



## CLEARING PERMIT

*Granted under section 51E of the Environmental Protection Act 1986*

<b>Purpose Permit number:</b>	CPS 9238/1
<b>Permit Holder:</b>	Shire of Mundaring
<b>Duration of Permit:</b>	From 18 October 2021 to 18 October 2031

The permit holder is authorised to clear native vegetation subject to the following conditions of this permit.

### **PART I – CLEARING AUTHORISED**

#### **1. Clearing authorised (purpose)**

The permit holder is authorised to clear native vegetation for the purpose of road and drainage construction

#### **2. Land on which clearing is to be done**

Richardson Road Reserve (PIN 11418627), Parkerville  
Falls Road Reserve (PINs 11837553, 11418634, Parkerville  
Victoria Road Reserve (PINs 11837554, 11418632), Parkerville  
Brooking Road reserve (PINs 11418633, 11418635), Parkerville  
Owen Road reserve (PIN 11418628), Parkerville

#### **3. Clearing authorised**

The permit holder must not clear more than 1.85 hectares of native vegetation within the area cross-hatched yellow in Figure 1 of Schedule 1.

#### **4. Type of clearing authorised**

The permit holder may clear native vegetation for the activities described in condition 1 to the extent that the permit holder has the power to carry out works involving clearing for those activities under the *Local Government Act 1995* or any other written law.

## **PART II – MANAGEMENT CONDITIONS**

### **5. Avoid, minimise, and reduce impacts and extent of clearing**

In determining the native vegetation authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending order of preference:

- (a) avoid the clearing of native vegetation;
- (b) minimise the amount of native vegetation to be cleared; and
- (c) reduce the impact of clearing on any environmental value.

### **6. Weed and dieback management**

When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of introduction and spread of *weeds* and *dieback*:

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) ensure that no known dieback or weed-affected soil, mulch, fill, or other material is brought into the area to be cleared; and
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

### **7. Revegetation - mitigation**

- (a) The Permit Holder must, within six (6) months of the commencement of clearing authorised under this Permit:
  - (i) undertake deliberate planting of at least 55 trees within the area hatched red in Figure 2 of Schedule 1, or an alternative area as otherwise approved by the *CEO*;
  - (ii) the revegetation area shall include a combination of *Corymbia calophylla* and *Eucalyptus wandoo*;
  - (iii) ensure only local provenance propagating material is used for revegetation activities;
  - (iv) ensure planting is undertaken at the optimal time;
  - (v) undertake weed control and watering of seedlings for at least three years post planting.
- (b) The Permit Holder must, within 24 months of planting the trees in accordance with condition 7(a)(i) of this Permit:
  - (i) engage an *environmental specialist* to make a determination that the planted trees will survive;
  - (ii) if the determination made by the environmental specialist under condition 7(b)(i) is that all planted trees will not survive, the Permit Holder must plant additional trees that will result in 55 trees persisting within the areas approved under condition 7(a);
  - (iii) where additional planting of trees is undertaken in accordance with condition 7(b)(ii), the Permit Holder must repeat the activities required by conditions 7(a)(ii)-(v), and 7(b)(i)-(ii) of this Permit.

## **PART III - RECORD KEEPING AND REPORTING**

### **8. Records that must be kept**

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

**Table 1: Records that must be kept**

<b>No.</b>	<b>Relevant matter</b>	<b>Specifications</b>
1.	In relation to the authorised clearing activities generally	<ul style="list-style-type: none"><li>(a) the species composition, structure, and density of the cleared area;</li><li>(b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings;</li><li>(c) the date that the area was cleared;</li><li>(d) the size of the area cleared (in hectares); and</li><li>(e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 5; and</li><li>(f) actions taken to minimise the risk of the introduction and spread of weeds and dieback in accordance with condition 6.</li><li>(g) actions taken to revegetate in accordance with condition 7.</li></ul>

### **9. Reporting**

The permit holder must provide to the *CEO* the records required under condition 8 of this permit when requested by the *CEO*.

## **DEFINITIONS**

In this permit, the terms in Table have the meanings defined.

**Table 2: Definitions**

<b>Term</b>	<b>Definition</b>
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> .
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
fill	means material used to increase the ground level, or to fill a depression.

<b>Term</b>	<b>Definition</b>
dieback	means the effect of <i>Phytophthora</i> species on native vegetation.
department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent, and has a minimum of 2 years work experience relevant to the type of environmental advice that an environmental specialist is required to provide under this permit, or who is approved by the CEO as a suitable environmental specialist
EP Act	<i>Environmental Protection Act 1986</i> (WA)
local provenance	means native vegetation seeds and propagating material from natural sources within 50 kilometres and the same IBRA subregion of the area cleared.
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
optimal time	means the period from May to October for undertaking planting and seeding
Planting	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species
rehabilitate/ rehabilitated / rehabilitation	means actively managing an area containing native vegetation in order to improve the ecological function of that area.
revegetate / vegetated / revegetation	means the re-establishment of a cover of local provenance native vegetation in an area using methods such as natural regeneration, direct seeding and/or planting, so that the species composition, structure and density is similar to preclearing vegetation types in that area.
weeds	means any plant – (a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i> ; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

