, including the LGA, the owner or occupier of the land and other stakeholders in accordance with Condition 8 of CPS 818. 3. VMP has been completed, refer to Appendix 2. 4. An offset proposal will be prepared. 5. Summary of submissions and a statement addressing each of those submissions to be published on website.
2. Clearing is at variance or may be at variance with Clearing Principle (g) land degradation, (i) surface or underground water quality <u>or</u> (j) the incidence of flooding.	No	No further action required.
3. Clearing is at variance with Clearing Principle (g) land degradation, (i) surface or underground water quality <u>and</u> (j) the incidence of flooding.	No	No further action required.
4. The Proposal involves clearing for temporary works (as defined by CPS 818).	No	No further action required.
5a. Proposal is within a Region that: • has rainfall greater than 400mm; and, • is South of the 26th parallel; and, • works are necessary in 'Other than dry conditions'; and, • works have potential for uninfested areas to be impacted.	No	Standard Vehicle and Plant management actions from Annexure 204B (TABLE 204B.9.1), Hygiene Checklists (D17#859669) and Vehicle, Plant and Machinery Hygiene Register Template (D23#179551) will be applied.
5b. Do the proposed works require clearing within or adjacent to DBCA managed lands in non-dry conditions?	No	Works adjacent to the DBCA managed Cardup Nature reserve are proposed to be undertaken in dry conditions. No further action required.

Impact of Clearing	Yes/No or NA	Further Action Required
6. 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	No further action required.
7. Weeds are 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.
8. Did an environmental specialist conduct the survey or field assessment?	Yes	The Environmental Specialist undertaking the biological assessments was suitably qualified and had more than three years' experience.
9. Did an environmental specialist prepare the Assessment Report and any other associated documentation including the VMP, Dieback Management Plan or Offset Proposal?	Yes	The Environmental Specialist preparing the Assessment Report and any other associated documentation including the VMP, Dieback Management Plan or Offset Proposal was suitably qualified and had more than three years' experience.

10 REFERENCES

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11 APPENDICES

Appendix 1: CPS 818 condition 8 (e) (iii) Biological Survey Report Conclusions

Flora, Fauna and Black Cockatoo Survey

Due to a change in the design of the project Main Roads engaged GHD to conduct a Reconnaissance flora and vegetation survey, Basic fauna survey and Black Cockatoo habitat assessment of the survey area. Existing data and reports for the project were used in conjunction with field data from this survey to assess and map the survey area for this memorandum report.

Vegetation

The vegetation types mapped within the survey area do not represent any EPBC Act or BC Act listed TECs or DBCA listed PECs. In Umwelt (2021) vegetation type 4 was identified as SCP3c - *Corymbia calophylla Xanthorrhoea preissii* woodlands and shrublands, SCP (listed as Endangered under the BC Act and Endangered under the EPBC Act). This vegetation type was mapped within polygons 2, 4 and 7. The remnant vegetation within these polygons was in thin linear strips that occurred adjacent to roads with a vegetation condition of Degraded. DBCA has previously advised that thin linear areas of TEC SCP3c within the project that were in poorer than Good condition were not considered to be extant examples of the TEC SCP 3c (Main Roads 2020). Therefore, the vegetation mapped as 4 within the survey area is not considered to be representative of TEC SCP3c.

The vegetation condition in the survey area ranged from Good to Completely Degraded condition, 76.46 % of the survey area was mapped as Cleared as it consisted of roads and tracks, infrastructure or pastures. The disturbances within the survey area were associated with existing infrastructure and consisted of cleared areas and significant weeds. Vegetation rated as Good in condition was dominated by native species in the upper and middle strata, the lower stratum was generally dominated by herbaceous and grassy weeds. Vegetation rated as Degraded or Completely Degraded condition contained a number of significant weeds.

Flora

Seventy-nine flora taxa (including subspecies and varieties) representing 29 families and 55 genera were recorded from the survey area during the field survey. This total comprised of 34 native taxa and 45 introduced/non-endemic planted flora taxa.

No EPBC Act or BC Act listed flora were recorded within the survey area. One DBCA Priority 4 listed species *Grevillea olivacea* was recorded at several locations within the survey area. Although *Grevillea olivacea* P4 is listed as a priority flora species by DBCA it is considered to be planted within the survey area, and well outside its natural range.

Forty-five introduced/ non endemic planted flora taxa were recorded in the survey area. Of these, three species are listed as a Declared Pests under the BAM Act, with one also listed as a WoNS:

- **Gomphocarpus fruticosus* Declared Pest
- **Zantedeschia aethiopica* Declared Pest
- **Asparagus asparagoides* Declared Pest and WoNS.

Fauna

Three fauna habitat types were identified and mapped based on existing habitat types identified by Bamford and Huang (2019). These include VSA 1 (farmland/cleared areas), VSA 2 (remnant and re-planted native vegetation), and VSA 3 (creek lines with native vegetation).

