



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS

Area Permit Number: 8667/1

File Number: DWERVT3406

Duration of Permit: From 3 December 2020 to 3 December 2022

PERMIT HOLDER

Ms Sarah Lau on behalf of Suk Mei Lau

LAND ON WHICH CLEARING IS TO BE DONE

Lot 8 on Diagram 73314, Mariginiup

AUTHORISED ACTIVITY

The Permit Holder shall not clear more than 0.87 hectares of native vegetation within the area cross-hatched yellow on attached Plan 8667/1.

CONDITIONS

1. Avoid, minimise and reduce the impacts and extent of clearing

In determining the amount of native vegetation to be cleared authorised under this Permit, the Permit Holder must have regard to the following principles, set out in 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.

2. Dieback and weed control

When undertaking any clearing or other activity authorised under this Permit, the Permit Holder must take the following steps to minimise the risk of the 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.

3. Records must be kept

The Permit Holder must maintain the following records for activities done pursuant to this Permit, in relation to the clearing of native vegetation authorised under this Permit:

- (a) 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 or decimal degrees;
- (b) the date that the area was cleared;
- (c) the size of the area cleared (in hectares);
- (d) actions taken to avoid, minimise and reduce the impacts and extent of clearing in accordance with condition 1 of this Permit; and
- (e) actions taken to minimise the risk of the introduction and spread of *dieback* and *weeds* in accordance with condition 2 of this Permit.

4. Reporting

The Permit Holder must provide to the *CEO* the records required under condition 3 of this Permit, when requested by the *CEO*.

DEFINITIONS

The following meanings are given to terms used in this Permit:

CEO: means the Chief Executive Officer of the Department responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*;

dieback means the effect of *Phytophthora* species on native vegetation;

fill means material used to increase the ground level, or fill a hollow;

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;

weed/s 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 Regional Weed Rankings Summary, regardless of ranking; or
- (c) not indigenous to the area concerned.



Mathew Gannaway
MANAGER
NATIVE VEGETATION REGULATION

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

10 November 2020

Plan 8667/1

115°48'54.000" 115°48'57.600" 115°49'1.200" 115°49'4.800"



-31°42'36.000"
-31°42'39.600"
-31°42'43.200"
-31°42'46.800"

-31°42'36.000"
-31°42'39.600"
-31°42'43.200"
-31°42'46.800"

115°48'54.000" 115°48'57.600" 115°49'1.200" 115°49'4.800"

Legend

-  CPS areas approved to clear
-  base layers
-  Local Government Authorities
-  Cadastre - LGATE 218
-  Roads - Landgate 012

Image



0 25 50 m



MGA 94
Geocentric Datum of Australia 1994

Mathew
Gannaway
2020.11.10
09:41:09 +08'00'

Officer with delegated authority under Section 20
of the Environmental Protection Act 1986



GOVERNMENT OF
WESTERN AUSTRALIA
WA Crown Copyright 2018



1. Application details

1.1. Permit application details

Permit application No.: 8667/1
Permit type: Area Permit

1.2. Applicant details

Applicant's name: Ms Sarah Lau on behalf of Suk Mei Lau
Application received date: 04 September 2019

1.3. Property details

Property: Lot 8 on Diagram 73314
Local Government Authority: Wanneroo, City of
Localities: Mariginiup

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	Purpose category:
4.9998 (original)		Mechanical Removal	Building or structure
0.87 (revised)		Mechanical Removal	Building or structure

1.5. Decision on application

Decision on Permit Application: Granted
Decision Date: 10 November 2020
Reasons for Decision:

The clearing permit application was received on 4 September 2019 and has been assessed against the clearing principles, planning instruments and other matters in accordance with section 51O of the *Environmental Protection Act 1986* (EP Act). It has been concluded that the proposed clearing is not likely to be at variance with any of the clearing Principles.

Through assessment, the Delegated Officer determined that the proposed clearing may cause the spread of weeds and dieback into adjacent areas of remnant vegetation. To mitigate potential impacts to adjacent remnant vegetation, a weed and dieback management condition has been placed on the permit. The weed and dieback management condition requires earth-moving machinery to be clean of weeds and dieback when entering and exiting the clearing area, ensure that no dieback or weed-affected soil, mulch, fill or other material is brought into the area to be cleared and restrict the movement of machines and other vehicles to the limits of the area to be cleared.

The Delegated Officer also took into consideration that the applicant reduced the application area from 4.99 hectares to 0.87 hectares. This reduced the impacts on areas considered to potentially contain suitable habitat for conservation significant fauna and flora species, ecological linkage values, threatened and priority ecological communities and the risk of land degradation in form of wind erosion.

The revised application area contains an understorey dominated by weeds with *Adenanthos cygnorum* (woolybush) and *Jacksonia furcellata* over *Stirlingia latifolia* shrubs. Minimal foraging habitat is present.

Given the above, the Delegated Officer decided to grant a clearing permit subject to weed and dieback management.

In determining to grant a clearing permit subject to the above management conditions, the Delegated Officer found that the proposed clearing is not likely to lead to an unacceptable risk to the environment.

2. Site Information

Clearing Description

The original application is to clear 4.9998 hectares of native vegetation within Lot 8 on Diagram 73314, Mariginiup, for the purpose of development of stables, paddocks, private track and paddock shelters (Figure 1 and Figure 2a-d).

During the assessment of the application, the applicant amended the clearing footprint from 4.99 hectares to approximately 0.87 hectares (Figure 4) to minimise clearing impacts.

Vegetation Description

The Application area occurs within the 'Swan Coastal Plan' Interim Biogeographic Regionalisation for Australia (IBRA) bioregion, and is mapped as the following Swan Coastal Plain vegetation complexes (Hedde et al., 1980):

- Pinjar Complex (approximately 26.5 per cent of the application area) described as vegetation ranging from woodland of *Eucalyptus marginata* (Jarrah) - *Banksia* species to a fringing woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca preissiana* (Moonah) and sedgelands; and
- Karrakatta Complex (approximately 73.5 per cent of the application area) described as predominantly open forest of *Eucalyptus gomphocephala* (Tuart) - *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri) and woodland of *Eucalyptus marginata* (Jarrah) - *Banksia* species. *Agonis flexuosa* (Peppermint) is co-dominant south of the Capel River.