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**END OF CONDITIONS**



**Meenu Vitarana**  
A/Manager

NATIVE VEGETATION REGULATION

*Officer delegated under Section 20  
of the Environmental Protection Act 1986*

23 September 2021



# Schedule 1

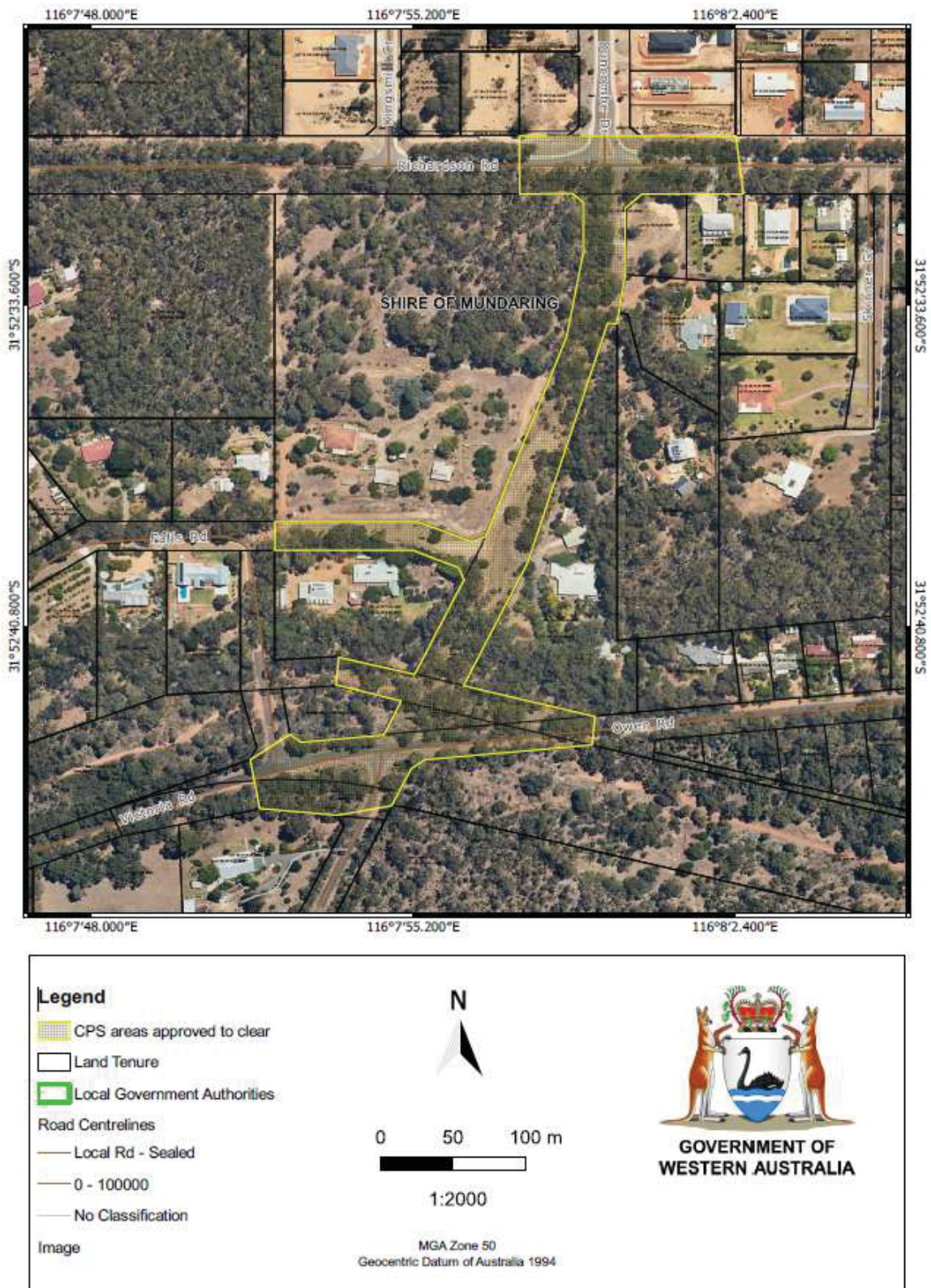


Figure 1: Map of the boundary of the area within which clearing may occur



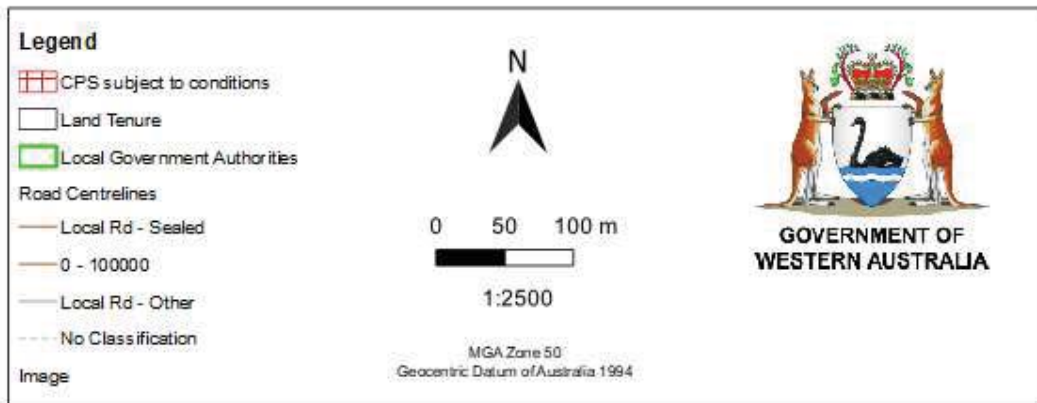
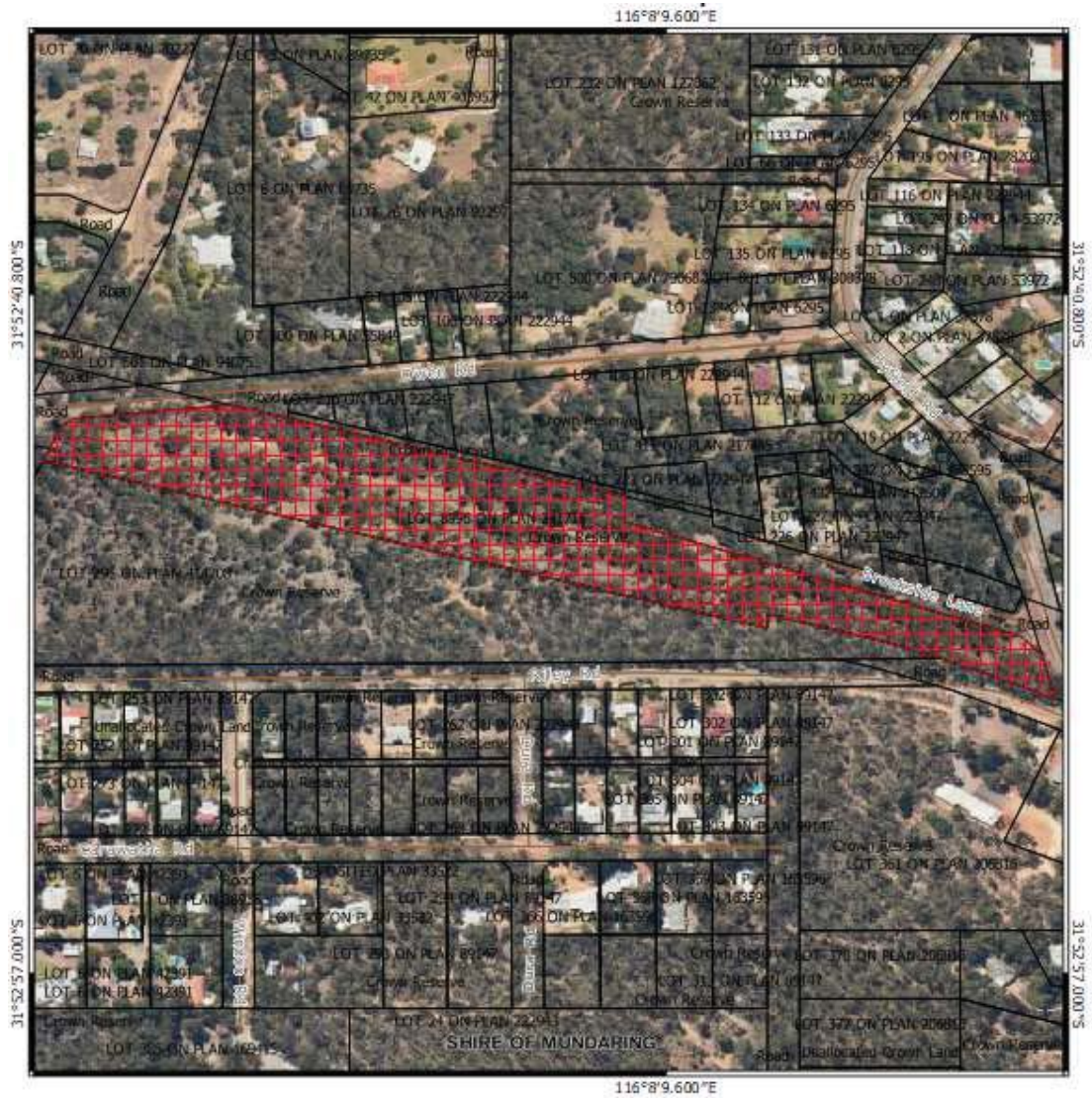


