GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS

Area Permit Number: CPS 9973/1

File Number: DWERVT11467

Duration of Permit: From 25 August 2023 to 25 August 2035

PERMIT HOLDER

Shire of Murray

LAND ON WHICH CLEARING IS TO BE DONE

Readheads Road, Reserve (Pin 1362219), North Dandalup

AUTHORISED ACTIVITY

The permit holder must not clear more than 0.156 hectares of *native vegetation*, within the area cross-hatched yellow in Figure 1 and 2 of Schedule 1.

CONDITIONS

1. Period during which clearing is authorized

The permit holder must not clear any *native vegetation* after 25 August 2025.

2. 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.

3. 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.

4. Revegetation and rehabilitation

The permit holder must within 24 months of undertaking clearing authorised under this permit:

(a) undertake the *planting* of 72 *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) and *Banksia sp*. seedlings located within the cross-hatched green area in Figure 1 and 2 of Schedule 2, within Readheads Road, Reserve (Pin 1362219), North Dandalup;
(b) ensure only *local provenance* species are used;
(c) ensure *planting* is undertaken at the *optimal time*;
(d) the permit holder must within 24 months of *planting* the 72 *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) and *Banksia sp*. seedlings in accordance with condition 4(a) of this permit;
    (i) engage an *environmental specialist* to make a determination that at least 72 *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) and *Banksia sp*. seedlings will survive; and
    (ii) if the determination made by the *environmental specialist* under condition 4(c)(i) that at least 72 *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) and *Banksia sp*. seedlings will not survive, the permit holder must plant additional native seedlings that will result in at least 72 *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) and *Banksia sp*. seedlings persisting located within the cross-hatched green area in Figure 1 and 2 of Schedule 2, within Readheads Road, Reserve (Pin 1362219), North Dandalup.
    (iii) undertake *weed* control activities on an 'as needs' basis to ensure success of *revegetation*;
(e) where additional *planting* of native seedlings is undertaken in accordance with condition 4(c)(ii), the permit holder must repeat the activities required by condition 4(b) and 4(c) of this permit.

5. 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

No.	Relevant matter	Specifications
1.	In relation to the	(a) the species composition, structure, and

No.	Relevant matter	Specifications
	authorised clearing activities generally	density of the cleared area; (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; (c) the date that the area was cleared; (d) the size of the area cleared (in hectares); (e) actions taken to avoid, minimise, and reduce the impacts and extent of *clearing* in accordance with *condition* 2; (f) actions taken to minimise the risk of the introduction and spread of *weeds* and *dieback* in accordance with *condition* 3; (g) actions taken to undertake planting of 72 *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) and *Banksia sp.* seedlings in accordance with *condition* 4, including the *environmental specialist* determination on survivability. (h) Any remedial actions undertaken in accordance with *condition* 4.

6. Reporting

The permit holder must provide to the *CEO* the records required under *condition* 5 of this permit when requested by the *CEO*.

DEFINITIONS

In this permit, the terms in Table 2 have the meanings defined.

Table 2: Definitions

Term	Definition
CEO	Chief Executive Officer of the department responsible for the administration of the *clearing* provisions under the *Environmental Protection Act 1986*.
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.

Term	Definition
fauna specialist	means a person who holds a tertiary qualification specializing in environmental science or equivalent, has a minimum of two years work experience in fauna identification and surveys of fauna native to the region being inspected or surveyed and holds a valid fauna licence issued under the *Biodiversity Conservation Act 2016*;
fill	means material used to increase the ground level, or to fill a depression.
dieback	means the effect of *Phytophthora* species on native vegetation.
department	means the department established under section 35 of the *Public Sector Management Act 1994* (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
EP Act	*Environmental Protection Act 1986* (WA)
environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent, and has 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.
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 July for undertaking planting.
planting	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species.
rehabilitate	means actively managing an area containing native vegetation in order to improve the ecological function of that area.
revegetate	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 pre-clearing vegetation types in that area.

Term	Definition
weeds	means any plant – (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; 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.

END OF CONDITIONS

Mathew Gannaway
MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

1 August 2023

SCHEDULE 1

The boundary of the area authorised to be cleared is shown in the maps below (Figure 1 and 2).

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

Figure 2: Map of the boundary of the eastern areas within which clearing may occur

SCHEDULE 2

The boundary of the areas revegetation and rehabilitation must occur shown in the maps below (Figure 1 and 2).

Figure 1: Map of the boundary of the western areas within which revegetation and rehabilitation must occur

Figure 2: Map of the boundary of the eastern areas within which revegetation and rehabilitation must occur

Government of Western Australia
Department of Water and Environmental Regulation

Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9973/1
Permit type:	Area permit
Applicant name:	Shire of Murray
Application received:	22 November 2022
Application area:	0.156 hectares of native vegetation (revised)
Purpose of clearing:	Road upgrades
Method of clearing:	Mechanical clearing and professional tree loppers
Property:	Readheads Road Reserve (PIN 1362219)
Location (LGA area/s):	Shire of Murray
Localities (suburb/s):	North Dandalup

1.2. Description of clearing activities

The initial clearing application from the Shire of Murray (the Shire) was to clear 0.58 hectares of native vegetation, containing 111 native trees and associated understorey in Readheads Road Reserve (PIN 1362219), North Dandalup, for the purpose of road upgrades (Shire of Murray, 2022).

During the assessment, the Shire reduced the clearing footprint to 0.156 hectares, containing 48 native trees and associated understorey (Shire of Murray, 2023g). The road upgrades are associated with the State black spot project (Shire of Murray, 2022).

1.3. Decision on application

Decision:	Granted
Decision date:	1 August 2023
Decision area:	0.156 hectares of native vegetation, as depicted in Figure 1 and 2 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 (the Department) advertised the application for 21 days and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix A), relevant datasets (Appendix E.1.), representative photographs of the application area (Appendix D), the clearing principles set out in Schedule 5 of the EP Act (Appendix B), relevant planning instruments and any other matters considered relevant to the assessment (Section 3). The Delegated Officer also took into consideration the purpose of the clearing to improve public safety by upgrading Redheads Road, North Dandalup, through a road safety audit. The road redesign is a part of a State blackspot project (Shire of Murray, 2022).

The assessment identified that the proposed clearing will result in:

- the loss of native vegetation that is suitable foraging habitat for *Zanda latirostris* (Carnaby's black cockatoo), *Zanda baudinii* (Baudin's black cockatoo) and *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo) (collectively known as black cockatoos);
- the loss of native vegetation that is representative of the Guildford Complex, an extensively cleared vegetation type; and
- the potential introduction and spread of weeds and dieback into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values.

After consideration of the available information, as well as the applicant's avoidance and minimisation measures (see Section 3.1), the Delegated Officer determined that some of the impacts of the proposed clearing, including the potential to facilitate the introduction of weeds and dieback, can be minimised and managed to unlikely lead to an unacceptable risk to environmental values through permit conditioning. However, impacts to habitat for black cockatoos and clearing an extensively cleared vegetation complex remained significant even after the application of avoidance and minimisation measures, and constituted a significant residual impact.

The Delegated Officer determined that the following measures was sufficient to counterbalance the significant residual impacts of the proposed clearing:

- The revegetation of 72 native trees, consisting of *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) and *Banksia sp*., within the Readheads Road Reserve (PIN 1362219), North Dandalup, to mitigate the loss of 48 native trees suitable for black cockatoo foraging and that is representative of the Guildford Complex.

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

- avoid, minimise and reduce the impacts and extent of clearing;
- implement weed and dieback management measures to mitigate impacts to adjacent vegetation; and
- undertake deliberate planting of at least 72 locally-provenanced native trees, consisting of *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) and *Banksia sp*., within the Readheads Road Reserve (PIN 1362219), North Dandalup.

