GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 8687/1
Permit Holder:	Shire of Murray
Duration of Permit:	From 14 July 2023 to 14 July 2038

ADVICE NOTE

Allocation of offset site
In relation to condition 10 of this permit, it is noted that 0.66 hectares of Crown Reserve 1453, Lot 254 on Plan 143141, Coolup, will be attributed to the offset for this project. The nominated 0.66 hectare area contains *black cockatoo* habitat, the '*Corymbia calophylla* - *Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain' Commonwealth listed Threatened Ecological Community, and is a significant remnant within an extensively cleared landscape, in addition to other environmental values.

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

PART I – CLEARING AUTHORISED

1. Clearing authorised (purpose)

The permit holder is authorised to clear *native vegetation* for the purpose of road widening.

2. Land on which clearing is to be done

Coolup South Road reserve (PINs 1379419, 1379435, 1379434 and 1379433), Coolup

3. Clearing authorised

The permit holder must not clear more than 0.28 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1 of Schedule 1.

4. Period during which clearing is authorised

The permit holder must not clear any *native vegetation* after 14 July 2028.

PART II – MANAGEMENT CONDITIONS

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

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

(a) avoid the clearing of *native vegetation*;

(b) minimise the amount of *native vegetation* to be cleared; and

(c) reduce the impact of clearing on any environmental value.

6. Weed and dieback management

When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of introduction and spread of *weeds* and *dieback*, including but not limited to:

(a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;

(b) ensure that no known *dieback* or *weed*-affected soil, *mulch*, *fill*, or other material is brought into the area to be cleared; and

(c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

7. Priority flora management

Prior to undertaking any clearing authorised under this permit, the permit holder must:

a) Engage an *environmental specialist* to demarcate all *priority flora* individuals that are to be retained located within 20 metres of the authorised clearing area cross-hatched yellow on Figure 1 of Schedule 1.

b) When undertaking any clearing authorised under this permit, the permit holder must not cause or allow the clearing of more than one (1) *Grevillea bipinnatifida* subsp. *pagna* (P1) plant.

8. Erosion management

The permit holder must commence construction activities no later than three (3) months after undertaking the authorised clearing activities to reduce the potential for erosion.

9. Directional clearing

The permit holder must conduct clearing activities in a slow, progressive manner towards adjacent *native vegetation* to allow fauna to move into adjacent *native vegetation* ahead of the clearing activity.

10. Offset – Land acquisition

Prior to the commencement of clearing authorized under this permit, the permit holder must provide to the *CEO* a copy of the executed change in purpose of Crown Reserve 1453 (Lot 254 on Plan 143141) from ‘recreation’ to ‘conservation’ within the area cross-hatched orange in Figure 1 of Schedule 2.

11. Offset – Vegetation management fencing

a) Within twelve months of clearing, the permit holder shall construct a fence along the perimeters of the areas cross-hatched red on Figure 1 of Schedule 2.
b) Fences should allow for the movement of wildlife by being raised 15 centimetres from the ground.
c) Within one month of installing the above fences, the permit holder shall notify the *CEO* in writing that the fencing has been completed.

12. Offset – Revegetation and rehabilitation

a) Within 12 months of the commencement of clearing, the permit holder must *revegetate* 0.66 hectares of *native vegetation* within the area cross-hatched red in Figure 2 of Schedule 2 (Crown Reserve 1453), of which provides:
    i. species which provide suitable foraging habitat for *black cockatoos*, and
    ii. species of the '*Corymbia calophylla - Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain' Threatened Ecological Community as described in *Approved Conservation Advice*.
b) undertake *rehabilitation* activities at an *optimal time*;
c) undertake *weed* control activities to maintain the minimum criteria specified in Schedule 3 (Rehabilitation Completion Criteria);
d) implement hygiene protocols by cleaning earth-moving machinery of soil and vegetation prior to entering and leaving the *rehabilitation* areas;
e) establish at least four 10 x 10 metre quadrat monitoring sites within *rehabilitated* areas;
f) monitor quadrats specified in condition 12(e) as per Schedule 3 (Rehabilitation Completion Criteria);
g) monitoring of quadrats specified in condition 12(e) is to be undertaken by an *environmental specialist*;
h) achieve the completion criteria specified in the attached Schedule 3 (Rehabilitation Completion Criteria) after the five year monitoring period for areas *rehabilitated* under this permit;
i) undertake remedial actions for areas *rehabilitated* where monitoring indicates that *rehabilitation* has not met the completion criteria, outlined in Schedule 3 (Rehabilitation Completion Criteria), including:
    i. *rehabilitate* the area by deliberately *planting* and/or *direct seeding native vegetation* seeds that will result in the minimum targets specified in Schedule 3 (Rehabilitation Completion Criteria) ensuring only *local provenance* seeds and propagating material are used;
    ii. undertake further *weed* control activities; and
    iii. undertake watering activities.
j) where remedial actions are undertaken in accordance with condition 12(i), repeat steps required under conditions 12(g)-(i).
k) where in the opinion of the *environmental specialist* that the monitoring indicates that *rehabilitation* has met the completion criteria specified in the attached Schedule 3 (Rehabilitation Completion Criteria), that report is to be provided to the *CEO*.

PART III - RECORD KEEPING AND REPORTING

13. 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 authorised clearing activities generally	(a) the species composition, structure, and 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 1994/2020 (GDA94/20), expressing the geographical coordinates in Eastings and Northings; (c) the date that the area was cleared; (d) the date that construction commenced; (e) the direction of clearing; (f) the size of the area cleared (in hectares); (g) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 5; (h) actions taken to minimise the risk of the introduction and spread of *weeds* and *dieback* in accordance with condition 6; (i) actions taken in accordance with condition 10; and (j) actions taken in accordance with condition 11.
2.	In relation to flora management pursuant to condition 7	(a) the name and location of each *priority flora* plant, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994/2020 (GDA94/20), expressing the geographical coordinates in Eastings and Northings; (b) actions taken to demarcate each *priority flora* plant recorded; (c) actions taken to avoid the clearing of *priority flora* plants; and (d) the number of *priority flora* plants cleared in accordance with condition 7(b) of this permit
3.	In relation to rehabilitation pursuant to condition 12	(a) a description of the *rehabilitation* activities undertaken; (b) the size of the areas *rehabilitated* (in hectares); (c) the date that *rehabilitation* works began; (d) any remediation works undertaken; and (e) the date that completion criteria are considered

No.	Relevant matter	Specifications
		to be met.