Figure 2: The boundary of the area within which revegetation is to occur (Condition 7)



# Clearing Permit Decision Report

## 1 Application details and outcome

### 1.1. Permit application details

<b>Permit number:</b>	CPS 9238/1
<b>Permit type:</b>	Purpose permit
<b>Applicant name:</b>	Shire of Mundaring
<b>Application received:</b>	16 March 2021
<b>Application area:</b>	1.85 hectares of native vegetation
<b>Purpose of clearing:</b>	Constructing a crossing and road extension
<b>Method of clearing:</b>	Mechanical
<b>Property:</b>	Richardson Road Reserve (PIN 11418627) Falls Road Reserve (PINs 11837553, 11418634) Victoria Road Reserve (PINs 11837554, 11418632) Brooking Road reserve (PINs 11418633, 11418635) Owen Road reserve (PIN 11418628)
<b>Location (LGA area/s):</b>	Shire of Mundaring
<b>Localities (suburb/s):</b>	Parkerville

### 1.2. Description of clearing activities

The vegetation proposed to be cleared is contained within a single contiguous area within the various road reserves (see Figure 1, Section 1.5). The application is to clear selected trees and understorey along impacted area to enable the installation of a new crossing of the Jane Brook and extension of Brooking Road from Owen Road to Richardson Road and new connection with Falls Road.

### 1.3. Decision on application

<b>Decision:</b>	Granted
<b>Decision date:</b>	23 September 2021
<b>Decision area:</b>	1.85 hectares of native vegetation as depicted in Section 1.5, below.

### 1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix A), relevant datasets (see Appendix E.1), the findings of a fauna, flora and vegetation surveys (see Appendix D), the clearing principles set out in Schedule 5 of the EP Act (see Appendix B), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration that the clearing is to facilitate a new road (Brooking Road) which is currently only a gravel road.

The assessment identified that the proposed clearing will result in:



- the loss of native vegetation that is suitable habitat for three species of black cockatoo
- the potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values, and
- potential impacts to water quality within the Jane Brook.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is unlikely to have long-term adverse impacts on local and regional environmental values and can be minimised and managed to be unlikely to lead to an unacceptable risk to environmental values.

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise and reduce the impacts and extent of clearing
- take hygiene steps to minimise the risk of the introduction and spread of weeds
- undertake revegetation by planting of 55 native trees of suitable species within a nearby area to provide future habitat for black cockatoo species.

### 1.5. Site maps

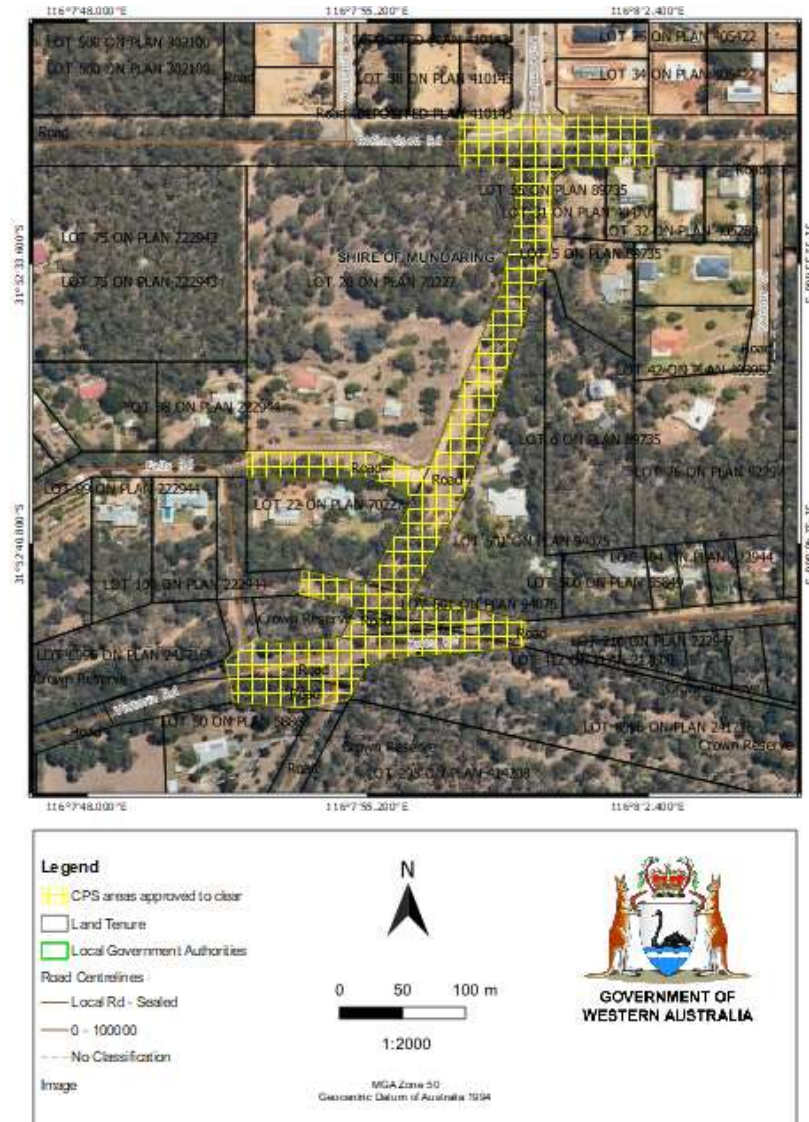


Figure 1 Map of the application area

The area crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit.