Forty-eight fauna taxa were identified within the three fauna habitat types. They represented 35 birds, six mammals, five reptiles and two frogs were recorded from the survey area during the field survey. Of these, 4 are of significant species:

- Baudin's Cockatoo (*Zanda baudinii*)
- Carnaby's Cockatoo (*Zanda latirostris*)
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*)
- Quenda (*Isodon fusciventer*).

Fauna value and connectivity

The fauna value and connectivity are considered important to the area (Strategen 2021) due to the high amount of clearing that has occurred within the greater survey area. Therefore, the importance of existing remnant vegetation is given greater significance, particularly for conservation significant species like Black Cockatoos and Quenda. The areas that demonstrated the highest fauna value predominantly consisted of the vegetation comprised of 'a mixture of open forest to tall open forest of *Corymbia calophylla*, *Eucalyptus wandoo*, *Eucalyptus marginata*' and 'woodland of *Eucalyptus wandoo* with minor components including *Eucalyptus rudis* and *Eucalyptus camaldulensis*'. The value to Black Cockatoo is described in greater detail below.

Black Cockatoo

Forest Red-tailed Black Cockatoo were observed flying overhead and/or foraging during the survey period, within and around the survey areas. The Forest Red-tailed Black Cockatoo is listed as Vulnerable under the EPBC and BC Acts. Foraging evidence from Baudin's Cockatoo and Carnaby's Cockatoo was observed throughout the survey area. Baudin's Cockatoo and Carnaby's Cockatoo are listed as Endangered under the EPBC and BC Acts.

The Black Cockatoo foraging vegetation value ranged from no foraging value to moderate to high foraging value. A total of 26.44 ha (76.91%) was classified as 'no foraging value' using the scoring system developed by Bamford and utilised by Strategen (2021). This was the result of the majority of the survey area being comprised of cleared or highly degraded vegetation, with only scattered foraging species. This reflects the fragmented nature of habitat within the survey area, which is intersected by roads as well as cleared rural and urban areas. The remaining 7.93 ha ranged from low to high foraging value, with 1.38 ha (4.02%) of 'moderate to high' value foraging habitat present within the survey area.

A total of 236 suitable DBH trees were identified and mapped within the survey area. Ninety-three (93) Marri trees with a DBH of or greater than 500 mm were recorded within the survey area. The importance of conserving Marri with sufficient age and size to produce hollows has been highlighted by Johnstone et al. (2013) for the purpose of conserving Forest Red-tailed Black Cockatoo populations. In the Jarrah/Marri Forest, Marri trees are considered to provide over 90% of breeding hollows suitable for use by Black Cockatoos (Johnstone & Kirkby 2011). Within the survey area, Marri is considered the most important source of breeding habitat (Kirkby 2019). Flooded Gum also constituted a substantial portion of potential breeding habitat within the survey area, with 67 trees recorded, and 9 Jarrah trees. These species are not considered as important for Black Cockatoos as they seem to provide far fewer potential breeding hollows (Kirkby 2019). However, within the survey area, 9 hollows were recorded within five trees consisting of a Flooded Gum and Jarrah. Only one (hollow in Jarrah) was considered potentially suitable for Black Cockatoo nesting but showed no signs of previous use.

Considering the local and regional context of the survey area, the closest known breeding record of Carnaby's Cockatoo is located 10 km east of the survey area in the Wungong Catchment, while for Baudin's Cockatoo the closest sites are 10 km east in the Serpentine Hills area and 16 km east in the Wungong Catchment. (Kirkby 2019). Forest Red-tailed Black Cockatoo are known to breed 8 km east in the Wungong Catchment and have also been observed prospecting and chewing at hollow

entrances at the nearby Cardup Nature Reserve which is 1.5 km east of the survey area (Kirkby 2019). It is evident that habitat connectivity and the availability of nearby foraging resources are necessary to support these breeding sites and local Black Cockatoo populations (White et al. 2014). No current breeding was observed for any species of Black Cockatoos during the survey period.

Whilst there were no observed roost sites located within the survey area, and no active roosting was observed during the survey period, the survey area is expected to contain suitable roosting habitat for Black Cockatoos. Within the local area (6 km radius) of the survey area there are 15 confirmed Black Cockatoo roost sites (Peck et al. 2019). Of those, eight are confirmed to be used by white-tailed Black Cockatoos, five by Forest Red-Tailed Black Cockatoo and three are joint roosts (Peck et al. 2019). Given the proximity of roost sites to the survey area, the area is considered to provide roosting value for the three species of Black Cockatoos.

Although no water sources are documented within the Survey Area, it is expected that suitable drinking sites would be available throughout the year from gardens, farm dams and stock troughs. There are also seasonal natural water bodies throughout the Byford/Mundijong areas such as Beenyup Brook, Cardup Brook, Manjedal Brook and Medulla Brook.

Appendix 2: Vegetation Management Plan

DOLEY ROAD CONNECTION

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 Doley Road Connection.