1.5. Site maps

Figure 1: Map of the eastern application areas along Readheads Road Reserve (PIN 1362219), North Dandalup. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

Figure 2: Map of the eastern application areas along Readheads Road Reserve (PIN 1362219), North Dandalup. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing 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 the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM 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)

Relevant policies considered during the assessment include:

- *Environmental Offsets Policy* (2011)

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)
- *Environmental Offsets Guidelines* (August 2014)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

The Shire has provided both avoidance and mitigation strategies to minimise environmental impact of the proposed Readheads Road upgrade.

Avoidance

The four kilometres of road upgrades along Readheads Road has been redesigned to minimise the need to clear native trees. Adoption of reduced shoulder width, maintaining road centrelines within the road reserve and minimising drainage construction has reduced the overall tree clearing requirements. The proposed clearing is required to remove a crest and improve sight lines to a minimum acceptable standard. Additional clearing is required at the rail level crossing to enable the stagger of the intersection (Shire of Murray, 2022).

The initial CPS 9973/1 application considered the removal of 111 native trees, including one containing a hollow, to accommodate the road upgrade. Further on-site inspections with stakeholders identified that the extent of cut and tree clearing could be reduced by redesigning the roads vertical geometry. Although it is noted that the revised design does not provide the desirable clearance zones for the operating speed zone, the Shire is comfortable the revised design is a satisfactory compromise between road safety and environmental conservation objectives (Shire of Murray, 2023b). As a result of these avoidance measures, the clearing was reduced to 48 native trees including (Figure 3 and 4) (Shire of Murray, 2023c: 2023g):

- one *Banksia* sp.;
- ten *Xanthorrhoea* sp.;
- two *Eucalyptus marginata* (jarrah) with diameter at breast height (DBH) greater than 500 millimetres;
- three *Eucalyptus marginata* (jarrah) with a DBH between 300 and 400 millimetres;
- 23 *juvenile Eucalyptus marginata* (jarrah*)* with a DBH less than 300 millimetres;
- ten *Corymbia calophylla* (marri) trees;
- all trees with hollows were avoided.

Figure 3: Map of the western application areas along Readheads Road Reserve (PIN 1362219), North Dandalup, after avoidance and minimisation measure had been implemented by the Shire of Murray. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit. The areas cross-hatched blue indicates areas covering the original clearing application footprint where clearing is not authorised to occur.

Figure 4: Map of the eastern application areas along Readheads Road Reserve (PIN 1362219), North Dandalup, after avoidance and minimisation measure had been implemented by the Shire of Murray. The areas crosshatched yellow indicate the areas authorised to be cleared under the granted clearing permit. The areas cross-hatched blue indicates areas covering the original clearing application footprint where clearing is not authorised to occur.

Mitigation

The Shire have agreed to plant a minimum of 72 native tree seedlings of jarrah, marri and *Banksia* sp. within Readheads Road Reserve (PIN 1362219), North Dandalup, as mitigation measures for the clearing of the 48 trees that provide foraging value for black cockatoos (Shire of Murray, 2023d).

Revegetation Mitigation

An assessment of the revegetation was undertaken using the WA Environmental Offsets Metric and having consideration for the Environmental Offsets Policy (2011) and the Environmental Offsets Guidelines (2014). To ensure adequate suitability of an offset to balance the significant residual impact of the loss of foraging habitat and clearing an extensively cleared vegetation complex, the calculation identified that the intentional planting of 72 native trees of black cockatoo foraging species that are also representative of the Guildford Complex, within Readheads Road Reserve (PIN 1362219), North Dandalup, would be sufficient to ensure that no significant residual impacts from the loss of 48 native trees that provide foraging habitat for black cockatoos or for impacts to the Guildford Complex remains.

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 (Appendix A) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, and/or land and water resource values.

The assessment against the clearing principles (Appendix B) identified that the impacts of the proposed clearing present a risk to fauna, potential for land degradation and conservation areas. 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 Principle (a and b)

Assessment

Within the local area (10 kilometre radius of the application area), 18 conservation significant fauna species have been recorded. As the clearing application is for the removal of tree habitat with minimal native understorey, it is only likely for the proposed clearing to impact the arboreal species recorded in the local area, which are the black cockatoos. The tree species proposed to be cleared include one *Banksia* sp., ten *Xanthorrhoea* sp.(grass trees), two *Eucalyptus marginata* (jarrah) trees with diameter at breast height DBH greater than 500 millimetres with no hollows, three jarrah trees with a DBH between 300 and 400 millimetres with no hollows, 12 juvenile jarrah trees with a DBH less than 300 millimetres and ten marri trees (Shire of Murray, 2023c and 2023e). These trees are likely to provide habitat for *Zanda latirostris* (Carnaby's black cockatoo), *Zanda baudinii* (Baudin's black cockatoo) and *Calyptorhynchus banksia naso* (forest red-tailed black cockatoo), which are listed as endangered and/or vulnerable under the BC Act and the Commonwealth EPBC Act. It must be noted that *Calyptorhynchus* sp. (white-tailed black cockatoo) have been recorded in the local area. These records were obtained when the data collector could not definitively distinguish if they spotted a Carnaby's or Baudin's black cockatoo, therefore the white-tailed black cockatoo category was created to incorporate these records.

Black Cockatoo species

According to available mapping, the application area is located within the known distribution and feeding area for Carnaby's, Baudin's and forest red-tailed black cockatoos. While habitat requirements for the three species of black cockatoos differ, the requirements in general can be categorised as breeding habitat, foraging habitat and night roosting habitat.

Breeding habitat

Suitable breeding habitat for black cockatoos includes trees which either have a suitable nest hollow or are of a suitable DBH to develop a nest hollow (DAWE, 2022). The application area is located 956 metres from an area mapped as known to be breeding habitat for Carnaby's cockatoo. This species generally occurs in woodland or forest and nests in hollows in live or dead trees of *Eucalyptus salmonophloia* (salmon gum), *Eucalyptus wandoo* (wandoo), *Eucalyptus gomphocephala* (tuart), *Eucalyptus marginata* (jarrah), *Eucalyptus rudis* (flooded gum), *Eucalyptus loxophleba subsp. loxophleba* (York gum), *Eucalyptus accedens* (powderbark), *Eucalyptus diversicolor* (karri) and

Corymbia calophylla (marri) (DAWE, 2022). Habitat trees considered potentially suitable for Black Cockatoo breeding have a DBH greater than 500 millimetres (for salmon gum and wandoo, suitable DBH is 300 millimetres).

The Shire confirmed that only a couple of the trees proposed to be cleared are greater than 500 millimetres DBH. None of the trees proposed to be cleared contain hollows suitable for black cockatoos (Shire of Murray, 2023g). Therefore, the proposed clearing is not likely to significantly impact breeding habitat for black cockatoos.

Night Roost sites

Black cockatoo night roosts are usually located in the tallest trees of an area, and in close proximity to both a food supply and surface water (DAWE, 2022). Jarrah, one of the species proposed to be cleared, is known to provide night roosting habitat for one or more of the three black cockatoo species (DAWE, 2022). Given the fact that several of the trees proposed to be cleared are mature trees (DBH greater than 500 millimetres) (Shire of Murray, 2022), they may provide night roosting habitat for black cockatoos now or into the future.