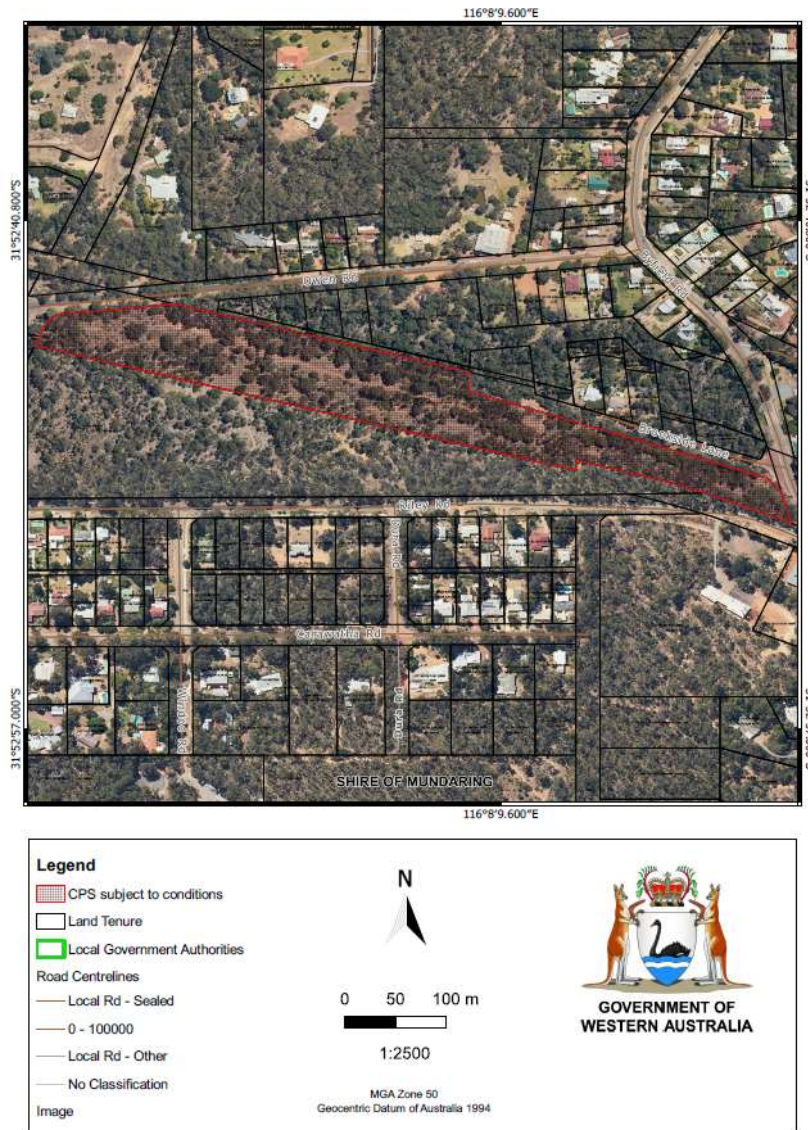


Figure 2 Map of the application area

The area cross-hatched red indicates the area within which revegetation should occur as noted in the Permit.

## 2 Legislative context

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 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the polluter pays principle
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016)

### **3 Detailed assessment of application**

#### **3.1. Avoidance and mitigation measures**

Evidence was submitted by the applicant, explaining:

- Clearing works will be limited to only what is required for the construction of the public road and associated earthworks.
- Provision and management of stormwater runoff to be incorporated into the overall design and footprint.
- The vertical design will seek to follow existing longitudinal gradients for the new road to limit fill above the new culvert crossing located in a sag curve.
- The new culvert to have in-situ concrete wing walls to limit the impacts of fill and locally stabilise the batters at Jane Brook.
- Batters and disturbed areas will be stabilised with seeded hydro-mulch (native mix).
- The Shire noted there are no alternatives to realigning the Brooking Road extension within the road reservation corridor.

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

#### **3.2. Assessment of impacts on environmental values**

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix A) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see Appendix B) identified that the impacts of the proposed clearing present a risk to habitat for black cockatoo species, adjacent vegetation and impacts to surface water within the Jane Brook. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

##### **3.2.1. Biological values (Fauna) - Clearing Principles (b)**

###### Assessment

According to available databases, 26 conservation significant fauna species have been recorded within the local area. Of these, five are migratory bird species associated with waterbodies, three species are likely locally extinct, and two species are Priority species associated with larger waterbodies. Ground-dwelling species have been recorded within the local area including the quenda, the western brush wallaby, the Tamar wallaby and the chuditch, however it is considered these species may only use the application area when transitioning from locations, this is largely due to the limited understory within the application area.

The application area may provide habitat for the southern death adder, the Guildford springtail, Dell's skink and the graceful sunmoth. Noting that there is a large amount of habitat for these species within the local area, the proposed clearing would not impact the conservation status of the species at a local or regional level.

The application area is within the mapped distribution of three conservation significant species of black cockatoo:

- Carnaby's Cockatoo
- Baudin's Cockatoo
- Forest red-tail black cockatoo

In particular, the application area is within the mapped breeding area for Carnaby's cockatoo and the core habitat for forest red-tail black cockatoo.

According to available databases, there are 18 white-tail black cockatoo breeding sites, one forest red-tail black cockatoo breeding site and 36 black cockatoo roosting sites within the local area. The application area is also mapped as foraging habitat for species of black cockatoo.

With regards to foraging habitat, the species of black cockatoo have different foraging requirements. The application area consists mostly of marri and some flooded gumtrees. Parts of the marri tree are a common foraging resource for Baudin's cockatoo and the forest red-tailed black cockatoo, and flooded gums are also used by the forest red-tailed black cockatoo. The significance of foraging habitat is increased when it occurs within 6-12 kilometres of a nesting site and/or 6 kilometres of a night roost site. The survey provided noted that forest red-tailed black cockatoos were observed feeding within the application area and foraging debris was noted during the application area attributed to this species.

'Breeding habitat' is defined in referral guidelines as trees of species known to support breeding within the range of the species which have a suitable nest hollow OR are of a suitable diameter at breast height (DBH) to develop a nest hollow. For most tree species, suitable DBH is 500 mm. The survey completed (Emerge, 2021b) noted the application area contains 55 native trees with a diameter at breast height of greater than 500 millimetres, therefore all of these trees could be considered as breeding trees in accordance with the definition above. The survey noted that none of these trees contained hollows.

Night roosting habitat for black cockatoo species include tall trees or groups of tall trees usually located close to water sources and within an area of quality foraging habitat. The use of the night roosting habitat can change daily to weekly. The survey completed (Emerge, 2021b) focuses on breeding habitat but given the records of night roost in the local area and the distance to a water source, it is considered the trees within the application area would be suitable as night roosting habitat for black cockatoo species. Noting the amount of vegetation retained within the local area, the loss of the trees within the application area is not likely to be a significant loss for night roosting habitat.

The application area is within Jarrah Forrest IBRA Bioregion. This IBRA region has been previously mapped for its foraging potential (Glossop et al., 2011). Of the mapped potential foraging habitat, 16,845 hectares is contained within the local area, covering 51 per cent of the local area. Of this, a large portion located in Department of Biodiversity Conservation and Attractions (DBCA) managed land including National Park's, State Forest's and DBCA managed timber reserves. Noting the amount of foraging habitat available within the local area, the loss of 1.85 hectares is not considered significant.

#### Conclusion

Noting the above and the presence of approximately 55 per cent coverage of remnant vegetation in the local area, the Department considers that abundant foraging resources and night roosting habitat would be located within the local area. Therefore, the proposed clearing is unlikely to represent a significant impact to foraging resources, breeding or available night roosting habitat for black cockatoos.

A permit to clear includes a mitigation measure for black cockatoo habitat loss which involves planting the same amount of trees that are proposed to be cleared.

#### **3.2.2. Biological values (land and water resources) - Clearing Principles (f, g, i and j)**

##### Assessment

The application area crosses the Jane Brook, a tributary to the Swan River. The application includes constructing a crossover of the Jane Brook to accommodate a road.

The survey completed noted the presence of *Eucalypts rudis*, which while are not strictly riparian, are recorded within sandy or loam soils and the wetter parts of south-western Western Australia. The vegetation unit described in association with the Jane Brook is described as 'Woodland *Eucalyptus rudis* subsp. *rudis* with scattered *Melaleuca raphiophylla* trees over non-native herbland'. In addition to this species, a *Eucalyptus patens* (blackbutt) was also recorded within the application area. This species is known to occur in depressions, stream banks and valleys. Noting the above, the vegetation is determined to be growing in association with a watercourse.