14. Reporting

The permit holder must provide to the *CEO* the records required under condition 13 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
approved conservation advice	means Approved Conservation Advice for the '*Corymbia calophylla* - *Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain' Threatened Ecological Community, available at: https://www.environment.gov.au/biodiversity/threatened/communities/pubs/18-conservation-advice.pdf
black cockatoo species	means one or more of the following species: (a) *Zanda lateriosis* (Carnaby's cockatoo); (b) *Zanda baudinii* (Baudin's cockatoo); and/or (c) *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo).
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.
dieback	means the effect of *Phytophthora* species on native vegetation.
direct seeding	means a method of re-establishing vegetation through establishment of a seed bed and the introduction of seeds of the desired plant species
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.
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.
EP Act	*Environmental Protection Act 1986* (WA)
fill	means material used to increase the ground level, or to fill a depression.
local provenance	means native vegetation seeds and propagating material from natural sources within 50 kilometres and the same Interim Biogeographic Regionalisation for Australia (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 optimal time for undertaking direct seeding and planting for that region, typically April to July.

Term	Definition
planting(s)/plant	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species.
priority flora	means those flora species listed as Priority 1, 2, 3, or 4 by the Department of Biodiversity, Conservation and Attractions, as updated from time to time.
rehabilitation	means actively managing an area containing native vegetation in order to improve the ecological function of that 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
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
A/SENIOR MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