Foraging habitat

Foraging habitat differs between the three species of black cockatoos (DAWE, 2022):

- Baudin's cockatoo - Primarily seeds of marri, rarely jarrah, in woodlands and forest, and seeds of native proteaceous plant species (for example, *Banksia spp*. and *Hakea spp*.). During the breeding season feed primarily on native vegetation, particularly marri (seeds, flowers, nectar and grubs). Also, insects and insect larvae; pith of *Anigozanthos flavidus* (kangaroo paw); tips of *Pinus spp*.; *Macadamia spp.*, almonds and pecans; seeds of apples and pears; and persimmons.
- Carnaby's cockatoo - Native shrubland, kwongan heathland and woodland on seeds, flowers and nectar of native proteaceous plant species (*Banksia spp., Hakea spp.* and *Grevillea spp*.), as well as *Callistemon spp*. and marri. Also seeds of introduced species including *Pinus spp., Erodium spp*., wild radish, canola, almonds, macadamia and pecan nuts; insects and insect larvae; occasionally apples and persimmons; and liquidambar.
- Forest red-tailed black cockatoo - Primarily seeds of jarrah and marri in woodlands and forest, and edges of karri forests, including wandoo and blackbutt. Forages on *Allocasuarina* cones, fruits of *Persoonia longifolia* (snottygobble) and *C. haematoxylon* (mountain marri). Other less important foods include blackbutt, bullich, *Allocasuarina fraseriana, Hakea spp*., tuart, *E. decipiens* (redheart Moit) and *E. lehmanni* (bushy yate). Also, some introduced eucalypts such as *E. camaldulensis* (river red gum) and *E. grandis* (rose gum). On the Swan Coastal Plain, often feeds on introduced *Melia azedarach* (Cape Lilac), *E. caesia, E. erythrocorys*, lemon-scented gum and *Harpephyllum caffrum* (Kaffir plum).

The Shire noted the species proposed to be cleared include jarrah, grass trees and *Banksia* sp.. Noting the above listed foraging preferences of black cockatoo species, the application area provides foraging habitat for Baudin's, Carnaby's and forest red-tailed black cockatoo. The application area is also located within the mapped feeding distribution for black cockatoos.

Food resources within the range of roosting and breeding sites are important to sustain populations of black cockatoos, and foraging resources should therefore be viewed in the context of the proximity to the known night roosting and breeding sites to the application area. Black cockatoos will generally forage up to 12 kilometres from an active breeding site. Following breeding, they will flock in search of food, usually within six kilometres of a night roost (DAWE, 2022). Available databases show that there are several records of black cockatoo roost sites and a few mapped breeding locations within the local area. Therefore, the vegetation within the application area may support foraging by breeding and roosting populations. The ongoing loss of foraging habitat within proximity to breeding sites in the region represents a significant risk to black cockatoos.

Based on the above assessment, the application area is likely to provide significant foraging habitat for black cockatoos. According to the WA Environmental Offsets Calculator and consistent with the WA Environmental Offsets Policy (2011), to mitigate the loss of 48 native trees suitable for black cockatoo foraging, 72 native seedlings suitable for black cockatoo foraging are required to be planted within the adjacent road reserve. A significant residual impact no longer remains following the mitigation planting.

Other fauna

The application area may function as an ecological linkage for fauna moving between larger remnants of native vegetation within the local area. The ecological linkage values will not likely be severed by the proposed clearing,

noting native vegetation will remain with the road reserve and additional trees will be planted as a mitigation measure to replace the trees being cleared.

Conclusion

Based on the above assessment, the application area is likely to provide significant foraging habitat for black cockatoos. Due to the nature of the proposed clearing and degraded understorey, other fauna species are not likely to be significantly impacted by the clearing. Ecological linkage values of the road reserve are likely to remain. Planting foraging species within the adjacent road reserve will ensure no significant residual impact remains for clearing black cockatoo foraging habitat.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- Avoidance and minimisations measures.
- Planting of 72 *Corymbia calophylla* (marri), *Eucalyptus marginata* (jarrah) and *Banksia sp.* seedlings within the Readheads Road Reserve (PIN 1362219), North Dandalup, to balance the significant residual impacts from the loss of 48 native trees suitable for black cockatoo foraging.

3.2.2. Environmental value: significant remnant vegetation - Clearing Principle (e)

Assessment

The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearance of ecological communities with an extent below 30 per cent of that present pre-1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001). The application area is located within the Swan Coastal Plain Interim Biogeographic Regionalisation of Australia (IBRA) bioregion, which retains approximately 38.62 per cent of its pre-European vegetation extent (Government of Western Australia, 2019b). The mapped Swan Coastal Plain vegetation 'Guildford Complex - 32' retains approximately 5.09 per cent of its pre-European native vegetation extent within the bioregion (Government of Western Australia, 2019a). This vegetation complex is described as a mixture of open forest to tall open forest of marri - wandoo - jarrah and woodland of wandoo (with rare occurrences of *Eucalyptus lane-poolei* (salmon white gum)). Minor components include *Eucalyptus rudis* (flooded gum) - *Melaleuca rhaphiophylla* (swamp paperbark). The extent of native vegetation remaining within the local area (10 kilometre radius of the application area) is 32.39 per cent.

Noting the proposed clearing is dominated by marri and jarrah trees, it was concluded that the application area is representative of the mapped Guildford Complex. As the vegetation complex retains less than 30 per cent of the original extent of native vegetation, less than the 30 per cent national objective and target for biodiversity conservation, the application area is considered to be within an extensively cleared landscape.

Conclusion

Due to the presence of suitable habitat for conservation significant fauna, the proposed clearing is impacting a significant remnant of native vegetation within an extensively cleared landscape. The mitigation measures proposed by the applicant through the revegetation of at least 72 native trees does not result in a significant residual impact, according to calculations made using the WA Environmental Offsets Metric Calculator (see section 3.2.1). Weed and dieback management measures will minimise impacts to the surrounding native vegetation.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- Planting and ensuring the survival of at least 72 native trees within the road reserve.
- Take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback.

3.2.3. Environmental value: water resources - Clearing Principles (f and i)

Assessment

The management category assigned to a wetland has been based on the evaluation of its attributes, functions and values. It provides guidance on the nature of management and protection the wetland should be afforded. The

categories that have been used on the Swan Coastal Plain in Western Australia are conservation, resource enhancement and multiple use.

- Multiple use wetlands (MUW) - are considered wetlands with few remaining important attributes and functions (EPA, 2004; EPA, 2008; DBCA, 2017a).
- Resource enhancement wetlands (REW) – are wetlands which may have been partially modified but still supports substantial ecological attributes and functions (DBCA, 2017a).
- Conservation category wetlands (CCW) - support a high level of environmental values. These are the highest priority wetlands and the management objective is the preservation of wetland attributes and functions (DBCA, 2017a). The management objectives should be to take all reasonable measures to retain the wetland's hydrological function (EPA, 2008).

The initial proposed clearing was located within 27 metres of a CCW, unnamed palusplain (UFI – 14635). Within this palusplain (UFI – 14635) lies a natural, non-perennial, minor river which is a tributary of the North Dandalup River (Figure 5). Clearing of vegetation within 50 metres of a CCW is not consistent with EPA Guidance Statement No.33 (Chapter B4) (EPA, 2008). All proposed clearing within 50 metres of the CCW has been removed from the application (Shire of Murray, 2023c). Through avoidance and minimisation measures, the application area is now approximately 107 metres from the wetland boundary.

Available mapping and spatial databases indicate that a large MUW, which is a flat, palusplain (UFI – 16021), covers the three eastern application areas (Figure 5). As these wetlands are classified as wetlands with few remaining important attributes and functions, it is recommended that the management objectives be considered in the context of ecologically sustainable development and best management practice catchment planning (DBCA, 2017a). The proposed clearing of the degraded vegetation within the application area is not likely to significantly impact the occurrence of the MUW.