Jane Brook, which intersects the application area, flows for most of the year which limits the opportunity to avoid clearing during times of flow. The proposed clearing is considered likely to cause deterioration in the quality of surface water quality within the Jane Brook. The Shire have provided comment that a customised headwall/wingwall is being investigated to reduce the earthworks near Jane Brook. In addition to this, the Shire commented that the works will assist in remedying an existing unlined drain that goes into the Jane Brook by installing a storage tank/pond to assist in settling water prior to its entry to the Jane Brook and settling out sediments. A further commitment from the Shire in regard to management of water quality is that the fill batters will be compacted in layers and the finished surface will be stabilised with biodegradable netting/matting and revegetated. The Delegated Officer determined that the Shire have provided information on their commitments to reduce the duration of water quality changes and that the



outcome will result in a benefit to the surface water quality, given the design includes improvements to the existing system.

One of the mapped soil types within the application area (the Murray 4 phase) has potential to cause land degradation in the form of increasing flood risk and waterlogging. This soil type is associated with the Jane Brook. Noting the area of intersection between the application area and the Jane Brook is minimal and that much vegetation is being retained within the adjacent areas, it is considered that the proposed clearing is not likely to cause or exacerbate the intensity of flooding or contribute to waterlogging.

#### Conclusion

Based on the above assessment, the proposed clearing will result in the removal of vegetation growing in association with a watercourse and short-term impacts to surface water quality.

For the reasons set out above, it is considered that the impacts of the proposed clearing can be managed by the management measures proposed by the Shire, who noted 'the new road formation including fill batters will be compacted in layers and the finished surface stabilised with a biodegradable netting/matting (Biotek jute mesh or similar) and revegetation with tube stock'.

The Shire have commented that the final design is still being developed and is likely to include storage tanks or settling pond with a lined open drain connecting to the Jane Brook with consideration given to additional tanks/ponds.

Noting the above and that the likely impacts are short-term, no permit conditions for the management of surface water quality have been placed on the clearing permit.

### **3.3. Relevant planning instruments and other matters**

Other relevant authorisations required for the proposed land use include a Permit to interfere with bed and banks under the *Rights in Water and Irrigation Act 1914* (RIWI Act). The Department's water licencing branch advised that there are two permits already issued to the Shire and have advised that the primary concern under the RIWI Act is maintenance of water flows during and after construction, as RIWI Act permit conditions are limited to this aspect (DWER, 2021).

Several Aboriginal sites of significance have been mapped within the local area and intersects the application area. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

**End**

## Appendix A. Site characteristics

### A.1. Site characteristics

Characteristic	Details
Local context	<p>The area proposed to be part of an expansive tract of native vegetation in the intensive land use zone of Western Australia. It is adjacent to numerous private land holdings with residential uses. The proposed clearing area contributes to a local ecological linkage.</p> <p>Spatial imagery indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 55 per cent of the original native vegetation cover.</p>
Ecological linkage	The application area is not within any formal ecological linkages but intersects a local linkage.
Conservation areas	The application area intersects an area that is part of the Wooroloo Regional Park. The conservation area is linear in shape running west to east and intersects the larger body of the Wooroloo Regional Park.
Vegetation description	<p>The vegetation survey (Emerge, 2021) indicate the vegetation within the proposed clearing area consists of five vegetations types including native and non-native vegetation. Representative photos and maps are available in Appendix D. The vegetation types described within the survey are are:</p> <ul style="list-style-type: none"> <li>• CcGm Woodland <i>Corymbia calophylla</i> with <i>Eucalyptus marginata</i> over shrubland to open shrubland <i>Grevillea manglesii</i> subsp. <i>manglesii</i>, <i>Xanthorrhoea preissii</i>, <i>Acacia pycnantha</i> and <i>Leptospermum erubescens</i> over mixed open herbland <i>Thysanotus dichotomus</i>, <i>Lepidosperma</i> spp. and <i>Tetraparia octandra</i></li> <li>• CcTo Forest <i>Corymbia calophylla</i> over scattered shrubs *<i>Acacia iteaphylla</i> over shrubland <i>Trymalium odoratissimum</i> subsp. <i>odoratissimum</i> and <i>Acacia pycnantha</i> over low open shrubland <i>Phyllanthus calycinus</i> over open herbland <i>Patersonia occidentalis</i> var. <i>occidentalis</i>, <i>Thysanotus dichotomus</i> and *<i>Watsonia meriana</i></li> <li>• CcX Forest <i>Corymbia calophylla</i> with <i>Eucalyptus marginata</i> over shrubland to open shrubland <i>Xanthorrhoea preissii</i> and <i>X. gracilis</i> over open herbland <i>Orthrosanthus laxus</i> var. <i>laxus</i>, <i>Stylidium</i> spp. and <i>Lomandra</i> spp. (or herbland absent)</li> <li>• Er Woodland <i>Eucalyptus rudis</i> subsp. <i>rudis</i> with scattered <i>Melaleuca raphiophylla</i> trees over non-native herbland *<i>Bacopa monnieri</i>, *<i>Oxalis purpurea</i> and *<i>Lysimachia arvensis</i>.</li> <li>• Non-native Heavily disturbed areas comprising non-native and planted trees and shrubs and scattered native plants over non-native grassland and herbland</li> </ul> <p>This is consistent with the mapped vegetation type Murray 2 complex, which is described as Open forest of <i>Eucalyptus marginata</i> subsp. <i>thalassica</i>-<i>Corymbia calophylla</i>-<i>Eucalyptus patens</i> and woodland of <i>Eucalyptus wandoo</i> with some <i>Eucalyptus accedens</i> on valley slopes to woodland of <i>Eucalyptus rudis</i>-<i>Melaleuca raphiophylla</i> on the valley floors in semiarid and arid zones.</p> <p>The mapped vegetation type retain approximately 69 per cent of the original extent (Government of Western Australia, 2019).</p>
Vegetation condition	<p>Vegetation survey (Emerge 2021) indicate the vegetation within the proposed clearing area is in very good to degraded (Keighery, 1994) condition, described as:</p> <ul style="list-style-type: none"> <li>• Very good; Vegetation structure altered, with obvious signs of disturbance, to</li> <li>• Degraded; Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.</li> </ul> <p>The full Keighery (1994) condition rating scale is provided in Appendix C. Survey descriptions and mapping are available in Appendix D.</p>

Characteristic	Details
Climate and landform	<p>The mapped contours show the application area is spread from elevations of between 245 meters above sea level to 195 meters above sea level. The lowest elevation is at the location of the Jane Brook.</p> <p>The annual average rainfall for the Perth metro region is approximately 730 millimetres per year.</p>
Soil description	<p>The soil is mapped as intersecting three soil types. The two types that make up majority of the application area are:</p> <ul style="list-style-type: none"> <li>• Murray 3 Phase which is described as Very gentle to moderately inclined sideslopes and lower slopes (&lt;15%) with very few areas of rock outcrop. Variable moderately well to well drained duplex and gradational soils.</li> <li>• Murray 4 Phase which is described as Very gently inclined valley floors with sideslopes &lt;20%), with very few areas of rock outcrop and poorly drained and commonly saline soils.</li> </ul>
Land degradation risk	The mapped soil types have a medium to high risk across many of the land degradation risk types. The summary of risk is tabulated within Appendix A.2.
Waterbodies	The desktop assessment and aerial imagery indicated that a minor non-perennial watercourse intersects the application area, the Jane Brook.
Hydrogeography	The application area is within the Swan River surface water area, proclaimed under the RIWI Act.
Flora	According to available databases, 36 conservation significant flora species have been recorded within the local area, six of which are threatened flora species.
Ecological communities	The application area does not contain any vegetation considered representative of a threatened or priority ecological community.
Fauna	According to available datasets, 26 conservation significant fauna species have been recorded within the local area. The nearest record to the application area is the forest red-tailed black cockatoo and the most frequently recorded is the Carnaby's Cockatoo.