18 June 2023

Schedule 1

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

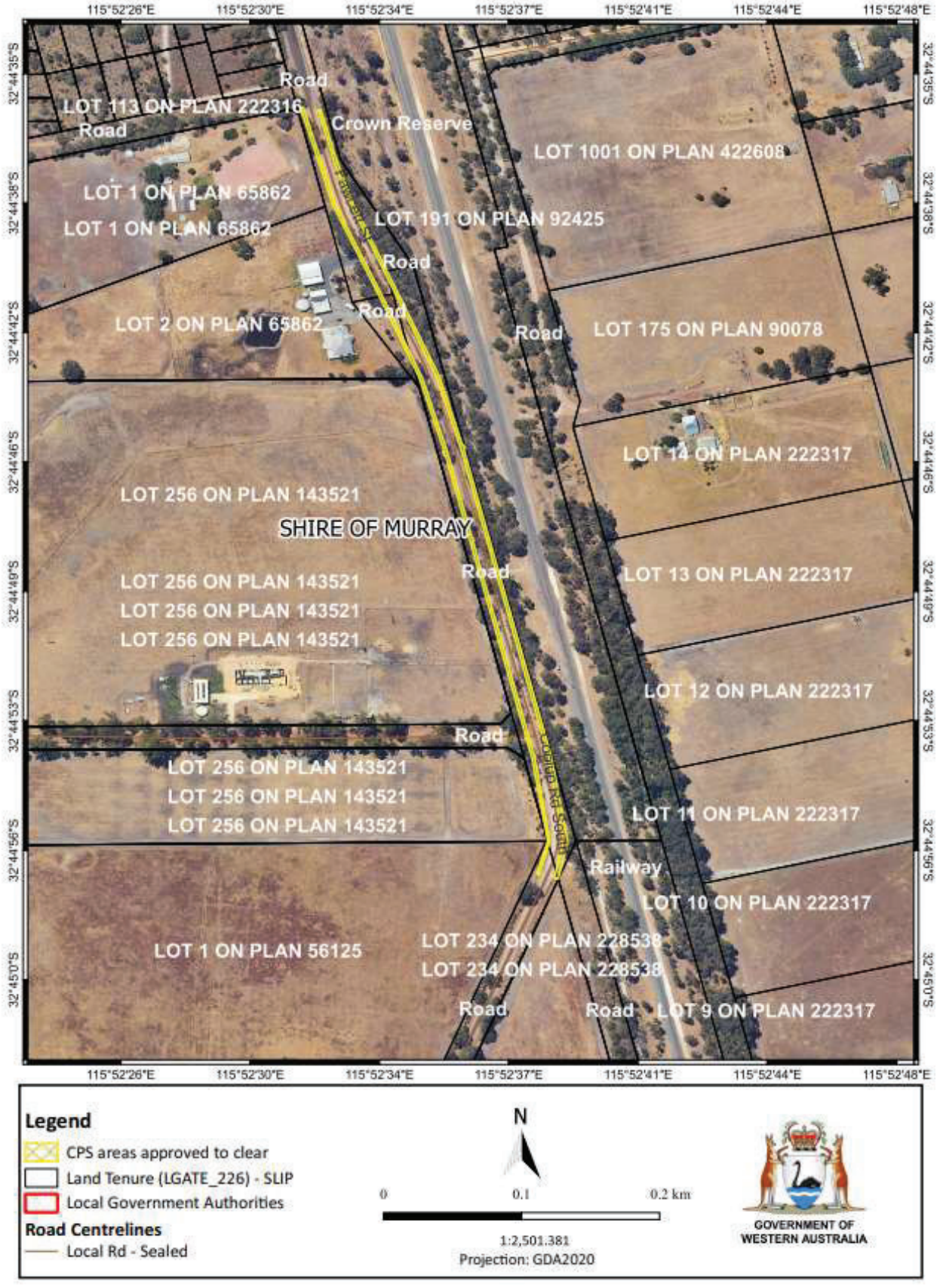

Figure 1: Map of the boundary of the area within which clearing may occur

Schedule 2

Figure 1: Map of the boundary of the area within which conditions occur

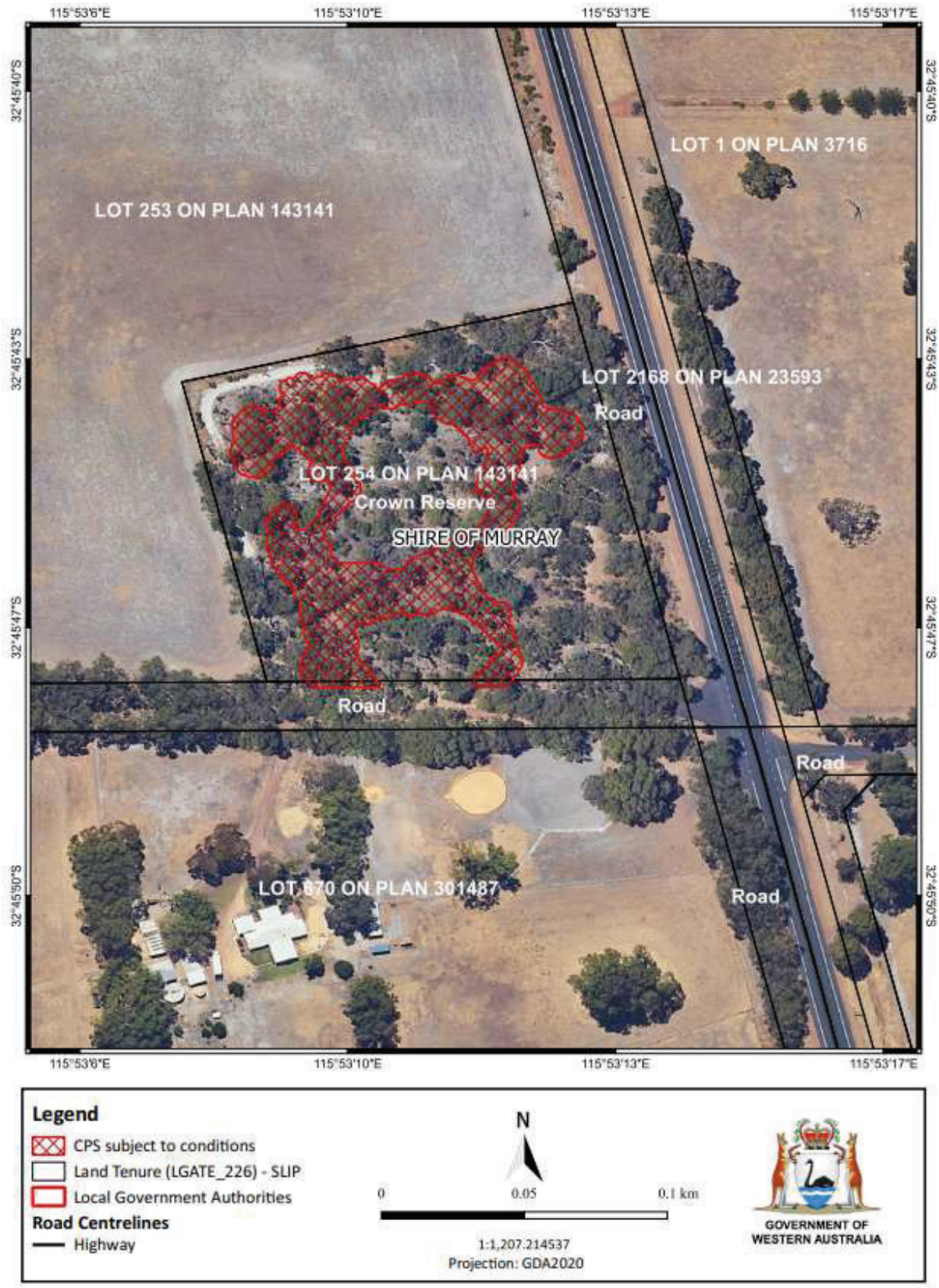

Figure 2: Map of the boundary of the area within which conditions occur

Schedule 3

Rehabilitation Completion Criteria

Characteristic	Measure	Baseline floristic data	Completion Target	Completion Criteria	Monitoring
			Vegetation in Very Good condition as per Keighery (1994)		
Species diversity (average across monitoring quadrats)	Total upper layer (height >5m)	Dominant species recorded within reference sites[1] - *Corymbia calophylla* - *Eucalyptus marginata*	Minimum of 50 per cent native canopy species returned, based on baseline data of reference sites	At least one of the canopy species specified in the baseline floristic data column are to be present and dominant across the rehabilitated area	Species diversity will be monitored at intervals of one month, six months, and then annually for five years following planting.. As required, monitoring will then continue annually until this criterion is met.
	Total mid layer (height 1-5m)	Dominant species recorded within reference sites[1] - *Acacia pulchella* - *Xanthorrhoea preissii*	Minimum of 50 per cent native mid layer species returned, based on baseline data of reference sites	At least one of the mid layer species specified in the baseline floristic data column are to be present and dominant across the rehabilitated area	
	Total ground layer (height <1m)	Dominant species recorded within reference sites[1] - *Banksia dallanneyi* - *Burchardia congesta* - *Caesia micrantha* - *Cyathochaeta avenacea* - *Dichopogon capillipes* - *Lepidosperma squamatum* - *Pyrorchis nigricans* - *Neurachne alopecuroidea*	Minimum of 60 per cent native ground layer species returned, based on baseline data of reference sites	At least five of the ground layer species specified in the baseline floristic data column are to be present and dominant across the rehabilitated area	
Species density (average across monitoring quadrats)	Total upper layer (height >5m)	Average native vegetation cover across reference sites[1] was 65%	Maintain or exceed baseline data of reference sites	Years 1 and 2 post planting: minimum upper canopy cover of 40% Years 3 to 5 post planting: minimum upper canopy cover of 65%	Species density will be monitored annually for five years following planting. As required, monitoring will then continue

Characteristic	Measure	Baseline floristic data	Completion Target	Completion Criteria	Monitoring
			Vegetation in Very Good condition as per Keighery (1994)		
	Total mid layer (height 1-5m)	Average native vegetation cover across reference sites[1] was 35%	Maintain or exceed baseline data of reference sites	Years 1 and 2 post planting: minimum mid layer cover of 20% Years 3 to 5 post planting: minimum mid layer cover of 35%	annually until this criterion is met.
	Total ground layer (height <1m)	Average native vegetation cover across reference sites[1] was 70%	Maintain or exceed baseline data of reference sites	Years 1 and 2 post planting: minimum lower ground layer cover of 50% Years 2 to 5 post planting: minimum ground layer cover of 70%	
Black cockatoo habitat	Species diversity (average across quadrats)	An average of 4 species that provide black cockatoo foraging habitat are present within the reference sites. The following native species recorded across the reference sites are identified to provide black cockatoo habitat opportunities: - *Agonis flexuosa* - *Banksia grandis* - *Corymbia calophylla* - *Eucalyptus marginata* - *Kingia australis* - *Xanthorrhoea preissii*	Equal or exceed species richness of reference site providing black cockatoo foraging habitat	At least 4 species which provide black cockatoo habitat opportunities are present in rehabilitated areas	Species diversity will be monitored at intervals of one month, six months, and then annually for five years following planting. As required, monitoring will then continue annually until this criterion is met.