A site inspection of the application area was conducted by the Department of Water and Environmental Regulation (DWER) on 15 November 2019.

The site inspection identified that vegetation within the application area comprises a mixture of *Eucalyptus marginata* (jarrah), *Allocasuarina fraseriana* and *Banksia* woodland (mainly *B. menziesii*). Generally, the central and northern portions of the application area had a higher density of *Banksia* sp. which roughly occur at a density of five trees per 15m². *Allocasuarina* woodland dominates within several parts. Other native species identified include occasional *Kunzea glabrescens* in more disturbed areas, *Hibbertia hypericoides* and *Xanthorrhoea preissii*. Several of the jarrah trees were large mature trees with hollows.

The southwest portion of the application area, which is restricted by the boundary of the application area and a track (Figure 1), is dominated by *Adenanthos cygnorum* (woolybush) and *Jacksonia furcellata* over *Stirlingia latifolia*. A review of historical imagery (Figures 3a-d) identified that this vegetation was completely cleared in 2005 and started regrowing in 2006 (Figures 3b and 3c).

Vegetation Condition

The condition of the vegetation within the application area is considered to be in very good to degraded condition, described as:

- Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery 1994); and
- Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery, 1994).

The condition of the vegetation was determined by the DWER site inspection (DWER, 2019).

Soil type

The application area is mapped as the Karrakatta Sands Yellow Phase Map Unit 211 SP_Ky, which is described as low hilly to gently undulating terrain. Yellow sand over limestone at 1-2 m. *Banksia* spp. woodland with scattered emergent *Eucalyptus gomphocephala* and *Eucalyptus marginata* and a dense shrub layer (Schoknecht et al., 2004).

The DWER site inspection (2019) identified that the application area largely comprises of grey sands.

Comments

The local area is considered a 10 kilometre radius from the perimeter of the application area.



Figure 1 Application area cross-hatched blue



Figure 2a *Eucalyptus marginata* with *Xanthorrhoea preissii* (DWER, 2019)



Figure 2b *Banksia menziesii* with surrounding *Allocasuarina fraseriana* and *Xanthorrhoea preissii* (DWER, 2019)



Figure 2c Dense native understorey in very good condition (Keighery, 1994) (DWER, 2019)



Figure 2d Norther boundary of the application area showing representative species including *Eucalyptus*, *Allocasuarina*, *Banksia* and *Adenanthos* over *Xanthorrhoea preissii*, *Stirlingia latifolia* and *Hibbertia hypericoides* (DWER, 2019)



Figure 3a Historical imagery 1995



Figure 3b Historical imagery 2005



Figure 3c Historical imagery 2006

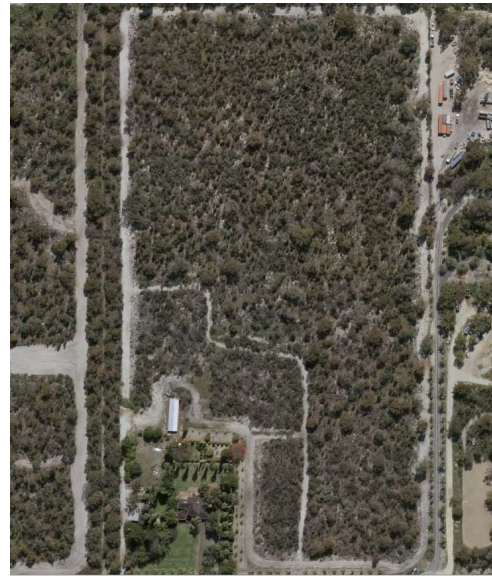


Figure 3d Historical imagery 2020

3. Minimisation and mitigation measures

In relation to whether alternatives have been considered that would avoid or minimise the need for clearing, the applicant has advised the following (Applicant, 2019a):

“As we do value our environment and native wildlife, we plan to maintain the existing established trees on the property, especially the tall larger trees that have housed families of large and small native birds for as long as I can remember. In future landscaping we would also like to plant native species such as the *Banksia prionotes* to help the local cockatoos with their food source as done already by other Mariginiup community members earlier this year.”

The applicant has amended the clearing footprint from 4.99 hectares to approximately 0.87 hectares. The following assessment is the preliminary assessment of the original extent of the application area. Section 5 and 6 below outline the amendments made by the applicant and the consideration of the variances made in response to the amendment.

4. Assessment of application against clearing principles, planning instruments and other relevant matters

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

Proposed clearing may be at variance with this Principle

Key Summary

The proposed clearing may be at variance with this Principle as the vegetation within the application may contain:

- Individuals of Threatened flora species *Caladenia huegellii*;

- Individuals of Priority 1 flora species *Baeckea* sp. Limestone (N. Gibson & M.N. Lyons 1425);
- Individuals of Priority 2 flora species *Acacia benthamii* and *Poranthera moorokatta*;
- Individuals of Priority 3 flora species *Conostylis bracteata* and *Styphelia filifolia*;
- 4.13 hectares of native vegetation that is representative of the federally listed Endangered Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region threatened ecological community (TEC) ;
- 4.13 hectares black cockatoos foraging, black-striped burrowing snake, quenda and masked owl habitat; and
- ecological linkage values within a highly cleared landscape.

According to available databases, four threatened and 25 priority flora species have been recorded within the local area. Threatened flora are discussed further under Principle (c). Based on the similarities shared between the soil and vegetation types in habitats for these flora taxa and within the application area, the following five priority species may occur within the application area:

- *Acacia benthamii* (Priority 2) – known from five populations within the local area spread over 13 kilometres in the City of Wanneroo, with the closest individual being recorded approximately 900 metres southwest from the application area. The species typically occupies limestone breakaways and is associated with woodland of *Banksia menziesii*, *B. attenuata*, *Eucalyptus marginata* or low open forest of *Allocasuarina fraseriana*, *Banksia attenuata* and *B. menziesii* over tall open shrubland of *Xanthorrhoea preissii* over low open heath of *Hibbertia hypericoides* and *Acacia humilis*. The species flowers from August to September (Western Australia (WA) Herbarium, 1998).
- *Baeckea* sp. Limestone (N. Gibson & M.N. Lyons 1425) (Priority 1) – known from five populations in the local area spread over 8.1 kilometres in the City of Joondalup and the City of Wanneroo and the closest population recorded approximately 4.2 kilometres southwest from the application area. This species tends to occur on yellow, grey sandy soils and is usually associated with *Banksia* woodland with scattered jarrah and tuart, tuart woodland, paperbark woodland or open *Eucalyptus* woodland with *E. todtiana*, *Banksia sessilis* and *Nuytsia floribunda*. The species flowers between November to January (WA Herbarium, 1998).
- *Conostylis bracteata* (Priority 3) – known from two populations in the local area spread over 2.1 kilometres in the City of Joondalup and the City of Wanneroo, with the closest population located approximately 3.4 kilometres southwest from the application area. The species occupies sand, limestone and consolidated sand dunes and is typically associated with *Banksia menziesii* and *Banksia attenuata* low open woodland to low open forest over *Xanthorrhoea preissii*, *Calothamnus sanguineus* and *Banksia sessilis* tall shrubland over *Allocasuarina fraseriana*, *Melaleuca systema* and *Hakea trifurcata* open shrubland or woodland of *Eucalyptus todtiana* over tall shrubland of *Acacia saligna*, *Banksia sessilis* var. *cygnorum*, *Kunzea glabrescens* and *Xanthorrhoea preissii*. The species flowers from August to September (WA Herbarium, 1998).
- *Poranthera moorokatta* (Priority 2) – known only from two locations overall. The first location is in Kings Park, Perth, where it grows in open *Banksia menziesii* – *Banksia attenuata* woodland on white silica sand in open spaces between shrubs, not in shaded areas or in areas of high litter cover. The Ellenbrook population was recorded as occurring with *Astartea* aff. *fascicularis*, *Banksia littoralis*, *Calothamnus lateralis*, *Centrolepis aristata*, *Melaleuca preissiana*, *Pericalymma ellipticum* var. *ellipticum* and *Phyllangium paradoxum* in a shallow dampland on mixed grey and white sand with scattered leaf litter (Barrett, 2012). The closest record of this species is located approximately 2.2 kilometres northwest from the application. The species flowers from late September to early November (WA Herbarium, 1998).
- *Styphelia filifolia* (Priority 3) – known from four populations recorded in the local area spread over 15 kilometres in the City of Swan and the City of Wanneroo, with the closest population recorded approximately 2.7 kilometres southwest from the application area. The species tends to occupy yellow, brown, grey sandy soils and is associated with woodland of *Banksia attenuata*, *B. menziesii*, *B. ilicifolia* over heath dominated by *Allocasuarina humilis* or *Andersonia*, *Hibbertia aurea*, *Banksia attenuata*, *Jacksonia floribunda*. The species flowers from February to March (WA Herbarium, 1998).

It is noted that much of the regional area has been cleared and given the application area comprises vegetation in very good (Keighery, 1994) condition, it may comprise suitable habitat for the abovementioned species. A flora survey of the area cross-hatched green on the Figure 4 below should be undertaken, targeting the above listed species to determine the impact of the proposed clearing on these species.

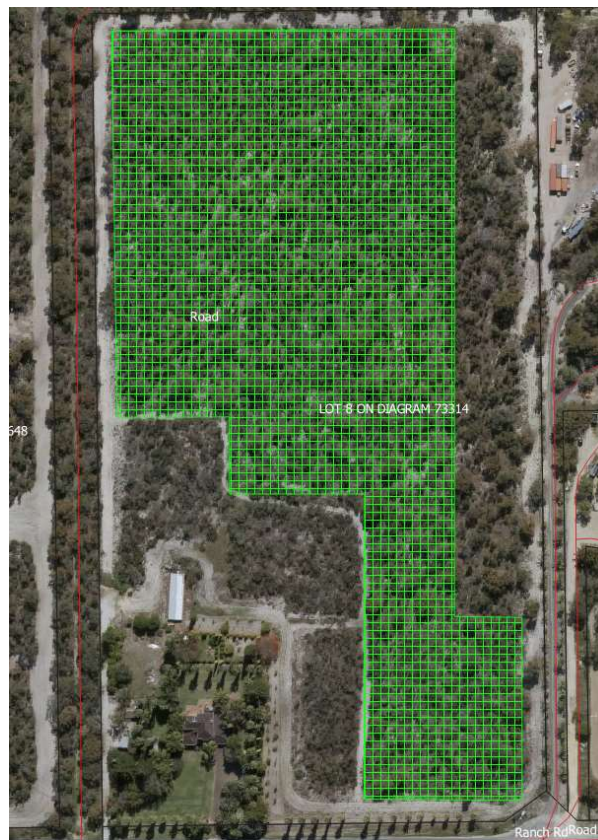


Figure 4 A portion of the application area requiring a flora survey

As discussed in Principle (b), the application area may contain habitat for a number of conservation significant fauna species, namely: black cockatoos, black-striped burrowing snake, quenda and masked owl, and provides an ecological linkage facilitation landscape connectivity and contributing to fauna dispersal between larger isolated bushland fragments.

As discussed in Principle (c), the application area may provide habitat for Grand Spider Orchid (*Caladenia huegelii*) listed as critically endangered under the *Biodiversity Conservation Act 2016* (BC Act).

According to available databases, a majority of the application area is located within the mapped Commonwealth listed TEC Banksia Woodlands of the Swan Coastal Plain, which is also the State listed Priority 3 priority ecological community (PEC) 'Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region' (hereafter referred as Banksia woodland) (Figure 1). The Approved Conservation Advice for the Banksia woodlands states:

- A number of vegetation communities or floristic community types are encompassed within the Banksia woodland ecological community. Some of these sub-communities within the Banksia woodland are highly restricted and listed as Threatened or Priority ecological communities in Western Australia. These have higher significance than sub-types known to be more common and should be provided specific or additional protection, particularly where assigned a higher threat rank than the Banksia woodland listing (Threatened Species Scientific Committee (TSSC), 2016).