## A.2. Land degradation risk table

Risk categories	Dwellingup 2 Phase
Wind erosion	>70% of map unit has a high to extreme wind erosion risk
Water erosion	<3% of map unit has a high to extreme water erosion risk
Salinity	<3% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	>70% of map unit has a high subsurface acidification risk or is presently acid
Flood risk	<3% of the map unit has a moderate to high flood risk
Water logging	<3% of map unit has a moderate to very high waterlogging risk
Phosphorus export risk	<3% of map unit has a high to extreme phosphorus export risk

Risk categories	Murray 3 Phase
Wind erosion	50-70% of map unit has a high to extreme wind erosion risk
Water erosion	<3% of map unit has a high to extreme water erosion risk
Salinity	<3% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	>70% of map unit has a high subsurface acidification risk or is presently acid



Flood risk	<3% of the map unit has a moderate to high flood risk
Water logging	<3% of map unit has a moderate to very high waterlogging risk
Phosphorus export risk	10-30% of map unit has a high to extreme phosphorus export risk

Risk categories	Murray 4 Phase
Wind erosion	3-10% of map unit has a high to extreme wind erosion risk
Water erosion	50-70% of map unit has a high to extreme water erosion risk
Salinity	50-70% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	30-50% of map unit has a high subsurface acidification risk or is presently acid
Flood risk	50-70% of the map unit has a moderate to high flood risk
Water logging	50-70% of map unit has a moderate to very high waterlogging risk
Phosphorus export risk	10-30% of map unit has a high to extreme phosphorus export risk

### Appendix B. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
<b>Environmental value: biological values</b>		
<p><u>Principle (a):</u> <i>“Native vegetation should not be cleared if it comprises a high level of biodiversity.”</i></p> <p><u>Assessment:</u> The area proposed to be cleared does not contain locally or regionally significant flora, fauna, habitats or assemblages of plants.</p>	Not likely to be at variance	No
<p><u>Principle (b):</u> <i>“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.”</i></p> <p><u>Assessment:</u> The area proposed to be cleared contains foraging, roosting and breeding habitat for conservation significant fauna.</p>	May be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (c):</u> <i>“Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</i></p> <p><u>Assessment:</u> The area proposed to be cleared is unlikely to contain flora species listed under the BC Act.</p>	Not likely to be at variance	No
<p><u>Principle (d):</u> <i>“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.”</i></p> <p><u>Assessment:</u> The area proposed to be cleared does not contain species that can indicate a threatened ecological community.</p>	Not likely to be at variance	No
<b>Environmental value: significant remnant vegetation and conservation areas</b>		
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u> The extent of the mapped vegetation type and the vegetation type within the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be</p>	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
cleared is not considered to be part of a significant ecological linkage in the local area.		
<p><u>Principle (h):</u> <i>“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.”</i></p> <p><u>Assessment:</u> Given the distance to the nearest conservation area, the proposed clearing may have an impact on the environmental values of adjacent conservation areas. A weed and dieback management condition has been applied.</p>	May be at variance	No
<b>Environmental value: land and water resources</b>		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u> Given a water courses intersects the application area; the proposed clearing may impact on- or off-site hydrology and water quality.</p>	At variance	Yes <i>Refer to Section 3.2.2, above.</i>
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u> The mapped soils are moderately to highly susceptible to land degradation risk categories. Noting the extent of the application area and the vegetation remaining within the adjacent areas the proposed clearing is not likely to have an appreciable impact on land degradation.</p>	May be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<p><u>Principle (i):</u> <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.”</i></p> <p><u>Assessment:</u> Given a watercourse is recorded within the application area, the proposed clearing may impact surface or ground water quality.</p>	May be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<p><u>Principle (j):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</i></p> <p><u>Assessment:</u></p> <p>One of the mapped soils within the application area and topographic contours in the surrounding area do indicate the proposed clearing may contribute to increased incidence or intensity of flooding.</p> <p>Given a non-perennial watercourse is recorded within the application area, the proposed clearing may contribute to waterlogging.</p>	May be at variance	Yes <i>Refer to Section 3.2.2, above.</i>

### Appendix C. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

### Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

### Appendix D. Biological survey information excerpts

Plant community	Description	Area (ha)
CcGm	Woodland <i>Corymbia calophylla</i> with <i>Eucalyptus marginata</i> over shrubland to open shrubland <i>Grevillea manglesii</i> subsp. <i>manglesii</i> , <i>Xanthorrhoea preissii</i> , <i>Acacia pycnantha</i> and <i>Leptospermum erubescens</i> over mixed open hermland <i>Thysanotus dichotomus</i> , <i>Lepidosperma</i> spp. and <i>Tetraria octandra</i> (Plate 1).	0.9
CcTo	Forest <i>Corymbia calophylla</i> over scattered shrubs * <i>Acacia iteaphylla</i> over shrubland <i>Trymalium odoratissimum</i> subsp. <i>odoratissimum</i> and <i>Acacia pycnantha</i> over low open shrubland <i>Phyllanthus calycinus</i> over open hermland <i>Patersonia occidentalis</i> var. <i>occidentalis</i> , <i>Thysanotus dichotomus</i> and * <i>Watsonia meriana</i> (Plate 2).	0.21
CcX	Forest <i>Corymbia calophylla</i> with <i>Eucalyptus marginata</i> over shrubland to open shrubland <i>Xanthorrhoea preissii</i> and <i>X. gracilis</i> over open hermland <i>Orthrosanthus laxus</i> var. <i>laxus</i> , <i>Stylidium</i> spp. and <i>Lomandra</i> spp. (or hermland absent) (Plate 3).	0.66
Er	Woodland <i>Eucalyptus rudis</i> subsp. <i>rudis</i> with scattered <i>Melaleuca raphiophylla</i> trees over non-native hermland * <i>Bacopa mannieri</i> , * <i>Oxalis purpurea</i> and * <i>Lysimachia arvensis</i> (Plate 4).	0.28
Non-native	Heavily disturbed areas comprising non-native and planted trees and shrubs and scattered native plants over non-native grassland and hermland (Plate 5).	0.64
Cleared	Hard surfaces not supporting vegetation such as bitumised road.	0.50

Above: Plant communities and descriptions (Emerge, 2021)





*Plate 1: Plant community CcGm in 'very good - good' condition*



*Plate 2: Plant community CcTo in 'very good - good' condition*

Above: Photographs of plant communities within the application area (Emerge, 2021)