Characteristic	Measure	Baseline floristic data	Completion Target	Completion Criteria	Monitoring
			Vegetation in Very Good condition as per Keighery (1994)		
	Species density	The percentage cover of species providing black cockatoo habitat opportunities recorded across the reference sites[1] was 75%	Equal or exceed cover of species providing black cockatoo foraging habitat	Years 1 and 2 post planting: minimum of 50% coverage of species which provide black cockatoo habitat opportunities within the rehabilitation area. Years 2 to 5 post planting: minimum of 75% coverage of species which provide black cockatoo habitat opportunities within the rehabilitation area.	Species density will be monitored annually for five years following planting. As required, monitoring will then continue annually until this criterion is met.
Weed cover	Average weed cover across the reference sites is 5% The following weed species are known to occur across the reference sites[1] - *Acacia podalyriifolia* - *Anthoxanthum odoratum* - *Arundo donax* - *Avena ?barbata* - *Babiana angustifolia* - *Briza maxima* - *Briza minor* - *Bromus diandrus* - *Chamaecytisus palmensis* - *Disa bracteata* - *Ehrharta calycina* - *Ehrharta longiflora* - *Eragrostis curvula*	Reduction in weed cover to achieve a vegetation condition rating of Very Good (Keighery, 1994)	Total weed cover within the rehabilitated area will not exceed 5%	Primarily only non-aggressive exotic species present. If aggressive species are present, these would be under active control and comprise no more than 5 per cent of total species abundance on the site. No declared weeds within the rehabilitated area	General weed cover within the revegetation area will be monitored at intervals of one month, six months and then annually for five years following planting. As required, monitoring will then continue annually until this criterion is met.

Characteristic	Measure	Baseline floristic data	Completion Target	Completion Criteria	Monitoring
			Vegetation in Very Good condition as per Keighery (1994)		
	- *Hypochaeris glabra* - *?Monoculus monstrosus* - *Olea Europa* - *Osteospermum ecklonis* - *Oxalis glabra* - *Oxalis pes-caprae* - *Watsonia meriana*				

[1] Reference sites refer to Q1, Q2 and Q3 data collected for the Targeted EC assessment of Reserve 1456, Coolup (Emerge, 2023)

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 8687/1
Permit type:	Purpose permit
Applicant name:	Shire of Murray
Application received:	1 October 2019
Application area:	0.28 hectares of native vegetation
Purpose of clearing:	Road widening
Method of clearing:	Mechanical
Property:	Coolup South Road Reserve (PINs - 1379419, 1379433, 1379434 and 1379435), Coolup
Location (LGA area/s):	Shire of Murray
Localities (suburb/s):	Coolup

1.2. Description of clearing activities

The vegetation proposed to be cleared is 0.28 hectares of native vegetation along both sides of Coolup Road South for the construction of a dual sealed road to improve the safety for motorists. The road is currently a single lane sealed road with wide gravel shoulders that are a hazard for motorists passing (see Figure 1, Section 1.5).

1.3. Decision on application

Decision:	Granted
Decision date:	18 June 2023
Decision area:	0.28 hectares of native vegetation, as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (the department) advertised the application for 14 days and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix B), relevant datasets (see Appendix G.1), the findings of a flora and vegetation survey and a site inspection (see Appendix F), the clearing principles set out in Schedule 5 of the EP Act (see Appendix C), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration the purpose of the clearing is to improve the safety of Coolup Road South.

After consideration of the above information, as well as the avoidance, minimisation and mitigation actions taken by the Shire of Murray (the Shire), the Delegated Officer determined that the proposed clearing will result in the following significant residual impacts:

- the loss of native vegetation representative of the Threatened Ecological Community (TEC) '*Corymbia calophylla - Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain' floristic community 3c (FCT 3c),
- the loss of native vegetation that is suitable habitat for black cockatoo species, and
- the loss of native vegetation that is significant as a remnant within an extensively cleared landscape.

In accordance with the Government of Western Australia's Environmental Offsets Policy and Environmental Offsets Guidelines, the Delegated Officer determined that the following land acquisition and rehabilitation offsets are required to address the above significant residual impacts:

- the change in Crown Reserve (Lot 254 on Plan 143141) vesting from 'Recreation' to 'Conservation', and
- the revegetation of 0.66 hectares of native vegetation within Crown Reserve (Lot 254 on Plan 143141) from good condition to very good condition that provides:
    - a total of 0.66 hectares of vegetation representative of the FCT 3c TEC;
    - a total of 0.54 hectares of suitable foraging habitat for the endangered Carnaby's and Baudin's black cockatoo species;
    - a total of 0.52 hectares of foraging habitat for the vulnerable Forest red-tailed black cockatoo species; and
    - a total of 0.51 hectares of vegetation representative of the Guildford Complex and is a significant remnant within an extensively cleared landscape.

The Delegated Officer determined that the above offset was sufficient to counterbalance the significant residual impacts associated with this project. Further information on the suitability of the offset provided is summarised in Section 4.

The Delegated Officer determined that the proposed clearing may also result in the following impacts:

- potential indirect impacts to the surrounding vegetation, including conservation significant flora, *Grevillea bipinnatifida* subsp. *pagna* (P1), from risk of the introduction and spread of weeds and dieback into adjacent native vegetation,
- potential risk of land degradation from minor wind erosion, and
- potential direct impacts to fauna utilising the application area during the time of clearing.

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

- avoid, minimise to reduce the impacts and extent of clearing,
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback,
- construction activities to occur within three months of clearing to minimise wind erosion,
- undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity,
- provision of an offset, as outlined above.

Given the above and noting that the offset provided (see Section 4) counterbalances the significant residual impacts, the Delegated Officer determined that the proposed clearing is unlikely to lead to an unacceptable risk to the environment.