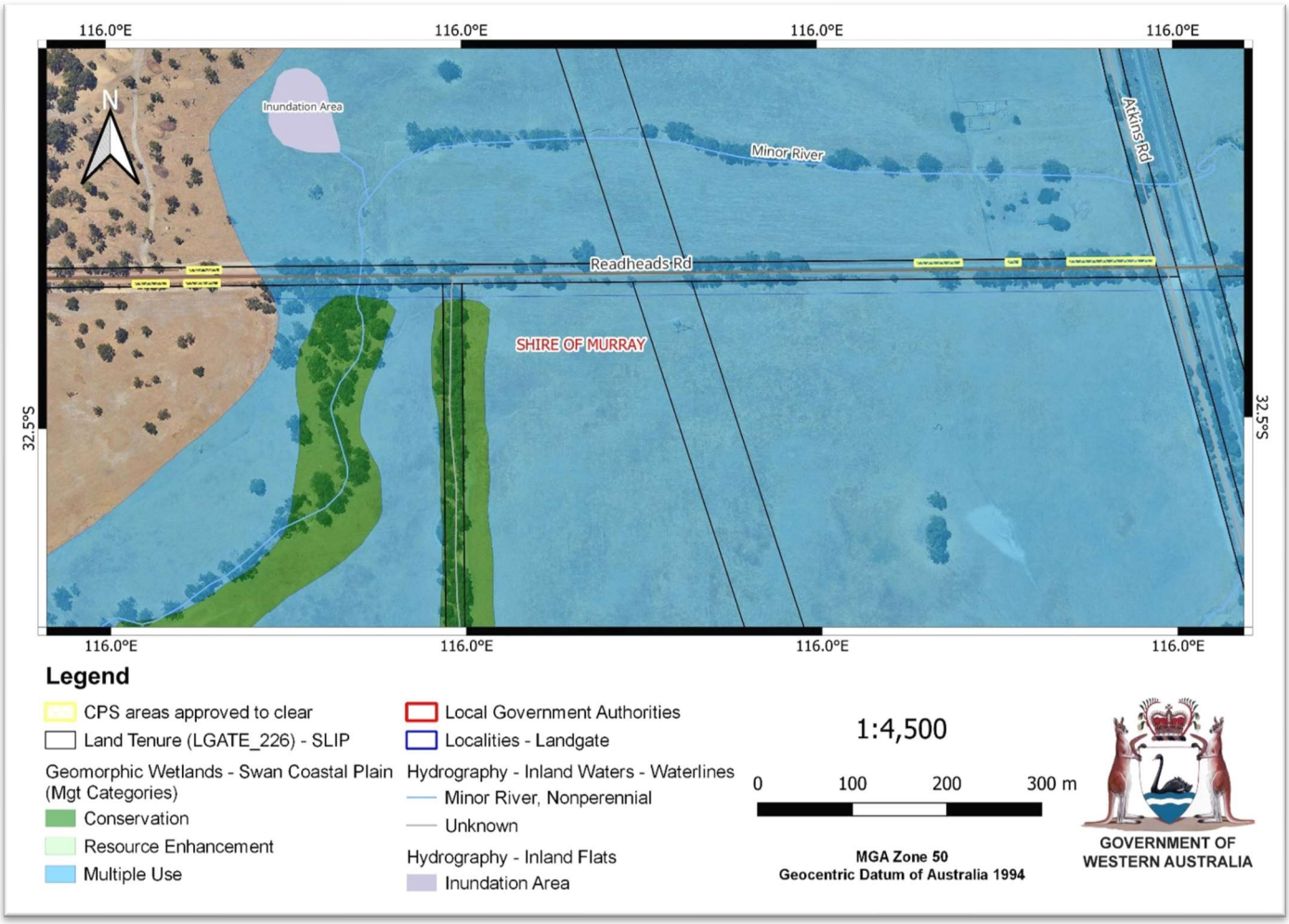

Figure 5: Geomorphic Wetlands and hydrography mapped adjacent to the application area.

Conclusion

As the application areas are in close proximity to several Geomorphic Wetlands, there is a potential for the introduction and spread of weeds and dieback into the adjacent riparian vegetation. Potential impacts to wetlands as a result of the introduction and spread of weeds and dieback may be minimised by the implementation of a weed management condition.

As the clearing within the MUW is unlikely to impact on the best management practice catchment planning, including potential surface and groundwater impacts (detailed in Section 3.3), the proposed clearing is unlikely to be significant in relation to this wetland value.

Conditions

To address potential impacts to wetland habitat from proposed road upgrades, and potential weed and dieback encroachment, the following management measure will be required as a condition on the clearing permit.

- Implement weed and dieback management measures to mitigate impacts to adjacent areas.

3.3. Relevant planning instruments and other matters

The Shire of Murray advised the Department that local government approvals are not required, and that the proposed clearing is consistent with the Shire's Local Planning Scheme.

The road upgrades are associated with the State black spot project (Shire of Murray, 2022). Black Spot locations are determined by the Australian Government as being road locations where crashes are occurring or are at risk of occurring.

The application area is located with the Dandalup River System Surface Water Area (UFI 17) and the Murray Groundwater Area (UFI 42) both proclaimed under the RIWI Act. Groundwater will not be intercepted, the beds or banks of any watercourses will not be disturbed, therefore no other permitting by the Department is required.

The applicant may have notification responsibilities under the EPBC Act for impacts to Baudin's, Carnaby's and forest red-tailed black cockatoo and their habitats, as set out in the EPBC Act (DAWE, 2022). The applicant has been advised to contact the federal Department of Water, Agriculture and the Environment (DAWE) to discuss EPBC Act referral requirements.

The application area is located with the boundary of the registered Native Title (Indigenous Land Use Agreements) Gnaala Karla Booja Indigenous Land Use Agreement (WI2015/005).

The registered Aboriginal Heritage Site, the Dandalup River (Place ID: 27937) runs parallel through the centre of the areas proposed to be cleared and then along the northern edge of the most easterly clearing area. This Aboriginal Heritage area is Mythological, a Hunting Place, a Natural Feature, a Plant Resource and a Water Source. Several other Aboriginal Heritage sites of significance have been mapped within the local 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

The information provided below describes the key characteristics of the area proposed to be cleared and is based on the best information available to DWER at the time of this assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix B.

A.1. Site characteristics

Characteristic	Details
Local context	The application area is located within the Swan Coastal Plain IBRA Bioregion. The proposed clearing is of native trees within the Readheads Road Reserve (PIN 1362219), North Dandalup within the Shire of Murray, and approximately 70 kilometres south of Perth. The area is a part of intensive land use area and is directly adjacent to land cleared for intensive agriculture. Aerial imagery and spatial data indicate the local area (10 kilometre radius from the centre of the area proposed to be cleared) retains approximately 32.39 percent of the original remnant vegetation cover (Appendix A.1.).
Ecological linkage	Readheads Road was surveyed as a roadside conservation – road centreline (DBCA-030) area in December 2008, as weeds were identified. The area proposed to be cleared contributes to an ecological linkage along the roadside and with the adjacent conservation wetlands. A south west regional ecological linkage (Object ID: 28) has been mapped approximately 115 metres west of the most western area proposed to be cleared. This mapped linkage identifies regional ecological linkage axis lines that aim to link patches of remnant vegetation judged to be of regional significance by retaining the best (condition) and/or most contiguous patches available to act as stepping stones for flora and fauna between regionally significant areas (Molloy *et al.*, 2009).
Conservation areas	The application area does not intersect with any DBCA managed lands. DBCA Legislated tenure (DBCA – 011) North Dandalup Nature Reserve (PIN 424926, 424929, 424928) and Dwellingup State Forest (PIN 424932) are located within 2.25 and 2.95 kilometres east of the application area. These areas are vested with the Conservation Commission of WA.
Vegetation description	Photographs and survey diagrams supplied by the Shire (Shire of Murray, 2023c) found the proposed clearing area is consistent with original Mattiske and Havel 1998 vegetation complex mapping in the area which is the Guildford Complex – 32. This complex is described as a mixture of open forest to tall open forest of *Corymbia calophylla* (marri) - *Eucalyptus wandoo* (wandoo) - *Eucalyptus marginata* (jarrah) and woodland of *Eucalyptus wandoo* (wandoo) (with rare occurrences of *Eucalyptus lane-poolei* (Salmon White Gum)). Minor components include *Eucalyptus rudis* (flooded gum) - *Melaleuca rhaphiophylla* (swamp paperbark). Representative photos and survey diagrams are available in Appendix D. The Guildford Complex - 32 vegetation complex has retained 5.09 per cent of the pre-European extent (Government of Western Australia, 2019b).
Vegetation condition	Photographs supplied by the applicant indicate the vegetation within the proposed clearing area is in Degraded condition (Keighery, 1994) condition. The full Keighery (1994) condition rating scale is provided in Appendix C. Representative photos are available in Appendix D.
Climate and landform	The southwest of Western Australia experiences a Mediterranean climate of hot dry summers and cool wet winters, and the proposed clearing area is situated within the 'Temperate – distinctly dry and warm summer' (BOM, 2016). An average of 680.6 millimetres of rainfall is recorded annually from the Pinjarra South weather station. The site occurs on the Swan Coastal Plain, which is the geomorphic unit that characterises much of the Perth metropolitan area. The site is not known to contain any restricted landforms or unique geological features.