The Proposal involves modification and construction of the Doley Road Connection between Orton Road and Cardup Siding Road, comprising:

- Preliminary works (e.g. geotechnical investigations)
- Vegetation clearing
- Ground disturbance
- Construction of sealed road including the installation of culverts to maintain the flow of Cardup Brook.

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

Actions, and their relevant timeframes, from this VMP will be documented within the relevant Tender Documentation (Specifications), such as:

- Specification 204 Environmental Management
- Specification 301 Vegetation Clearing and Demolition
- Specification 303 Materials and Water
- Specification 304 Revegetation
- Specification 304 Rehabilitation of Disturbed Areas.

Once the Contract has been awarded, the Superintendent's Contract Management Team (or equivalent roles) are to ensure that the requirements are implemented by the Contractor.

Avoiding, Mitigating and Managing the Impacts of Clearing

A number of measures were undertaken to during the development and design of the proposal to reduce its impact the environment.

For further information on the alternatives that were considered during the proposal development, please go to Section 1.5 of the Clearing Assessment Report for the proposal.

For further information on the measures undertaken to avoid, minimise, reduce and manage the proposal's clearing impacts, please go to Section 1.6 of the Clearing Assessment Report for the proposal.

VMP Actions

General vegetation management actions to be undertaken is shown in Appendix 2.1: General Vegetation Management Actions for Clearing.

Appendix 2.1: General vegetation management actions for clearing

Management Action	Responsibility	Timing
The Contractor must ensure plant, machinery and equipment, is cleaned down prior to arrival to the site.	Superintendent	During construction
Vehicle hygiene inspection checklists will be utilised to manage potential weed/dieback spread on earth-moving machinery.	Superintendent	During construction
No known dieback infested soil, mulch, fill or other material will be permitted into the works area.	Superintendent	During construction
All Clearing must be undertaken in such a way to allow fauna to move out of the Clearing area.	Superintendent	During construction
The Limits of Vegetation Clearing will be demarcated on site prior to the commencement of clearing to prevent entry into areas of native vegetation.	Superintendent	During construction
Natural drainage pathways will not be obstructed from stockpile gravel, crushed rock and excavated material.	Superintendent	During construction
All recently cleared, exposed and loose surface areas shall be protected from wind, water and soil erosion.	Superintendent	During construction
The Contractor will ensure that clearing of native vegetation is only undertaken in dry conditions, unless otherwise approved and / or directed by the Superintendent.	Superintendent	During construction
The Contractor must develop and detail a Site induction training program as part of the CEMP that includes as a minimum, the significant environmental impacts, actual or potential, of work activities associated with the Contract	Superintendent	During construction

The following specific actions shall also be implemented and will be the responsibility of the Superintendent to ensure they are completed prior to clearing commencing, unless otherwise specified:

- Implement, monitor and adhere to the sedimentation and erosion processes developed to address the requirements in the pre-works for clearing and works associated with Cardup Brook
- Prepare a weed control program, for nominated weed species for control and disposal.

The above actions will be documented within Specifications 204 and 301.

Main Roads' preclearing **Hold Point** applies to all projects that require vegetation clearing, as documented within Specification 301 (301.12 PRE-CLEARING PROCESS). Accordingly, all Hold Point actions must be signed off prior to clearing commencing. This Hold Point comprises the following actions:

1. Prior to the commencement of any clearing operations, the Contractor must certify for the Superintendent's verification and approval that the following activities have been completed in accordance with the relevant specification:
 - a. The pegging of limits of vegetation clearing has been undertaken.
 - b. The pegged vegetation clearing area does not exceed the Limits of Vegetation Clearing.
 - c. Mature trees have been conserved as far as practicable.
 - d. The pegging of special environmental areas has been undertaken.
 - e. All pre-clearing weed control has been undertaken.
 - f. All pre-clearing fauna operational controls have been undertaken.
 - g. All pre-clearing dieback operational controls have been undertaken.
 - h. Suitable and unsuitable topsoil zones have been identified.

- i. Vegetation and topsoil stockpile locations have been identified.
- j. All clearing machinery is compliant with controls.

Monitoring and Maintenance Program

The Superintendent's Contract Management Team shall monitor the implementation of management actions that are a **Hold Point**. **Hold Point** actions must be signed off by the Superintendent's Representative to confirm it has occurred and recorded within the Superintendent's Contract Management Plan.

Non-Compliance

Non-compliance with management actions will trigger corrective actions, preventative actions and/or an incident investigation. Non-compliances will be recorded with Main Roads incident management system and reviewed by Main Roads Manager Environment.

The need for reporting non-compliances with VMP management actions to DWER will be determined as part of an incident investigation.

Revegetation

Revegetation will be undertaken in accordance with Condition 9 of CPS 818. Relevant requirements from Condition 9 have been incorporated into Project Revegetation Plan Template. The elements to be implemented by the Contractor will be incorporated into the relevant Specification 304.