1.5. Site map

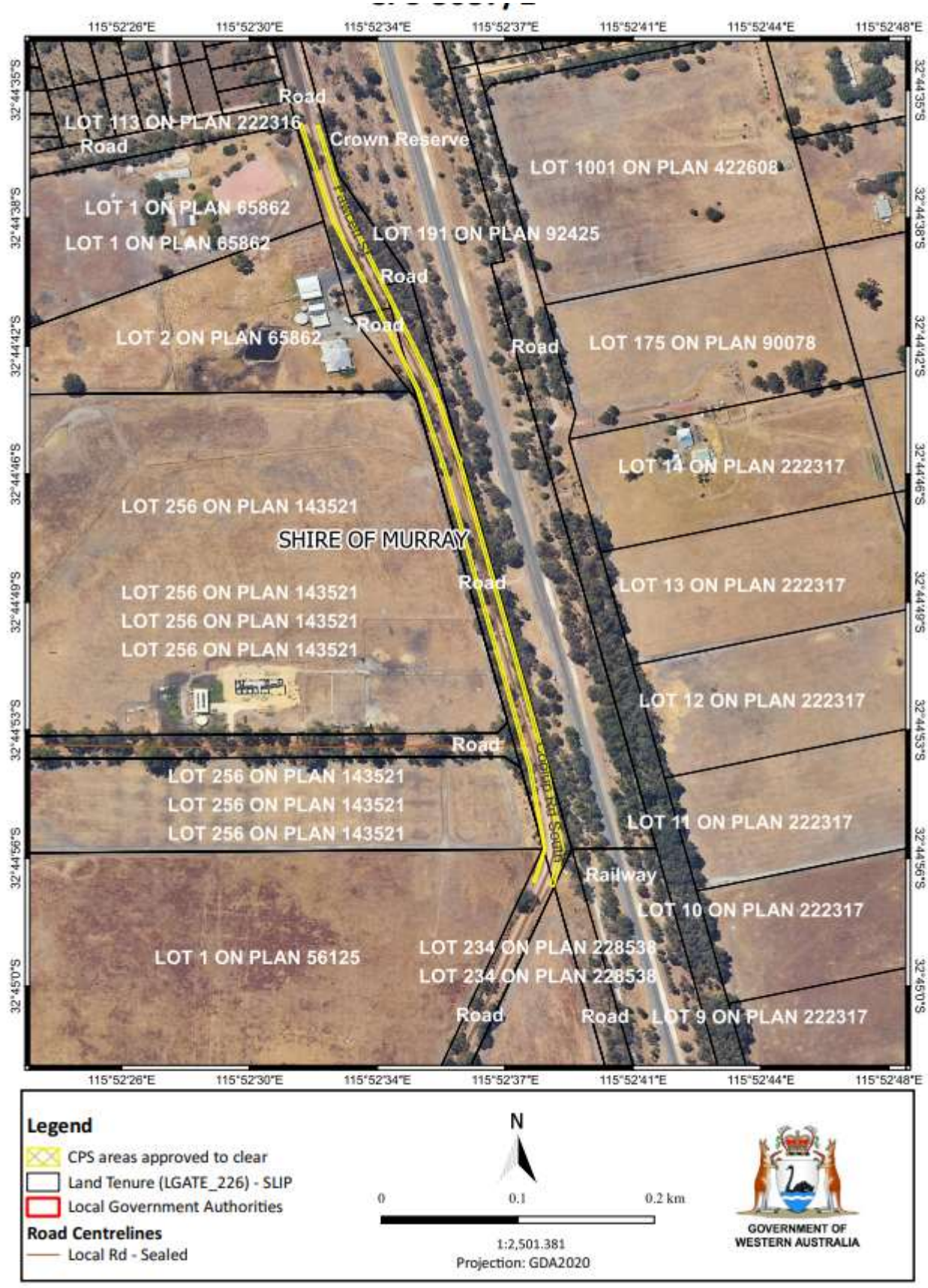

Figure 1 Map of the application area

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

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)

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)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

The Shire of Murray (2020) have reduced the clearing to the minimum required to ensure the safety of the road. This has been achieved by:

- adopting a reduced seal and shoulder design width normally recommended by AustRoads Design guidelines to reduce the road pavement width required by two metres,
- reducing the tree clearance zone recommended by AustRoads to retain significant trees,
- minimising the extent and shape of the drainage on the Eastern side to retain significant trees.

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.

After consideration of avoidance and mitigation measures, it was determined that an offset to counterbalance the significant residual impacts to black cockatoo foraging habitat, significant remnant vegetation and vegetation representative of the FCT 3c TEC was necessary. In accordance with the Government of Western Australia's *Environmental Offsets Policy* and *Environmental Offsets Guidelines*, these significant residual impacts have been addressed through the conditioning of environmental offset requirements on the permit. The nature and suitability of the offset provided is summarised in Section 4.

3.2. Assessment of impacts on environmental values

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

The assessment against the clearing principles (see Appendix C) identified that the impacts of the proposed clearing present a risk to biological values (fauna, adjacent flora and vegetation) and significant remnant vegetation. 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 (flora and vegetation) - Clearing Principles (a) and (d)

Assessment

Threatened Ecological Community

A site inspection undertaken on 24 January 2020 identified vegetation within the application area that resembled the FCT 3c TEC which is listed as Critically Endangered under the BC Act and Endangered under the EPBC Act (DWER, 2020). Given this, the department requested a flora and vegetation survey be conducted for the proposed clearing area. Emerge undertook a detailed flora and vegetation survey during Spring of 2020, as per the Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016) (Emerge, 2020). Two vegetation units were mapped within the application area:

- CcJs: low woodland to forest of *Corymbia calophylla* over *Jacksonia sternbergiana* and *Xanthorrhoea preissii* over forbland of *Mesomelaena tetragona*, *Tetraria octandra, Cyathochaeta avenacea*, **Babiana angustifolia*, **Watsonia meriana* and open grassland of **Ehrharta calycina* and * *Eragrostis curvula*
- Cc: low woodland to forest of *Corymbia calophylla* over occasional *Xanthorrhoea preissii* over bare ground or weeds

A small portion of the survey area (0.72 hectares) was mapped as cleared, described as heavily disturbed areas comprising bitumen hard stand, bare ground or weeds (Emerge, 2020). Vegetation condition was mapped from 'very good - good' to 'completely degraded' condition (Keighery, 2094). The most intact native vegetation was mapped within the north eastern portion of the site with approximately 0.35 hectares identified as being in 'very good – good' condition (Emerge, 2020; Appendix F).

Emerge (2020) determined that the plant community CcJs and Cc are representative of the FCT 3c TEC. A total of 0.21 hectares of this TEC occurs within the application area in 'very good – good' to 'degraded' condition. One of the key threats to this community is the clearing of native vegetation. Clearing for agriculture has been extensive on the heavy soils on the eastern side of the Swan Coastal Plain, with approximately 97 per cent of all vegetation in the area being cleared (commonwealth of Australia, 2019).

The Department of Biodiversity, Conservation and Attractions (DBCA) noted the total area recorded for FCT 3c is approximately 123.8 hectares, and therefore vegetation aligning with this TEC in good or better condition is considered significant due to the limited areas that remain (DBCA, 2020). Due to the very restricted distribution of the FCT 3c TEC, no condition thresholds are applied to the nationally-listed ecological community and hence all areas meeting the description of the ecological community are habitat areas critical to its survival (Commonwealth of Australia, 2019).

Given this, it is considered that the proposed clearing of 0.21 hectares of vegetation representative of the FCT 3c TEC constitutes a significant residual impact. In accordance with the Government of Western Australia's Environmental Offsets Policy and Environmental Offsets Guidelines, this significant residual impact has been addressed through the conditioning of an environmental offset requirement, see Section 4 below.

Flora

According to available databases, seven threatened flora and 24 priority flora species have been recorded within a 10 kilometre radius of the application area. A likelihood of occurrence assessment for threatened and priority flora located within the local area was undertaken for the application area. Noting the preferred habitat types, including soil and vegetation types mapped over the application area, the likelihood analysis concluded that the application area may comprise suitable habitat for nine conservation significant flora species.