The Banksia woodland typically occurs over sandy soils from Jurien Bay to Dunsborough, and extends to the Whicher and Darling escarpments (TSSC, 2016). Conservation advice for this TEC states that the principal structural features of the community are a distinctive upper sclerophyllous layer of low trees, typically dominated or co-dominated by one or more listed *Banksia* species, including *Banksia attenuata* (TSSC, 2016). The community may also have an emergent tree layer of jarrah and marri (TSSC, 2016). The site inspection undertaken by DWER officers (DWER, 2019) noted the central and northern portions of the application area comprise of a higher density of *Banksia* sp. which approximately occur at a density of five trees per 15m². Based on this, it is considered likely that the Banksia woodland TEC occurs within the application area. To accurately determine the extent of this TEC impacted by the proposed clearing, a vegetation survey of the area cross-hatched green in Figure 4, which includes an assessment against the key diagnostic factors, is required. The survey is not required for the regrowth vegetation in the southwest portion of the application area further described in Section 2.

As discussed in Principle (d), the application area may contain state listed TEC *Banksia attenuata* woodlands over species rich dense shrublands (floristic community type 20a as originally described in Gibson et al. (1994)).

As discussed in Principle (e), the application area is considered a significant as a remnant in an area that has been extensively cleared.

The disturbance caused by the proposed clearing may impact adjacent native vegetation through an increase of weeds and dieback. Weed and dieback management practices will assist in mitigating this risk.

Given the above, the proposed clearing may be at variance with this 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.

Proposed clearing may be at variance with this Principle

Key Summary

The proposed clearing may be at variance with this Principle as the vegetation within the application may contain:

- 4.13 hectares black cockatoos foraging habitat, black-stripped burrowing snake, quenda and masked owl habitat; and
- ecological linkage values within a highly cleared landscape.

According to available databases, 29 conservation significant fauna species have been recorded within the local area. Of these, the application may provide potential habitat for three threatened black cockatoo species: forest red-tailed black cockatoo (*Calyptorhynchus banksia* subsp. *naso*), Carnaby's cockatoo (*Calyptorhynchus latirostris*), and Baudin's cockatoo (*Calyptorhynchus baudinii*), Black-striped burrowing snake (*Neelaps calonotos*), Quenda (*Isoodon obesulus*), Masked owl (*Tyto novaehollandiae*), a short-tongued bee (*Leioproctus douglasiellus*), Woolybush bee (*Hylaeus globuliferus*) and Western Brush Wallaby (*Notamacropus Irma*).

According to available databases, the application area is located outside of the mapped confirmed breeding area for black cockatoos. The closest confirmed breeding tree is located approximately 22.5 kilometres northwest from the application area. Suitable breeding habitat for black cockatoos includes trees which either 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 millimetres (Commonwealth of Australia, 2012). A site inspection conducted by DWER officers identified a number of habitat trees with hollows suitable for black cockatoos (DWER, 2019). Noting this, a black cockatoo habitat tree assessment is required for the application area to identify all habitat trees than contain a hollow(s) that may be suitable for black cockatoo breeding.

Black cockatoos have a preference for foraging habitat that includes jarrah and marri woodlands and forest heathland and woodland dominated by proteaceous plant species such as *Banksia* sp., *Hakea* sp. and *Grevillea* sp. (Commonwealth of Australia, 2012). Noting the vegetation types present within the application area, the application area comprises of suitable foraging habitat for black cockatoos. Potential evidence of black cockatoo foraging was observed during the site inspections (DWER, 2019) by the way of chewed *Banksia* cone.

Foraging habitat for black cockatoos within seven kilometres of a breeding site is important to adequately support breeding pairs, and individual night roosting sites need food and water within six kilometres (Environmental Protection Authority (EPA), 2019). A review of the available databases identified that there are 10 confirmed roosting sites within a six-kilometre buffer from the perimeter of the application area and this area contains approximately 28 per cent of the pre-European vegetation extent remaining. Overlapping foraging ranges within 12 kilometres also support roosting sites and maintain habitat connectivity and movement across the landscape (EPA, 2019). Within this area, there are 43 roosting sites and approximately 31 per cent of the pre-European vegetation extent remaining. Given this, the application area may provide significant foraging habitat for black cockatoos. A black cockatoo foraging habitat assessment is required for the application area to determine the extent of the application area suitable for black cockatoo foraging.

The occurrence of Black-striped burrowing snake (*Neelaps calonotos*) listed as Priority 3 by the Department of Biodiversity, Conservation and Attractions (DBCA) is restricted to the sandy coastal strip near Perth, between Mandurah and Lancelin. It occurs on dunes and sand-plains vegetated with heaths and *Eucalypt/Banksia* woodlands, where it shelters in the upper layers of loose soil beneath leaf litter at the base of trees and shrubs (Wilson and Swan, 2008). Noting the vegetation observed in the application area and potential reptile burrow identified during the DWER site inspection (2019), the application area may provide suitable habitat for black-stripped burrowing snake.

Quenda (*Isoodon obesulus*), listed as priority 4 by DBCA, is known to inhabit scrubby, swampy vegetation with low, dense understorey, located nearby water courses, pasture, or forest/woodland that is regularly burnt and is in areas of pasture and cropland lying close to dense cover. Populations inhabiting jarrah and wandoo forests are usually associated with watercourses (Department of Environment and Conservation, 2012a). Noting the vegetation observed in the application area and potential quenda evidence identified in the form of a small digging within the *Allocasuarina* ground foliage (DWER, 2019), the application area may provide habitat for quenda.

Masked owl (*Tyto novaehollandiae*), listed as Priority 3 by DBCA, inhabits forests, woodlands, timbered waterways and open country on the fringe of these areas and usually roosts in vertical hollows in large trees. The main requirements are tall trees with suitable hollows for nesting and roosting and adjacent areas for foraging (Birdlife Australia, 2020). Noting the presence of hollow bearing trees within the application area, particularly *Eucalyptus marginata* with a large vertical hollow, the application area may contain suitable habitat for masked owl.

A short-tongued bee (*Leioproctus douglasiellus*), listed as endangered under the BC Act, is recorded within the local area. The specimens of *L. douglasiellus* have been collected on two plant species, both of which are on the DBCA Priority Flora list: *Goodenia filiformis* (Priority 3) and *Anthotium junciforme* (Priority 4) (Department of the Environment, 2020a). The closest individual of a short-tongued bee was recorded approximately 3.8 kilometres northeast from the application area. Noting that the two foraging species are not likely to occur within the application area and that bees, in general, are highly mobile and known to have quite variable foraging distance characteristics that are largely driven by the function of the landscape, context and size of the individual, the application area is unlikely to be significant habitat for a short-tongued bee.