Characteristic	Details
Soil description	According to available mapping, the application area contains three types of soils. From west to east the soil systems include: • **Pinjarra P8 Phase - 213Pj__P8** - Broad poorly drained flats and poorly defined stream channels with moderately deep to deep sands over mottled clays; acidic or less commonly alkaline grey and yellow duplex soils to uniform bleached or pale brown sands over clay. • **Pinjarra, B1 Phase - 213Pj__B1** - Extremely low to very low relief dunes, undulating sandplain and discrete sand rises with deep bleached grey sands sometimes with a pale yellow B horizon or a weak iron-organic hardpan at depths generally greater than 2 m; banksia dominant. • **Pinjarra P1b Phase - 213Pj__P1b** - Flat to very gently undulating plain with deep acidic mottled yellow duplex soils. Moderately deep pale sand to loamy sand over clay: imperfectly drained and moderately susceptible to salinity in limited areas.
Land degradation risk	Information on land degradation risk factors according to the soil systems located within the application area is detailed in Appendix A.6.
Waterbodies	The desktop assessment, available databases and aerial imagery indicate that a natural, minor, non-perennial watercourse (Object ID - 15176) lies approximately 148 metres east of the western application areas and approximately 85 metres north of the eastern areas proposed to be cleared (Figure 5). Available mapping indicates that the flat, palusplain, Multiple Use Geomorphic Wetlands – Swan Coastal Plain (UFI - 4413) overlaps the three eastern application area footprints (Figure 5). There are two flat, palusplain, Conservation Category Geomorphic Wetlands – Swan Coastal Plain (UFI – 14635 and 5929) located approximately 107 and 230 metres to the closest area proposed to be cleared, respectively.
Hydrogeography	Murray Groundwater Area (UFI - 42) and Dandalup River System Surface Water Area (UFI – 17) proclaimed under the RIWI Act. The application area is located within the Coastal Plain Hydrological Zone - Occupies the western portion of the Perth Basin. Major aquifers: Leederville, Yarragadee & Cockleshell Gully Fms. The eastern Yoganup Fm, is a major recharge area; discharge to the Indian Ocean. It also lies within the South West Catchment Division (No. 6), the Peel Estuary - Murray River Catchment and the Murray River Basin (No. 614). Available mapping indicates that North and South Dandalup Rivers 1 in 100 (1%) AEP floodplain occurs directly adjacent to the western application areas and in between the application footprints. Groundwater salinity within the application area has been recorded as 500-1000 milligrams per litre.
Flora	The desktop assessment and available databases indicate that there are 32 records of conservation significant flora located within the local area. Of these records, there are two ‘Threatened’, one ‘Endangered’ and three ‘Critically Endangered’ listed under the BC Act and 16 are priority listed flora. There are no records of conservation significant flora within the application area according to local mapping. The closest record is priority 4 *Aponogeton hexatepalus* which is located 1.04 kilometres south of the application areas. As the proposed clearing is native trees and grass trees understorey, it is unlikely any conservation significant flora will be impacted by the clearing.
Ecological communities	There are four conservation significant ecological communities recorded within the local area (see Appendix A.4.). No significant ecological communities are mapped as occurring within the application area. The closest Threatened Ecological Communities (TEC) are the Endangered SCP3c - *Corymbia calophylla — Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain (floristic community type 3c as originally

Characteristic	Details
	described in Gibson et al. 1994) and the Endangered SCP3b - *Corymbia calophylla — Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (floristic community type 3b as originally described in Gibson et al. 1994), which are located 1.13 and 1.15 kilometres south-south-east of the application area, respectively. No conservation significant ecological communities will be impacted by the proposed clearing.
Fauna	There are records of 18 conservation significant fauna species found in the local area. The application area is within the mapped Carnaby's, Baudin's and forest red-tailed black cockatoo distribution area. Records of all three species of black cockatoos have been recorded in the local area. The closest confirmed black cockatoo roost is approximately 1.77 kilometres to the east of the application area and there are ten confirmed black cockatoo roosts within the local area. The closest confirmed forest red-tailed black breeding site is approximately 13.65 kilometres north-east of the proposed clearing and the closest confirmed white-tailed black cockatoo breeding site is approximately 7.18 kilometres north-east of the application area. A detailed fauna table can be found in Appendix A.3.

A.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion**					
Swan Coastal Plain	1,501,221.93	579,813.47	38.62	222,916.97	14.85
Vegetation complex*					
Guildford Complex - 32	90,513.13	4,607.91	5.09	287.49	0.32
Local area					
10km radius	34,289.42	11,106.15	32.39	-	-

*Government of Western Australia (2019a)

**Government of Western Australia (2019b)

A.3. Fauna analysis table

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
Threatened Fauna						
Phascogale tapoatafa wambenger (south-western brush-tailed phascogale, wambenger)	CD	N	N	4.42	5	N/A
Bettongia penicillata ogilbyi (woylie, brush-tailed bettong)	CR	N	N	5.34	2	N/A

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
Zanda latirostris (Carnaby's black cockatoo)	EN	Y	Y	0.63	71	Y
Zanda baudinii (Baudin's black cockatoo)	EN	Y	Y	1.84	11	Y
Botaurus poiciloptilus (Australasian bittern)	EN	N	N	1.86	1	N/A
Calyptorhynchus sp. 'white-tailed black cockatoo'	EN	Y	Y	3.59	13	Y
Tringa glareola (wood sandpiper)	MI	N	N	9.18	1	N/A
Westralunio carteri (Carter's freshwater mussel)	VU	N	N	1.38	4	N/A
Calyptorhynchus banksii naso (forest red-tailed black cockatoo)	VU	Y	Y	1.58	12	Y
Setonix brachyurus (quokka)	VU	N	N	1.85	1	N/A
Leipoa ocellata (malleefowl)	VU	N	N	4.18	1	N/A
Dasyurus geoffroii (chuditch, western quoll)	VU	N	N	8.15	20	N/A
Priority Fauna						
Ctenotus delli (Dell's skink, Darling Range southwest ctenotus)	P4	N	N	3.36	2	N/A
Notamacropus irma (western brush wallaby)	P4	N	N	4.27	1	N/A
Isoodon fusciventer (quenda, southwestern brown bandicoot)	P4	N	N	5.96	4	N/A
Falsistrellus mackenziei (western false pipistrelle, western falsistrelle)	P4	N	N	8.71	5	N/A
Oxyura australis (blue-billed duck)	P4	N	N	8.86	6	N/A
Glacidorbis occidentalis (jarrah forest freshwater snail)	P3	N	N	9.64	1	N/A

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

A.4. Ecological community analysis table

Community name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records within local area (total)	Are surveys adequate to identify? [Y, N, N/A]
SCP3c - *Corymbia calophylla — Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain (floristic community type 3c as originally described in Gibson et al. 1994)	Endangered	N	Y	Y	1.13	1	N/A
SCP3b - *Corymbia calophylla — Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal	Endangered	N	Y	Y	1.15	2	N/A