Targeted searches for conservation significant flora were conducted during the two season flora and vegetation surveys (Emerge, 2020). The survey area extended outside of the application area, covering 1.67 hectares, and was traversed comprehensively. Given this, and that the timing of the surveys were optimal for detecting most of the threatened or priority flora with potential to occur within the application area, the surveys were considered adequate to identify conservation significant flora species occurring within the proposed clearing area.

Two priority flora species were recorded; *Grevillea bipinnatifida* subsp. *pagna* (priority 1) and *Chamaescilla gibsonii* (priority 3) within the survey area. A total of eight individuals of the priority 1 species *Grevillea bipinnatifida* subsp. *pagna* were recorded within the survey area, with one individual located within the application area (Emerge, 2020). The priority 3 species *Chamaescilla gibsonii* was observed in abundance outside the application area.

Grevillea bipinnatifida subsp. *pagna* (P1) is known from five locations over a range of 50 kilometres north-south and seven kilometres east-west. DBCA advice received notes that the total number of plants across all locations is unknown. According to available databases, there are 14 records of this species within the local area with the majority

of these located 8 kilometres south of the application area. The proposed clearing will result in the loss of one individual *Grevillea bipinnatifida* subsp. *pagna* plant, equating to 12.5 per cent of those recorded within the survey. Noting the entire population recorded during the survey will not be cleared, clearing the one individual is not deemed to be significant. The remaining individuals occur within 20 metres of the application area. To minimise the risk of accidental clearing of additional plants, a flora management condition will be placed on the clearing permit, including the requirement to demarcate all known individuals located outside of the application area.

Chamaescilla gibsonii (P3) is known from 28 records across the Swan Coastal Plain, Jarrah Forest and Warren IBRA regions. Given no individuals are proposed to be cleared, impacts to this species are not considered to be significant.

The proposed clearing may cause degradation of adjacent and nearby habitat for *Grevillea bipinnatifida* subsp. *pagna* (P1) and *Chamaescilla gibsonii* (priority 3) by facilitating the spread of weeds and dieback. It is considered that this can be mitigated through a weed and dieback condition on the permit.

Conclusion

Based on the above assessment, the proposed clearing will result in the loss of 0.21 hectares of the FCT 3c TEC and the loss of one individual of the priority 1 species *Grevillea bipinnatifida* subsp. *pagna*. The proposed works has the potential to lead to indirect impacts to the remaining vegetation representative of the FCT 3c TEC and habitat for priority flora species, *Grevillea bipinnatifida* subsp. *pagna* (P1) and *Chamaescilla gibsonii* (P3), from the introduction and/or spread or weeds and dieback.

Whilst impacting priority flora, the proposed clearing will not impact the conservation status of the species being impacted or result in a significant regional impact. It is considered that the impacts of the proposed clearing on the FCT 3c TEC constitutes a significant residual impact, and an offset is required (see Section 4).

Conditions

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

- weed and dieback management to manage potential impacts to adjacent vegetation as a result of the proposed clearing.
- flora management condition, including the demarcation of known individuals of *Grevillea bipinnatifida* subsp. *pagna* located within 20 metres of the application area.
- offset – land acquisition, conserved in perpetuity, which includes 0.66 hectares of vegetation in good condition to very good condition that is representative of the FCT 3c TEC.

3.2.2. Biological values (fauna) - Clearing Principles (a) and (b)

Assessment

The application area is located within the Swan Coastal Plain IBRA region of WA. According to available databases, 15 conservation significant fauna species have been recorded within the local area (10 kilometre radius of the application area). A number of these records are associated with marine, estuarine or freshwater habitats that do not occur within the application area. In determining the likelihood of conservation significant fauna occurring within the proposed clearing area, consideration was given to the date of each record, results of the preferred habitat types, proximity of records to the application area, and the type and condition of the vegetation within the application area.

From the likelihood assessment, the application area is considered to comprise suitable habitat for six conservation significant fauna species:

- *Zanda latirostris* (Carnaby's cockatoo), listed as Endangered under the EPBC Act and BC Act;
- *Zanda baudinii* (Baudin's cockatoo), listed as Endangered under the EPBC Act and BC Act;
- *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo), listed as Vulnerable under the EPBC Act and BC Act;
- *Falco peregrinus* (Peregrine falcon), listed as Other specially protected species under BC Act
- *Phascogale tapoatafa wambenger* (South-western brush-tailed phascogale), listed as conservation Dependant under the EPBC Act and BC Act;
- *Myrmecobius fasciatus* (Numbat), listed as Endangered under the EPBC Act and BC Act;

A site inspection conducted by the department recorded fallen logs suitable as habitat for ground dwelling fauna within the proposed clearing area (DWER, 2020; Appendix F). While the application area is considered to contain suitable habitat for South-western brush-tailed phascogale (CD), Numbat (EN) and Peregrine falcon (OS), they are considered unlikely to occur within the application area given the low number of records within the local area (less than five) and the historical nature of the database records for these species (over 40 years old).

Black cockatoos

The application area occurs within the known distribution of all three threatened species of back cockatoo; *Zanda latirostris* (Carnaby's cockatoo), *Zanda baudinii* (Baudin's cockatoo) and *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo).

Habitat requirements for black cockatoos can be categorised as foraging habitat, breeding habitat and night roosting habitat. The Swan Coastal Plain is primarily used by black cockatoos for foraging resources, with some remnant vegetation suitable for breeding. Along the Swan Coastal Plain, black cockatoos will commonly use vegetation dominated by *Banksia* spp. and *Tuart* (Eucalyptus gomphocephala) woodlands, as well as *Marri* (Corymbia calophylla), with *Jarrah* (E. marginata) in the east (Commonwealth of Australia, 2022).

- Baudin's cockatoos primarily forage on seeds of Marri (rarely Jarrah), in woodlands and forest, and seeds of native proteaceous plant species (for example, *Banksia* spp. and *Hakea* spp.).
- Carnaby's cockatoos primarily forage on 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.
- Forest red-tailed black cockatoos primarily forage on seeds of Jarrah and Marri in woodlands and forest, and edges of Karri forests, including Wandoo and Blackbutt.

The vegetation proposed to be cleared is comprised of 0.21 hectares of low woodland to forest of *Corymbia calophylla* (Marri) over *Jacksonia sternbergiana* and *Xanthorrhoea preissii* and contains favoured foraging source for all three species of black cockatoos. Evidence of black cockatoo feeding was recorded during the site inspection conducted by the department's officers (DWER, 2020), with Forest red-tailed black cockatoos heard, although not sighted within the application area (Appendix F).