Woolybush bee (*Hylaeus globuliferus*), listed as Priority 3 by DBCA, is thought to favour flowers of *Adenanthos cygnorum* for feeding but has also been recorded on *Banksia attenuata* (Houston, 2018). The closest individual of a woolybush bee was

recorded approximately 3.2 kilometres northeast from the application area. *Hylaeus globuliferus* is considered to be highly mobile and will have access to suitable habitat adjacent to the application area. Noting this, the application area is unlikely to be significant habitat for this species.

The application area may also support a population of western grey kangaroos (*Macropus fuliginosus*) and the Western Brush Wallaby (listed as Priority 4 by DBCA). Kangaroo droppings were evident within the site during the DWER (2019) site inspection.

In addition, aerial imagery indicates that the application area is likely to function as a north-south ecological linkage between areas of remnant vegetation in the local area and may facilitate landscape connectivity and contribute to fauna dispersal between larger isolated bushland fragments in a cleared landscape.

Given the above, the application area may be at variance with this principle.

A fauna survey of the application area is required to determine the impacts on conservation significant fauna.

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

Proposed clearing may be at variance with this Principle

Key Summary

The proposed clearing may be at variance with this Principle as the vegetation within the application may contain:

- Individuals of Threatened flora species *Caladenia huegelii*

According to available databases, four threatened flora species have been recorded within the local area; being:

- Grand Spider Orchid (*Caladenia huegelii*) is known from two populations spread over 10.5 kilometres in the City of Wanneroo, with the closest population recorded approximately 6.5 kilometres northeast from the application area. The species tends to occupy grey or brown sand or clay loam and typically occurs in *Banksia attenuata* - *B. menziesii* low woodland with emergent jarrah or closed *Banksia* woodland with dominant *Banksia* sp., *Stirlingia latifolia*, *Hibbertia* spp., *Hypocalymma robustum* and *Conostephium pendulum*. The species flowers from September to October (WA Herbarium, 1998).
- Wabbling Hill Mallee (*Eucalyptus argutifolia*) is known from one population located approximately 7.8 kilometres west from the application area in the City of Wanneroo. The species occupies shallow soils over limestone and is associated with closed shrub *Mallee* to shrub *Mallee* of *Eucalyptus argutifolia* or closed tall shrubland: *Eucalyptus argutifolia*, *E. petrensis*, *Melaleuca cardiophylla*. This species is in flower between March and April (WA Herbarium, 1998).
- *Marianthus paralius* is known from two populations spread over 4.6 kilometres in the City of Joondalup, with the closest population recorded approximately 6.2 kilometres southwest from the application area. The species tends to occur on white sand over limestone and is usually associated with *Melaleuca cardiophylla*, *Scaevola crassifolia*, *Olearia axillaris*, *Rhagodia baccata* closed low heath. The species flowers from September to November (WA Herbarium, 1998).
- *Melaleuca* sp. Wanneroo (G.J. Keighery 16705) is known from eight populations spread over 2.7 kilometres in the City of Wanneroo, with the closest recorded approximately 7.5 kilometres northwest from the application area. The species tends to occupy shallow yellow/brown sand and is known to co-occur as a dominant, in dense patches with other *Melaleuca* species, predominantly *M. systema*. Associated species include *Acacia alata* var. *tetrantha*, *A. lasiocarpa*, *Thomasia triphylla*, *Leucopogon parviflorus*, *Grevillea preissii*, *Banksia sessilis* var. *cygnorum*, *Xanthorrhoea preissii*, *Calothamnus quadrifidus*, *Templetonia retusa*, *Astroloma microcalyx*, *Conostylis pauciflora* subsp. *euryrhipis*, *C. candicans*, *Tricoryne elatior*, *Hardenbergia comptoniana*, *Dianella revoluta*, *Desmocladius flexuosus*, *Lepidosperma calcicola* and *Lomandra maritima* (Department of the Environment, 2020b)

Based on the similarities shared between the soil and vegetation types in habitats for these flora taxa and within the application area, *Caladenia huegelii* may occur within the application area. A targeted flora survey within the area cross-hatched green in Figure 4 conducted at the appropriate flowering time is required to determine the impacts of the proposed clearing to this flora species.

Given the above, the proposed clearing may be at variance with this 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.

Proposed clearing may be at variance with this Principle

Key Summary

The proposed clearing may be at variance with this Principle as the vegetation within the application may contain:

- 4.13 hectares of native vegetation that is representative of the state listed TEC *Banksia attenuata* woodlands over species rich dense shrublands (floristic community type 20a as originally described in Gibson et al. (1994));

According to available databases, three TEC's as listed by the Minister for Environment have been mapped within the local area, being:

- *Melaleuca huegelii* - *Melaleuca systema* shrublands on limestone ridges (floristic community type 26a as originally described in Gibson et al. (1994)) - approximately 0.17 hectares of this TEC has been mapped within the local area, with the closest patch being approximately six kilometres northwest from the application area. The Department of Conservation and Land Management (2005) described this community as species rich thickets, heaths or scrubs dominated by *Melaleuca huegelii*, *M. systema* (previously *M. acerosa*), *Banksia sessilis* over *Grevillea preissii*, *Acacia lasiocarpa* and *Spyridium globulosum*, occurring on skeletal soil on ridge slopes and ridge tops (community 26a as described by Gibson et al. 1994). Noting the distance from the application area, the species composition of this TEC and the vegetation observed (DWER, 2019), the application area is not likely to comprise this TEC.
- *Banksia attenuata* woodlands over species rich dense shrublands (floristic community type 20a as originally described in Gibson et al. (1994)) (*Banksia attenuata* woodland)– approximately 0.47 hectares of this TEC has been mapped within the local area, with the closest patch being located approximately 240 metres northeast from the application area. Sites in *Banksia attenuata* and/or *Eucalyptus marginata* woodlands are found on a range of soils on the base of the Darling Scarp from Yarloop to Byford. Soils are mainly yellow orange and yellow sands. Most of the occurrences of this community type are *Eucalyptus marginata* – *Banksia attenuata* woodlands but the community also occurs as *Banksia* woodlands and heaths (Department of Environment and Conservation, 2012). Noting the distance from the application area, the species composition of this TEC and the vegetation observed (DWER, 2019), the application area may comprise this TEC.
- *Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands, Swan Coastal Plain (floristic community type 30a as originally described in Gibson et al. (1994)) – approximately 3.35 hectares of this TEC has been mapped within the local area, with the closest patch being approximately 9.5 kilometres southwest from the application area. A woodland and forest community located on calcareous sandy soils of the Quindalup Dunes between Trigg and Point Peron and on the Swan River in Peppermint Grove. The community is also present on Garden Island and Rottneest Island. Typical and common native taxa in the community are: *Callitris preissii*, *Melaleuca lanceolata*, *Spyridium globulosum*, *Acanthocarpus preissii*, *Rhagodia baccata*, *Austrostipa flavescens* and *Trachymene pilosa* (Gibson et al. 1994). The introduced herbs *Galium murale* (small bedstraw), *Asparagus asparagoides* (bridal creeper) and *Trachyandra divaricata* (dune onion weed) are common in the community (Department of Parks and Wildlife, 2014). Noting the distance from the application area, the species composition of this TEC and the vegetation observed (DWER, 2019), the application area is not likely to comprise this TEC.