*Plate 3: Plant community CcX in 'very good' condition*



*Plate 4: Plant community Er in 'degraded' condition*

Above: Photographs of plant communities within the application area (Emerge, 2021)





Plate 5: Plant community non-native in 'completely degraded' condition

Above: Photographs of plant communities within the application area (Emerge, 2020)

Table 4: Habitat trees recorded within the site

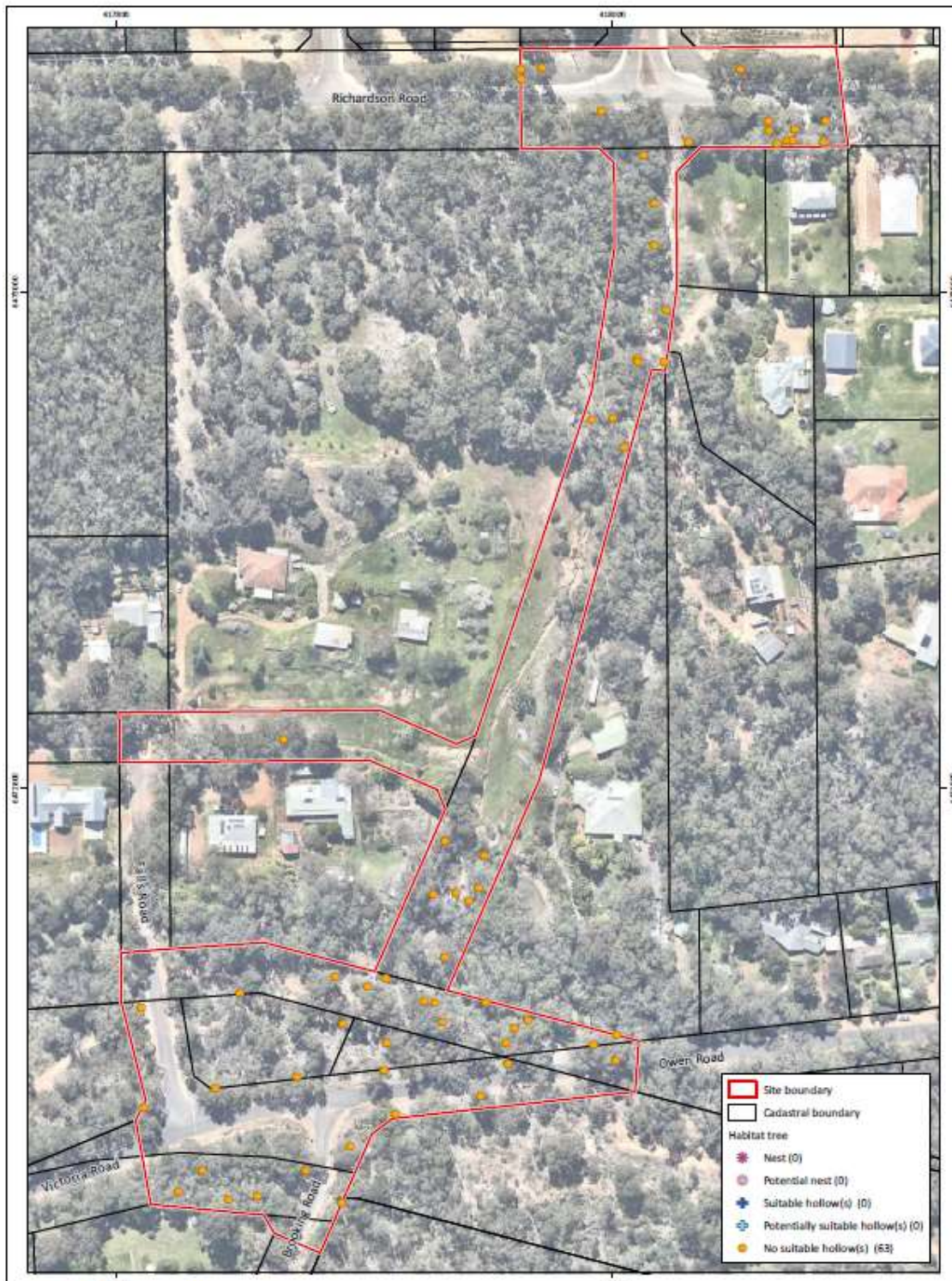
Category	No. trees	No. suitable hollows
Confirmed nest	0	-
Potential nest	0	-
Suitable hollow(s)	0	-
Potentially suitable hollow(s)	0	-
No suitable hollow(s)	63	0
<b>Total</b>	<b>63</b>	<b>0</b>

A total of 63 black cockatoo habitat trees were recorded within the site as shown in Figure 2.

The habitat trees comprised 46 *Corymbia calophylla* (marri), 1 *Eucalyptus marginata* (jarrah), 1 *Eucalyptus patens* (blackbutt), 11 *Eucalyptus rudis* (flooded gum), 2 *Eucalyptus wandoo* (wandoo) and 2 stags (dead trees).

None of the habitat trees recorded in the site contained hollows that were considered suitable or potentially suitable for nesting by black cockatoos. No evidence suggesting that breeding by black cockatoos occurs in the site was observed.

Above: Description of habitat trees surveyed (Emerge, 2021b)



**Figure 2: Black Cockatoo Habitat Trees**

<b>Project:</b> Targeted Black Cockatoo Breeding Habitat Assessment <b>Client:</b> Shire of Mundaring	<b>Plan Number:</b> EP20-134(02)-P02 <b>Drawn:</b> GAR <b>Date:</b> 10/03/2021 <b>Checked:</b> NS <b>Approved:</b> RAW <b>Date:</b> 12/03/2021	  <b>Scale:</b> 1:2,000@A4 GDA 1994 MGA Zone 50	
	<small>While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used.          © Landgate (2020), Newsmap Imagery date: 18/06/2020</small>		

Figure 3: Location of habitat trees surveyed (Emerge, 2021b)