Breeding habitat for species of black cockatoos is described within the 'EPBC Act referral guidelines for threatened black cockatoo species' (Commonwealth of Australia, 2022) which includes a list of trees species known to support breeding 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 mm (Commonwealth of Australia, 2022). Black cockatoos will generally breed in woodland or forest, but may also breed in partially cleared woodland or forest, including isolated trees. They nest in hollows in live or dead trees, many eucalypt species may provide suitable hollows, particularly Marri. Photos provided by the Shire and taken during the site inspection (Shire of Murray, 2019b; DWER, 2020) indicate the Marri trees within the application area are not of suitable size for cockatoo breeding or roosting habitat. One small hollow was observed, however this was considered too small for use by black cockatoos (DWER, 2020).

Food resources within the range of breeding sites and roost sites are important to sustain populations, and foraging resources are therefore viewed in the context of known breeding and night roosting sites, particularly within 12 kilometres of an impact area (Commonwealth of Australia 2017). A review of available desktop data revealed no confirmed breeding records within 12 kilometres of the application area.

Suitable black cockatoo roost habitat is generally in or near riparian environments or other permanent water sources. Black cockatoos will roost in tall trees, particularly Jarrah, Marri, Flooded Gum, Blackbutt, Tuart, Flat-topped Yate (Eucalyptus occidentalis), Salmon Gum, Wandoo and Karri. According to available databases, there are five known roost sites within 10 kilometres, and an additional 15 within 20 kilometres of the application area. Given the application area is within 10 kilometres of known roost sites, and is in close proximity to available water sources, the proposed clearing area is likely to support foraging by roosting individuals.

Connecting patches of vegetation between foraging resources, breeding habitat and night roosting habitat are essential to enable black cockatoos to access resources across their range. Black cockatoos have been significantly impacted by historical clearing of its habitat, resulting in fragmentation of breeding and foraging habitat, loss of breeding hollows, changes in the species distribution, and genetic partitioning (EPA, 2019). Therefore remnant patches of vegetation are considered important in maintaining black cockatoo habitat connectivity across the landscape.

Given the above, it is considered that the remaining suitable habitat for these species' within its current range is likely to be significant. Specifically, it is considered that the 0.21 hectares of foraging habitat within the application area is significant for black cockatoo due to the dominance of preferred foraging species (Marri) and the highly cleared nature of the surrounding local areas.

Ecological linkage

Given the extent to which the local area has been previously cleared, the application area may contribute towards fauna dispersal within the landscape. However, due to the vegetation that will remain within the road reserve after the proposed clearing, it is not likely that the proposed clearing will have a significant impact to linkage and dispersal values of fauna within the local area. The proposed clearing may cause degradation of habitat values of adjacent

and nearby remnant native vegetation by facilitating the spread of weeds and dieback. It is considered that the impact of clearing can be mitigated through a weed and dieback condition on the permit.

Conclusion

Based on the above assessment, the proposed clearing will result in the loss of 0.21 hectares of significant foraging habitat for black cockatoos. For the reasons set out above, it is considered that the impacts of the proposed clearing on black cockatoo foraging habitat constitutes a significant residual impact.

The proposed clearing is not likely to impact significant habitat for the remaining conservation significant fauna that have been recorded in the local area. However, individuals may utilise the application area to disperse through the landscape and mechanical clearing activities may pose a risk of fauna fatalities should individuals occur within the application area. Slow, directional clearing to allow for dispersal of species into other areas of remnant vegetation will mitigate this risk.

Conditions

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

- slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of clearing activity.
- offset – land acquisition, conserved in perpetuity, which includes:
    - 0.54 hectares of foraging habitat for the endangered Carnaby's and Baudin's black cockatoo species; and
    - 0.52 hectares of foraging habitat for the vulnerable Forest red-tailed black cockatoo species (see section 4)

3.2.3. Biological values (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 IBRA region and the Perth sub-region. The Swan Coastal Plain bioregion has approximately 579,813.47 hectares of native vegetation remaining, equating to approximately 38.6 per cent of its pre-European extent (Government of Western Australia 2019) (Appendix B2).

Regional Swan Coastal Plain vegetation complex descriptions of Heddle *et al*, (1980) as updated by Webb *et al.* (2016) mapped one complex over the application area, the 'Guildford' complex, 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) (Government of Western Australia 2019). The Guildford complex now retains approximately 5.09 per cent of the pre-European extent.

The flora and vegetation survey conducted by Emerge (2020) recorded two vegetation communities, woodlands dominated by *Corymbia calophylla* (marri), within the application area (Appendix F). The vegetation proposed to be cleared is considered representative of the 'Guildford' complex. Given this, the proposed clearing will further reduce the extent of these associations. In addition, the local area contains 11.55 per cent of the original pre-European vegetation extent.

As mentioned above (section 3.2.1 and 3.2.2), the application area contains the FCT 3c TEC, a priority flora species, and significant foraging habitat for black cockatoos. Given this, the area proposed to be cleared is considered significant as a remnant within an extensively cleared landscape.

Conclusion

Based on the above assessment, the proposed clearing will result in the loss of 0.21 hectares of the highly cleared 'Guildford' complex and native vegetation that is a significant remnant within an extensively cleared landscape. For the reasons set out above, it is considered that the impacts of the proposed clearing of significant remnant vegetation constitutes a significant residual impact, and an offset is required (see Section 4).

Conditions

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

- offset – land acquisition, conserved in perpetuity, which includes 0.51 ha of vegetation representative of the 'Guildford' complex and is a significant remnant within an extensively cleared landscape.

3.2.4. Land and water resources - Clearing Principle (f)

Assessment

This principle aims to conserve vegetated watercourses and wetlands and their buffers. The application area intersects two wetlands, a multiuse palusplain and multiuse dampland, however it is acknowledged that the proposed clearing area and local area has been modified through historical clearing for road infrastructure and agriculture. It is therefore considered unlikely that the vegetation within the application area is contributing significantly to the function of riparian communities in the local area.

Given the extent of the proposed clearing, and adjacent land uses, the proposed clearing is not considered likely to result in any significant or long-term impacts to the ecological values of the vegetation communities associated with the mapped wetlands within the application area.

Conclusion

Based on the above assessment, the proposed clearing is unlikely to result in significant impacts to the ecological values of vegetation communities associated with a watercourse or wetland. For the reasons set out above, it is considered that the impacts of the proposed clearing are considered likely to be minimal, localised and short-term. It is considered that the potential impacts of wind erosion can be managed through the implementation of erosion management strategies.

Conditions

To address potential impacts to nearby native vegetation from the proposed clearing, construction works will be required to begin with three months of clearing.