Based on the description of the vegetation present in the application area and photographs taken on site, it is considered likely that *Banksia attenuata* woodland occurs within the application area. To accurately determine the extent of this TEC impacted by the proposed clearing, a vegetation survey of the area cross-hatched green within Figure 4, which includes an assessment against the key diagnostic factors, is required.

Given the above, the proposed clearing may be at variance with this 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.

Proposed clearing is at variance with this Principle

Key Summary

The proposed clearing is at variance with this Principle as the vegetation within the application may contain:

- Significant habitat for fauna;
- Federally and/or state listed TEC;
- High level of biodiversity;
- ecological linkage values within a highly cleared landscape;
- very good condition vegetation that is representative of highly cleared Karrakatta -Central And\South vegetation complex.

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). Within constrained areas (areas of urban development in cities and major towns) on the Swan Coastal Plain, the threshold for representation of the pre-clearing extent of a particular native vegetation complex is 10 per cent (EPA, 2008). The application area is classified as a constrained area.

Table 1 Native vegetation statistics (Government of Western Australia, 2019)

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed lands (ha)	Extent remaining in all DBCA managed lands (proportion of Pre-European extent) (%)
IBRA bioregion					
Swan Coastal Plain	850,785.09	276,461.42	32.49	51,457.07	13.25
Swan Coastal Plain vegetation complexes					
Pinjar	4,892.64	1,765.34	35.47	660.40	4.90
Karrakatta Complex-Central And\South	53,080.99	12,467.20	23.49	10,426.47	8.07

The application area is located within the 'Swan Coastal Plain' IBRA bioregion. This bioregion has approximately 32.5 per cent of its pre-European vegetation extent remaining (Government of Australia, 2019).

The application area is also mapped in the following Swan Coastal Plain vegetation complexes:

- Pinjar which is mapped across approximately 26.5 per cent of the application area, and retains approximately 35.5 per cent pre-European vegetation; and
- Karrakatta Complex-Central and South is mapped across approximately 73.5 per cent of the application area, and retains approximately 23.5 per cent of its pre-European extent.

The local area retains approximately 31 per cent of its pre-European vegetation extent. This extent together with the extents of the mapped Swan Coastal Plain IBRA bioregion and the Swan Coastal Plain vegetation complexes retain greater than the abovementioned 10 per cent vegetation threshold for constrained areas (Government of Australia, 2019)

However, considering that the application area may contain suitable habitat for conservation significant fauna and flora species, *Banksia* woodland TEC, the application area is considered a significant as a remnant.

Given the above, the proposed clearing is at variance with this 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.

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

According to available databases, no watercourses or wetlands are mapped within the application area. The closest wetland is a conservation category wetland (CCW) Little Mariginup (ID 4544) located approximately 335 metres southeast from the application area (Figure 5). Noting the type of the vegetation in the application area, the extent of the proposed clearing, and the presence of cleared land and remnant vegetation between the application area and this CCW, the proposed clearing is not likely to impact on vegetation growing in association with a wetland.