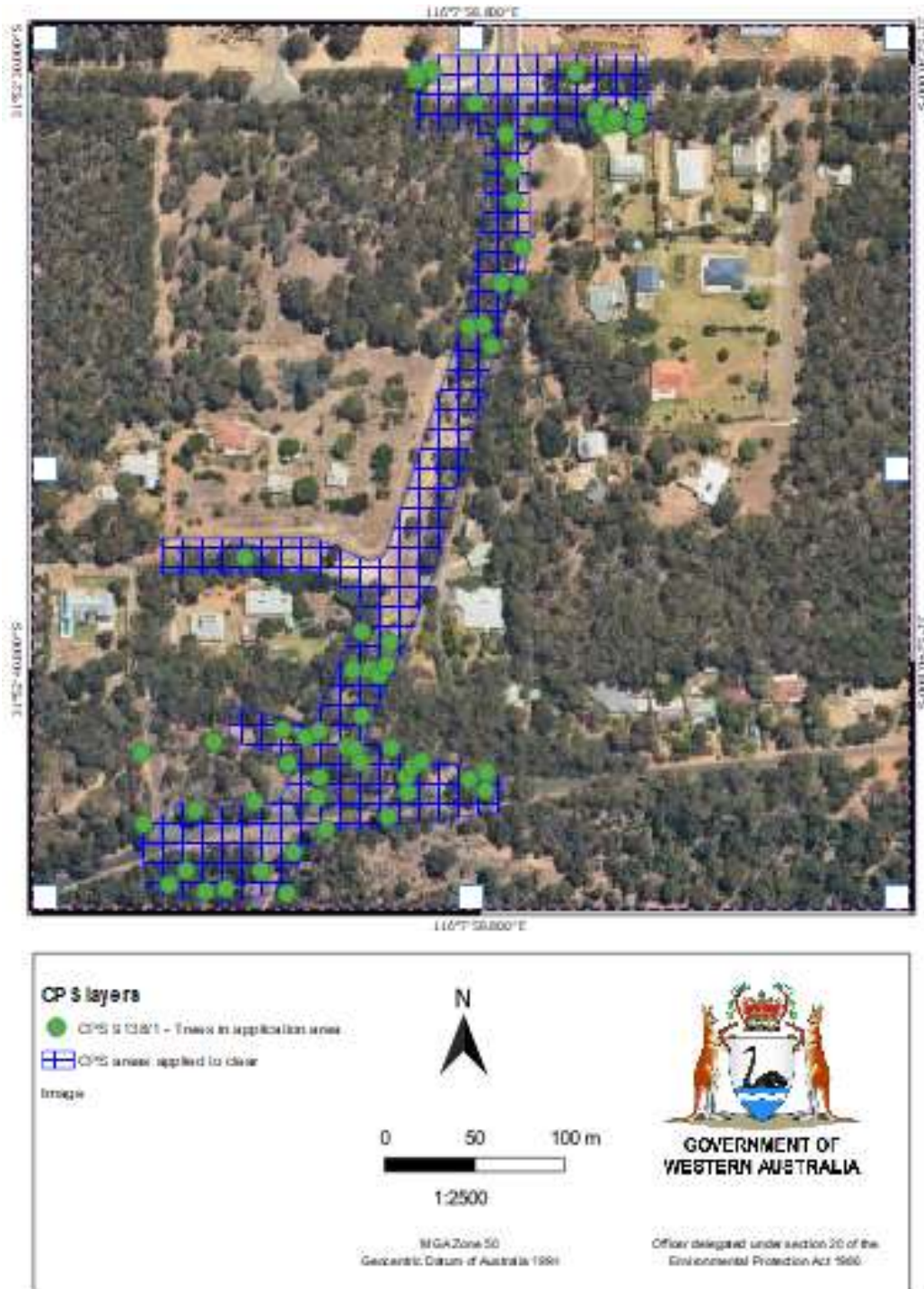


Figure 4: Application area with mapped location of habitat trees



## Appendix E. Sources of information

### E.1. GIS databases

Publicly available GIS Databases used (sourced from [www.data.wa.gov.au](http://www.data.wa.gov.au)):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

### E.2. References

Commonwealth of Australia (2001) *National Objectives and Targets for Biodiversity Conservation 2001-2005*, Canberra.

Department of Environment Regulation (DER) (2013). *A guide to the assessment of applications to clear native vegetation*. Perth. Available from: [https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Guidelines/Guide2\\_assessment\\_native\\_veg.pdf](https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Guidelines/Guide2_assessment_native_veg.pdf).

- Department of Primary Industries and Regional Development (DPIRD) (2019). *NRInfo Digital Mapping. Department of Primary Industries and Regional Development*. Government of Western Australia. URL: <https://maps.agric.wa.gov.au/nrm-info/> (accessed 17 May 2021).
- Department of Water and Environmental Regulation (DWER) (2019). *Procedure: Native vegetation clearing permits*. Joondalup. Available from: [https://dwer.wa.gov.au/sites/default/files/Procedure\\_Native\\_vegetation\\_clearing\\_permits\\_v1.PDF](https://dwer.wa.gov.au/sites/default/files/Procedure_Native_vegetation_clearing_permits_v1.PDF).
- Department of Water and Environmental Regulation (DWER) (Regulatory Services – Water) (2021) *Rights in Water and Irrigation Act 1914 advice for clearing permit application CPS 9238/1*, received 17 May 2021 (DWER Ref: A2016397).
- Emerge (2021) Detailed Flora and Vegetation Assessment – Proposed Brooking Road Extension, Parkerville. Perth, WA. (DWER ref: A2001711)
- Emerge (2021 b) Targeted Black Cockatoo Breeding Habitat Assessment – Proposed Brooking Road Extension, Parkerville. Perth, WA. (DWER ref: A2001710)
- Environmental Protection Authority (EPA) (2016). *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment*. Available from: [http://www.epa.wa.gov.au/sites/default/files/Policies\\_and\\_Guidance/EPA%20Technical%20Guidance%20-%20Flora%20and%20Vegetation%20survey\\_Dec13.pdf](http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/EPA%20Technical%20Guidance%20-%20Flora%20and%20Vegetation%20survey_Dec13.pdf).
- Environmental Protection Authority (EPA) (2016). *Technical Guidance – Terrestrial Fauna Surveys*. Available from: [https://www.epa.wa.gov.au/sites/default/files/Policies\\_and\\_Guidance/Tech%20guidance-%20Terrestrial%20Fauna%20Surveys-Dec-2016.pdf](https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Tech%20guidance-%20Terrestrial%20Fauna%20Surveys-Dec-2016.pdf).
- Government of Western Australia (2019) *2018 South West Vegetation Complex Statistics. Current as of March 2019*. WA Department of Biodiversity, Conservation and Attractions, Perth, <https://catalogue.data.wa.gov.au/dataset/dbca>
- Government of Western Australia. (2019) *2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019*. WA Department of Biodiversity, Conservation and Attractions. <https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics>
- Hedde, E. M., Loneragan, O. W., and Havel, J. J. (1980) *Vegetation Complexes of the Darling System, Western Australia*. In Department of Conservation and Environment, Atlas of Natural Resources, Darling System, Western Australia.
- Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Molloy, S., Wood, J., Hall, S., Wallrodt, S. and Whisson, G. (2009) *South West Regional Ecological Linkages Technical Report*, Western Australian Local Government Association and Department of Environment and Conservation, Perth.
- Northcote, K. H. with Beckmann G G, Bettenay E., Churchward H. M., van Dijk D. C., Dimmock G. M., Hubble G. D., Isbell R. F., McArthur W. M., Murtha G. G., Nicolls K. D., Paton T. R., Thompson C. H., Webb A. A. and Wright M. J. (1960-68) *Atlas of Australian Soils*, Sheets 1 to 10, with explanatory data. CSIRO and Melbourne University Press: Melbourne.
- Schoknecht, N., Tille, P. and Purdie, B. (2004) *Soil-landscape mapping in South-Western Australia – Overview of Methodology and outputs* Resource Management Technical Report No. 280. Department of Agriculture.
- Shire of Mundaring. (2021) *Clearing permit application CPS 9238/1*, received 16 March 2021 (DWER Ref: DWERDT428559).
- Western Australian Herbarium (1998-). *FloraBase - the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions, Western Australia. <https://florabase.dpaw.wa.gov.au/> (Accessed 17 May 2021)