Community name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records within local area (total)	Are surveys adequate to identify? [Y, N, N/A]
Plain (floristic community type 3b as originally described in Gibson et al. 1994)							
Banksia WL SCP - *Banksia* Woodlands of the Swan Coastal Plain ecological community	Priority 3 / Endangered	N	N	N	1.21	516	N/A
SCP15 - Forests and woodlands of deep seasonal wetlands of the Swan Coastal Plain (floristic community type 15 as originally described in Gibson et al. 1994)	Critically Endangered	N	N	N	8.70	1	N/A

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

A.5. Land degradation risk table

Degradation Risk	Pinjarra P8 Phase - 213Pj__P8	Pinjarra, B1 Phase - 213Pj__B1	Pinjarra P1b Phase - 213Pj__P1b
Wind erosion	M1 - 10-30% of map unit has a high to extreme risk	H2: >70% of map unit has a high to extreme risk	H1 - 50-70% of map unit has a high to extreme risk
Water erosion	L1 - <3% of map unit has a high to extreme risk		
Water logging	H2 - >70% of map unit has a moderate to very high risk	M1 - 10-30% of map unit has a moderate to very high risk	H2 - >70% of map unit has a moderate to very high risk
Water Repellence	L2 - 3-10% of map unit has a high risk	H2 - >70% of map unit has a high risk	H1 - 50-70% of map unit has a high risk
Sub-surface Acidification	H2 - >70% of map unit has a high risk or is presently acid		
Phosphorous export	M1 - 10-30% of map unit has a high to extreme risk	H1 - 50-70% of map unit has a high to extreme risk	L2 - 3-10% of map unit has a high to extreme risk
Salinity	L2 - 3-10% of map unit has a moderate to high risk or is presently saline	L1 - <3% of map unit has a moderate to high risk or is presently saline	
Flooding	L1: <3% of the map unit has a moderate to high risk		

Appendix B. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment: The area proposed to be cleared does not contain locally significant flora, fauna, habitats, assemblages of plants.	At variance	Yes Refer to Section 3.2.*1, above*.
Principle (b): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."* Assessment:	At variance	Yes *Refer to Section 3.2.1, above.*

Assessment against the clearing principles	Variance level	Is further consideration required?
The area proposed to be cleared contains foraging habitat for conservation significant fauna.		
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: The area proposed to be cleared is unlikely to contain habitat for threatened flora.	Not likely to be at variance	No
Principle (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."* Assessment: The area proposed to be cleared does not contain species that indicate a threatened ecological community.	Not at variance	No
Environmental value: significant remnant vegetation and conservation areas		
Principle (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."* Assessment: The extent of the mapped vegetation complex is not consistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is considered to be representative of the mapped vegetation complex.	At variance	Yes *Refer to Section 3.2.2, above*
Principle (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."* Assessment: Given the distance to the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas.	Not at variance	No
Environmental value: land and water resources		
Principle (f): *"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."* Assessment: Given one water course and three Geomorphic Wetlands are recorded within and adjacent to the application area, the proposed clearing may impact on- or off-site hydrology and water quality.	At variance	Yes *Refer to Section 3.2.3, above.*
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The mapped soils are moderately to highly susceptible to wind erosion, water repellence, sub-surface acidification and phosphorus export. Noting the extent and location of the application area and the condition of the vegetation, the proposed clearing is not likely to have an appreciable impact on land degradation.	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
Principle (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."* Assessment: Given the application area is located in a surface and groundwater area proclaimed under the RIWI Act and is located within and adjacent to Multiple Use and Conservation Category Wetlands, respectively, the proposed clearing may impact surface or ground water quality.	May be at variance	Yes *Refer to Section 3.2.3, above*
Principle (j): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."* Assessment: The mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding. Although the eastern application areas are located within a mapped flat, palusplain, Multiple Use Geomorphic Wetland, the location and extent of clearing, in addition to mitigation revegetation within the road reserve, the proposed clearing is unlikely to contribute to waterlogging.	Not likely to be at variance	No

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. Survey information excerpts / photographs of the vegetation

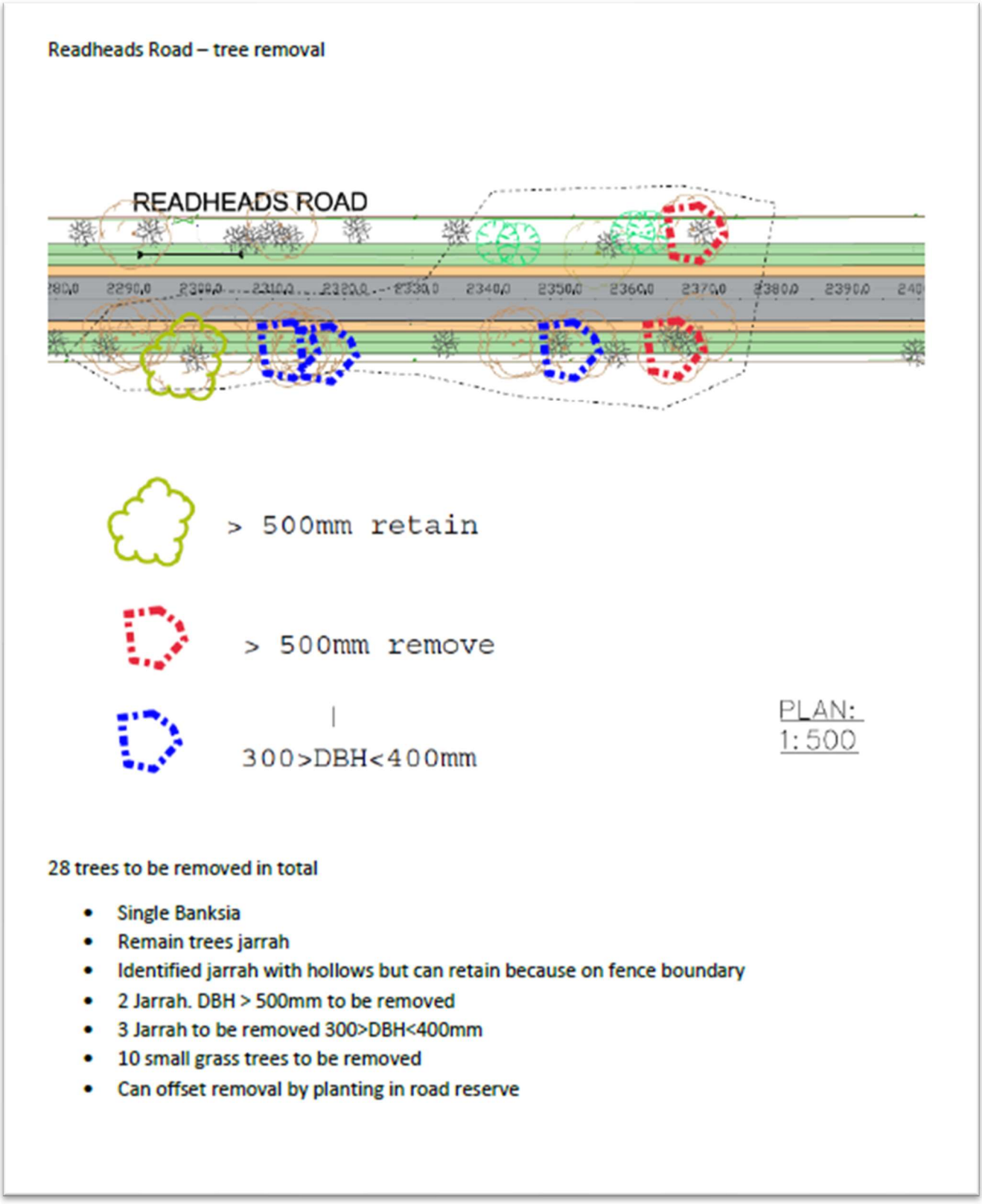

Figure 7: Excerpt from information provided by the Shire of Murray after measures of avoidance and minimisation had been taken. Please note an additional ten trees were re-added to the clearing application after this information was provided to the Department, as after a further survey of the area, they could not be avoided (Shire of Murray, 2023b).