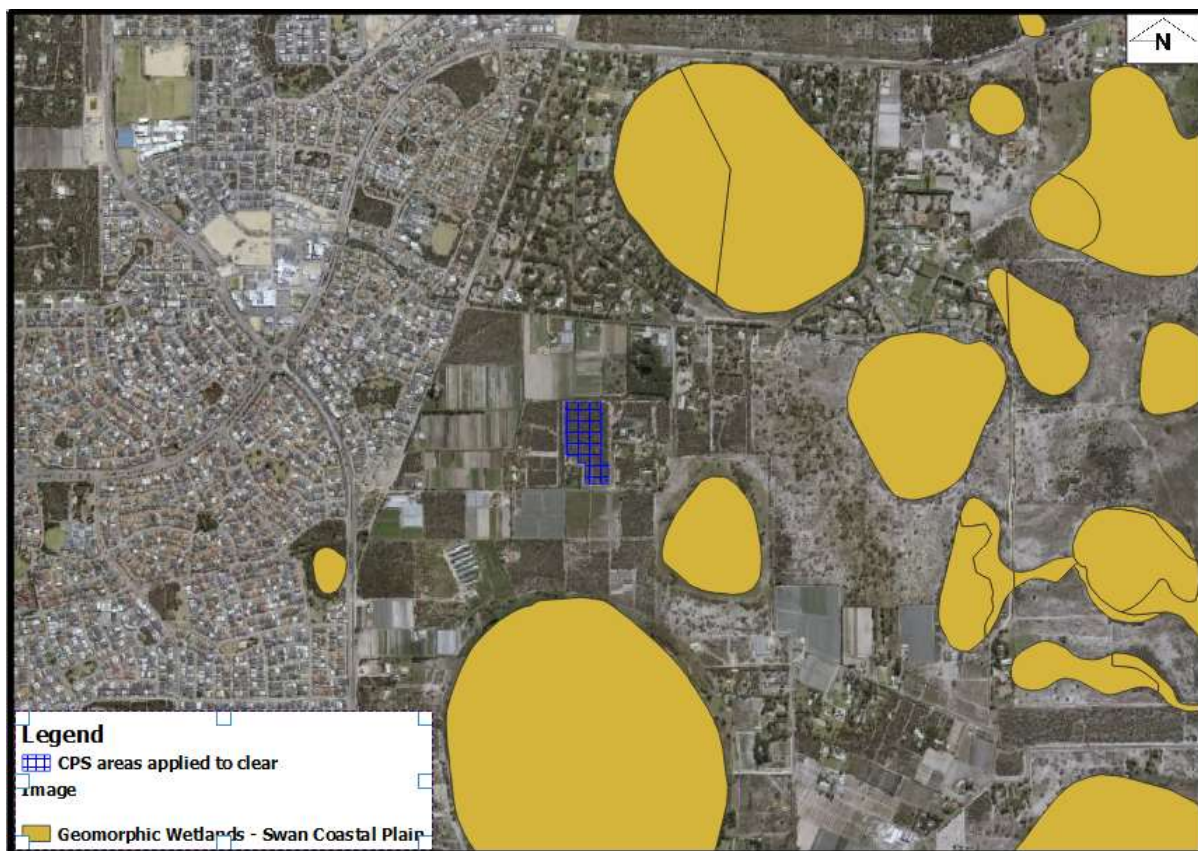


Figure 5 Map of geomorphic wetlands in the proximity of the application area

Given the above, the proposed clearing is not likely to be at variance with this principle.

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

Proposed clearing may be at variance with this Principle

Primary soils within the application area are mapped by the Department of Primary Industries and Regional Development (DPIRD) (2020). The mapped soil type within the application area is Karrakatta Sand Yellow Phase (Schoknecht et al., 2004) (discussed further under Section 2),

The table below summarises the land degradation risk as described by DPIRD (2020).

Table 2 Risk degradation summary

Risk categories	Karrakatta Sand Yellow Phase
Wind erosion	>70% of map unit has a high to extreme wind erosion risk
Water erosion	3-10% of map unit has a high to extreme water erosion risk
Salinity	30-50% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	10-30% 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	3-10% of map unit has a high to extreme phosphorus export risk

The topography of the application area is very flat and the average annual rainfall is 800 millimetres. Groundwater salinity within the application area has been mapped as fresh (Mayer, Ruprecht & Bari, 2005); being less than 500 total dissolved solids (milligrams per litre). Given the topography of the application area, the porous nature of sandy soils within the application area, and relatively low rainfall, the proposed clearing is unlikely to cause appreciable land degradation through water erosion, waterlogging or salinity.

However, the abovementioned mapped soil type has a high to extreme wind erosion risk. Considering this, cleared surrounding area and flat topography, the proposed clearing may cause appreciable land degradation in the form of wind erosion. Wind erosion management practices, such as staged clearing and conducting works within two months of clearing may mitigate the risk.

Given the above, the proposed clearing may be at variance with this 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.

Proposed clearing may be at variance with this Principle

According to available databases, there are seven conservation areas within the local area (Figure 6), being:

- Gngangara-Moore River State Forest (Class A) located approximately 1.5 kilometres north from the application;
- Joondalup Nature Reserve (PIN 4679) located approximately 2.6 kilometres southeast from the application area;
- Un-named conservation park (Class A) (area hatched red on Figure 4) located approximately 3.2 kilometres southwest from the application area,
- Lake Joondalup Nature Reserve (Class A) located approximately 3.3 kilometres southwest from the application area;
- Neerabup National Park (Class A) located approximately 5.1 kilometres west from the application area;
- Woodvale Nature Reserve located approximately 7.3 kilometres southwest from the application area; and
- Marmion Marine Park (Class A) located approximately 9.4 kilometres southwest from the application area.

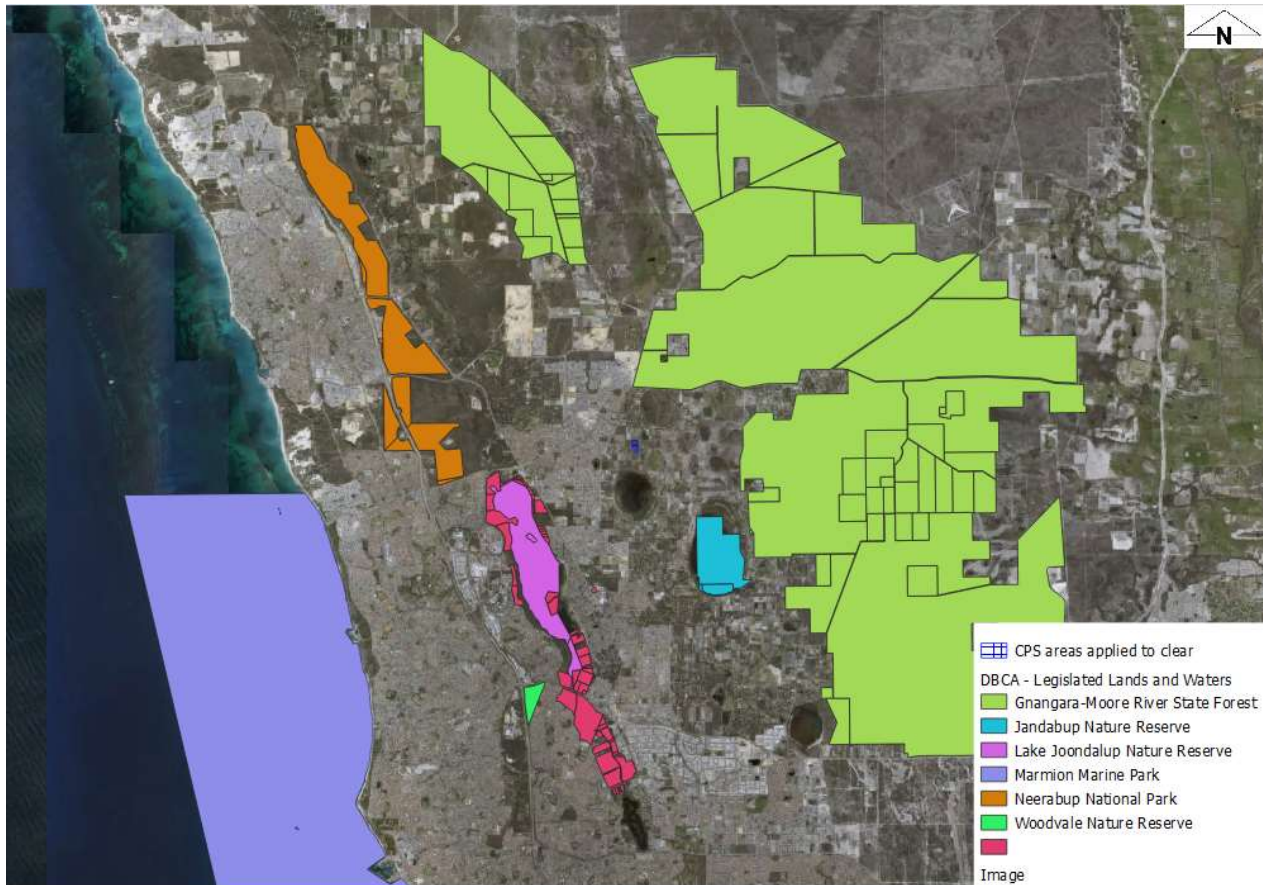


Figure 6 Map of the conservation area in local area

As mentioned in principle (b), native vegetation within the application area is considered likely to function as a north-south ecological linkage between areas of remnant vegetation in the local area and may facilitate landscape connectivity and contribute to fauna dispersal between larger isolated bushland fragments in a cleared landscape.

Considering this, the proposed clearing may be at variance with this 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.

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

According to available databases, no watercourses or wetlands are mapped within the application area, and it is unlikely that the proposed clearing would impact surface or underground water.

Groundwater salinity within the application area has been mapped as fresh (Mayer, Ruprecht and Bari, 2005); being less than 500 total dissolved solids (milligrams per litre). Noting this and the extent of the proposed clearing, the proposed clearing is not likely to cause deterioration of the quality of underground water in the form of salinity.

Given the above, the proposed clearing is not likely to be at variance with this principle.

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

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

According to available databases, less than 3 per cent of the mapped soil type has a moderate to high flood risk (DPIRD, 2020). Noting this and the extent of the proposed clearing, the proposed clearing is not likely to cause, or exacerbate, the incidence or intensity of flooding.

Given the above, the proposed clearing is not likely to be at variance with this principle.

Planning instruments and other relevant matters.

No Aboriginal sites of significance have been mapped within the application area.

The clearing permit application was advertised on the DWER website on 01 October 2019 with a 21 day submission period. No public submissions have been received in relation to this application.

A Development Approval (DA 2019/607) under the provision of the City Wanneroo District Planning Scheme No. 2 and the Metropolitan Region Scheme has been granted (Applicant, 2019b).

5. Applicant's Submissions

On 7 May 2020, DWER wrote to the applicant, outlining the impacts identified during the assessment of the application and inviting the applicant to provide additional advice addressing these matters.

On 2 November 2020, the applicant amended the application area by reducing the clearing area from 4.99 hectares to 0.87 hectares. The amended application area is restricted by the boundary of the application area and a track (Figure 7) and comprises of vegetation in predominantly a degraded (Keighery, 1994) to good (Keighery, 1994) condition. Vegetation is dominated by *Adenanthos cygnorum* (woolybush) and *Jacksonia furcellata* over *Stirlingia latifolia* (Figures 8a and 8b (DWER, 2019)). The DWER site inspection (2019) also observed that this area had been subject to higher levels of disturbance and had a greater number of weeds than the remaining vegetation at the property. As detailed in Section 2 of this report, the vegetation within the revised application area was completely cleared in 2005 and started regrowing in 2006 (Figures 3b and 3c).



Figure 7 Revised application area cross-hatched blue



Figure 8a



Figure 8b

Figures 8a and 8b. Representative photos of the vegetation within the revised application area (DWER, 2019)

6. Consideration of variances following applicant's submission/further information

The revised clearing area avoids the remaining 4.13 hectares of native vegetation including the areas of vegetation in a good (Keighery, 1994) to very good (Keighery, 1994) condition. It has also avoided areas considered to potentially contain suitable habitat for conservation significant fauna and flora species and Banksia woodland TEC

In relation to Principle (a), (c) and (d), the vegetation in the revised application area does not meet the key diagnostic criteria for vegetation to be considered representative of Banksia Woodland TEC. The proposed clearing is not likely to impact upon this or any other TECs or PECs. Taking into consideration that the amended application area is predominantly in degraded (Keighery, 1994) condition and contains an understorey dominated by weeds, the revised application area is not likely to provide habitat for threatened or priority flora.

In relation to Principle (b), noting the vegetation and its condition within the revised application area, the proposed clearing is not likely to impact on suitable habitat for black cockatoos, black-striped burrowing snake, masked owl and quenda. The vegetation remaining within Lot 8 adjacent to the amendment application area will provide habitat for these species and provide an ecological linkage allowing fauna to move across the landscape.

In relation to Principle (e), noting the reduced application area does not contain suitable habitat for conservation significant fauna and flora species and Banksia woodland TEC and that the extent of the native vegetation in the local area is above the national objectives for biodiversity conservation, the proposed clearing is not considered to be a significant remnant in an extensively cleared landscape.

In relation to Principle (g), noting the minimal extent of the proposed clearing spread along the remaining vegetation at Lot 8, as well as the presence of areas of native vegetation to the west of the amended application area, the proposed clearing is not likely to cause appreciable land degradation in form of wind erosion.

In relation to Principle (h), the impacts on the environmental values of the nearby conservation areas by limiting fauna movement throughout the local area has been reduced. The clearing of 0.87 hectares of native vegetation in a largely degraded (Keighery, 1994) condition adjacent to a 4.13 hectare remnant in better condition is not likely to have a significant impact upon fauna movement across the landscape. Weed and dieback management practices will help minimise impacts to adjacent remnant vegetation.

Considering the reduced application area, the proposed clearing is not likely to be at variance with principles (a), (b), (c), (d), (e), (g) and (h).

There is no change to Principle (f), (i) and (j) following the reduction in the application area.

7. References

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GIS databases:

- CPS Areas applied to clear
- NatureMap (conservation significant fauna)
- DAFWA Subsystems V5
- Soils of WA
- Vegetation Complexes – Swan Coastal Plain
- Managed Tenure
- Environmentally Sensitive Areas
- TPFL Data November 2020
- WAHerb Data November 2020
- Aboriginal Sites Register
- IBRA Vegetation WA
- WA TECPEC
- Land Degradation Hazards