Western outlook –(CH2370) 2 large jarrah to be removed

–(CH2370) large jarrah to be removed north verge

Figure 8: Photos provided by the Shire of Murray, of trees proposed to be cleared, after measures of avoidance and minimisation had been taken (Shire of Murray, 2023b).

Single Banksia

Single Banksia <300mm

Figure 9: Photos provided by the Shire of Murray, of the *Bankia sp.* proposed to be cleared, after measures of avoidance and minimisation had been taken (Shire of Murray, 2023b).

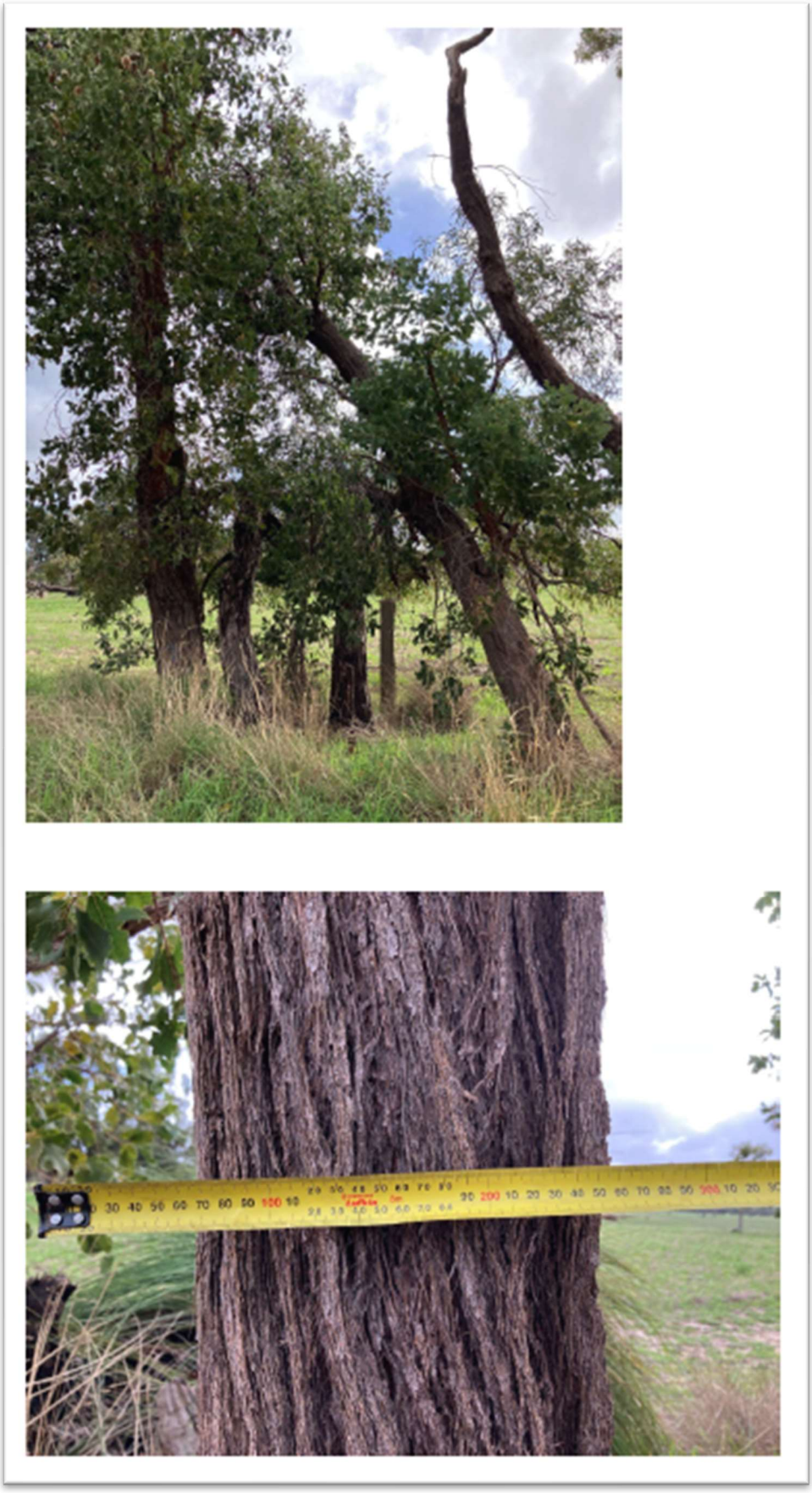

Figure 10: Photos provided by the Shire of Murray, of trees proposed to be cleared, after measures of avoidance and minimisation had been taken (Shire of Murray, 2023b).

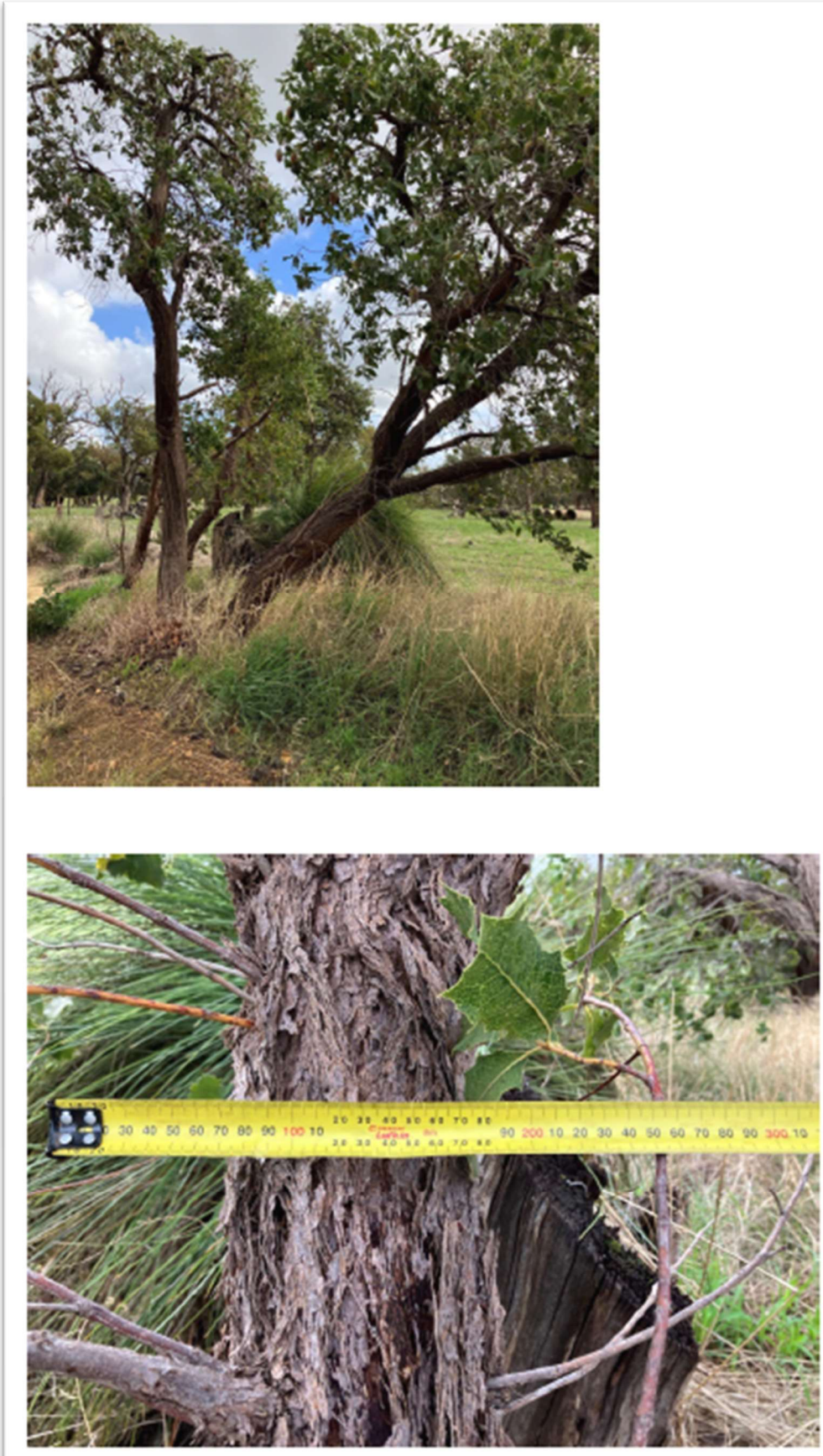

Figure 11: Photos provided by the Shire of Murray, of trees proposed to be cleared, after measures of avoidance and minimisation had been taken (Shire of Murray, 2023b).

–(CH2370) large jarrah to be removed south verge DBH.500mm - no hollow evident

Figure 12: Photos provided by the Shire of Murray, of mature jarrah proposed to be cleared, after measures of avoidance and minimisation had been taken (Shire of Murray, 2023b).

DBH <300mm

Figure 13: Photos provided by the Shire of Murray, of juvenile jarrah proposed to be cleared, after measures of avoidance and minimisation had been taken (Shire of Murray, 2023b).

DBH - <=400mm

DBH - <=400mm

Figure 14: Photos provided by the Shire of Murray, of trees proposed to be cleared, after measures of avoidance and minimisation had been taken (Shire of Murray, 2023b).

Figure 15: Photos provided by the Shire of Murray, of juvenile tree proposed to be cleared, after measures of avoidance and minimisation had been taken (Shire of Murray, 2023b).

large jarrah DBH .500mm – evidence of hollows

Large jarrah can be retained as located on boundary fence

Figure 16: Photos provided by the Shire of Murray, of mature tree with evidence of hollows that was avoided, after measures of avoidance and minimisation had been taken (Shire of Murray, 2023b).

Appendix E. Sources of information

E.1. GIS databases

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

- 10 Metre Contours (DPIRD-073)
- 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)
- Ramsar Sites (DBCA-010)
- 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

Brown, A., Thomson-Dans, C. and Marchant, N. (Eds) (1998) *Western Australia's Threatened Flora*. Department of Conservation and Land Management, Western Australia.

Bureau of Meteorology (BOM) (2016) *Climate classification maps: Climate classification of Australia*. Accessed at http://www.bom.gov.au/ and http://www.bom.gov.au/jsp/ncc/climate_averages/ Accessed July 2023.

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

Department of Agriculture, Water and the Environment (DAWE) (2022) *Referral guideline for 3 WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black Cockatoo*, Department of Agriculture, Water and the Environment, Canberra, February.

Department of Biodiversity, Conservation and Attractions (DBCA) (2017a) *A methodology for the evaluation of wetlands on the Swan Coastal Plain*, draft prepared by the Wetlands Section of the Department of Biodiversity, Conservation and Attractions and the Urban Water Branch of the Department of Water and Environmental Regulation, Perth. Available from: A methodology for the evaluation of wetlands on the Swan Coastal Plain

Department of Biodiversity, Conservation and Attractions (DBCA) (2017b) *Fauna Profile - Baudin's cockatoo Calyptorhynchus baudinii*. Retrieved from http://www.dbca.wa.gov.au/

Department of Primary Industries and Regional Development (DPIRD) (2017) *NRInfo Digital Mapping*. Accessed at https://maps.agric.wa.gov.au/nrm-info/ Accessed June 2020. Department of Primary Industries and Regional Development, Government of Western Australia.

Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2012) *EPBC Act referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo (endangered) Calyptorhynchus latirostris, Baudin's cockatoo (vulnerable) Calyptorhynchus baudinii, Forest red-tailed black cockatoo (vulnerable) Calyptohynchus banksii naso*. Department of Sustainability, Environment, Water, Population and Communities (now the Department of Agriculture, Water and Environment), Canberra.

Environmental Protection Authority (EPA) (2004) *Revised Draft Environmental Protection (Swan Coastal Plain Wetlands) Policy and Regulations 2004*. Environmental Protection Authority (EPA). November 2004.

Environmental Protection Authority (EPA) (2008) *Environmental Guidance for Planning and Development Guidance Statement No 33*. Environmental Protection Authority, Western Australia. Available from: https://www.epa.wa.gov.au/

Government of Western Australia (2019a) *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 (2019b) *2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report)*. Current as of March 2019. W.A. Department of Biodiversity, Conservation and Attractions, Perth. Available from https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics

Groom, C. (2011) *Plants Used by Carnaby's Black Cockatoo*. Department of Environment and Conservation, Perth, Western Australia.

Johnstone, R.E, Kirkby, T., and Sarti, K. (2013) *The breeding biology of the Forest Red-tailed Black Cockatoo Calyptorhynchus banksii naso Gould in south-western Australia*. I. Characteristics of nest trees and nest hollows. Available from: https://www.researchgate.net/publication

Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Le Roux, C. (2017) *Nocturnal roost tree, roost site and landscape characteristics of Carnaby's Black-Cockatoo (Calyptorynchus latirostris) on the Swan Coastal Plain*. Thesis. Edith Cowan University. School of Science. https://ro.ecu.edu.au/theses/2017

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.

Shire of Murray (2022) *CPS 9973-1- Shire of Murray - Application form and supporting documents*, received on 22 November 2022 (DWER Ref: DWERDT689945).

Shire of Murray (2023a) *CPS 9973-1- Shire of Murray – RFI response,* received on 7 June 2023 (DWER Ref: DWERDT790271).

Shire of Murray (2023b) *CPS 9973-1- Shire of Murray – RFI further response and attachments,* received on 12 June 2023 (DWER Refs: DWERDT790911, DWERDT791005 and DWERDT791007).

Shire of Murray (2023c) *CPS 9973-1- Shire of Murray – confirmation of the trees proposed to be cleared,* received on 12 June 2023 (DWER Ref: DWERDT791048).

Shire of Murray (2023d) *CPS 9973-1- Shire of Murray – Shapefiles for reveg area and confirmation of planting of 58 trees,* received on 4 June 2023 (DWER Ref: DWERDT804442).

Shire of Murray (2023e) *CPS 9973-1- Shire of Murray – further response to request for further information,* received on 12 June 2023 (DWER Ref: DWERDT790911).

Shire of Murray (2023f) *CPS 9973-1- Confirmation of reveg species, understorey clearing requirements,* received on 4 July 2023 (DWER Ref: DWERDT806722).

Shire of Murray (2023g) *CPS 9973-1- Shire of Murray – Confirmation from Shire of the planting of 72 trees for mitigation and species of addition 10 trees requiring clearing,* received on 10 July 2023 (DWER Ref: DWERDT804784).

Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) *Native Vegetation in Western Australia, Extent, Type and Status*. Resource Management Technical Report 249. Department of Agriculture, Western Australia.

Thackway, R and Cresswell, I.D. (eds) (1995) *An interim biogeographical regionalisation of Australia*. Australian Nature Conservation Agency (now Department of Agriculture, Fisheries and Forestry), Canberra.

Valentine, L. and Stock, W. (2008) *Food Resources of Carnaby's Black-Cockatoo (Calyptorhynchus latirostris) in the Gnangara Sustainability Strategy study area*. Unpubl. Report to Forest Products Commission. Centre for Ecosystem Management, Edith Cowan University and the Department of Environment and Conservation, Perth, Western Australia.

Western Australian Herbarium (WAH) (1998-). *FloraBase - the Western Australian Flora*. Department of Biodiversity, Conservation and Attractions. https://florabase.dpaw.wa.gov.au/ Accessed August 2021.

Webb, A., Kinloch, J., Keighery, G. and Pitt, G. 2016. *The Extension of Vegetation Complex Mapping to Landform boundaries within the Swan Coastal Plain Landform and Forested Region of South West Western Australia*. Department of Parks and Wildlife, Bunbury, WA.