3.3. Relevant planning instruments and other matters

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

4 Suitability of offsets

Through the detailed assessment outlined in section 3.2 above, the Delegated Officer has determined that the following significant residual impacts remain after the application of the avoidance and mitigation measures summarised in section 3.1:

- the loss of 0.21 hectares of native vegetation representative of the FCT 3c TEC,
- the loss of 0.21 hectares of native vegetation that is suitable habitat for black cockatoo species, and
- the loss of 0.21 hectares of native vegetation that is significant as a remnant within an extensively cleared landscape.

The Shire have provided an environmental offset consisting of a 2.02 hectare site, reserve 1453 (Lot 254 on Plan 143141) (Figure 2), located approximately 1.6 kilometres south of the application area. The management order of this reserve will be changed from 'Recreation' to 'Conservation'.

Within the offset site, the Shire proposes to rehabilitate 0.66 hectares of vegetation in good condition to very good condition (Keighery, 1994), that provides:

- vegetation representative of the FCT 3c TEC;
- suitable foraging habitat for the endangered Carnaby's and Baudin's black cockatoo species;
- suitable foraging habitat for the vulnerable Forest red-tailed black cockatoo species; and
- vegetation representative of the Guildford Complex and is a significant remnant within an extensively cleared landscape.

In assessing whether the proposed offset is adequate and proportionate to the significance of environmental values being impacted, a calculation using the WA State Offset Metric was undertaken. The calculation indicates that the proposed offset will address 100 percent of the significant residual impacts of clearing and is therefore consistent with the WA Environmental Offsets Policy, September 2011. The justification for the values used in the offset calculation is provided in Appendix F.

Using the WA State Offset Metric calculator, the following values are required to offset the significant residual impact of the proposed clearing:

- revegetation of 0.66 hectares of native vegetation, conserved in perpetuity, from good condition to very good condition, proposed by the Shire, that provides:
    - 0.66 hectares of vegetation representative of the FCT 3c TEC;
    - 0.54 hectares of vegetation suitable foraging habitat for the endangered Carnaby's and Baudin's black cockatoo species;
    - 0.52 ha of foraging habitat for the vulnerable Forest red-tailed black cockatoo species;
    - 0.51 ha of vegetation representative of the Guildford Complex and is a significant remnant within an extensively cleared landscape.

The proposed offset site contains:

- a total of 1.89 hectares of vegetation representative of the FCT 3c TEC
- a total of 1.89 hectares of black cockatoo foraging habitat, and
- a total of 1.89 hectares of vegetation within an extensively cleared local area in condition ranging from excellent to completely degraded condition.

Given the above, the Delegated Officer considers that the offset provided by the applicant adequately counterbalances the significant residual impacts listed above. The justification for the values used in the offset calculation is provided in Appendix E.

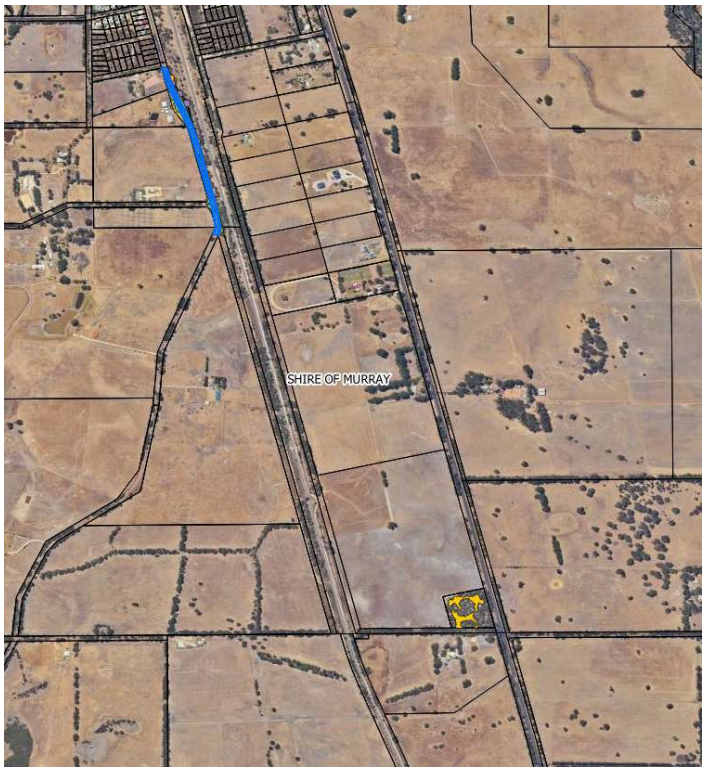

Figure 2: Location of Reserve 1453 (Lot 254 on Plan 143141) (orange) in relation to application area (blue).

End

Appendix A. Additional information provided by applicant

Request for information	Further information provided
Flora and fauna survey of the application area	The Shire provided a detailed flora and vegetation survey of the application area (Emerge, 2020). This information is presented in Section 3.1 of the Decision Report. Excerpts in Appendix F.
TEC assessment of the offset area	The Shire provided a TEC assessment of the offset area (Emerge, 2022). This information is presented in Section 4 of the Decision Report.

Appendix B. Site characteristics

B.1. 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 C.

Characteristic	Details
Local context	The area proposed to be cleared is distributed along a 0.7 kilometre stretch of vegetated road reserve within the intensive land use zone of Western Australia. The application area is surrounded by cleared land for agricultural and urban purposes. Aerial imagery indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 11.55 per cent of the original native vegetation cover.
Ecological linkage	While the proposed clearing is not within any mapped ecological linkages, it does contribute toward local linkages as surrounding properties are mostly cleared for agricultural purposes.
Conservation areas	The closest DBCA land is a nature reserve located 6.5 kilometres from the application.
Vegetation description	Flora and vegetation survey (Emerge, 2020) mapped two vegetation types within the application area: • Low woodland to forest of *Corymbia calophylla* (marri) over occasional *Xanthorrhoea preissii* over bare ground or weeds and • Low woodland to forest of *Corymbia calophylla* over *Jacksonia sternbergiana* and *Xanthorrhoea preissii* over forbland of *Mesomelaena tetragona*, *Tetraria octandra, Cyathochaeta avenacea*, **Babiana angustifolia*, **Watsonia meriana* and open grassland of **Ehrharta calycina* and * *Eragrostis curvula* Survey descriptions and maps are available in Appendix F. This is consistent with the mapped Guildford Complex, 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) (Shepherd et al, 2001) The mapped vegetation type retains approximately 5.09 per cent of the original extent (Government of Western Australia, 2019).
Vegetation condition	Flora and vegetation survey (Emerge, 2020) mapped the vegetation within the proposed clearing area in excellent to degraded condition (Keighery, 1994). The full Keighery (1994) condition rating scale is provided in Appendix D. Survey descriptions and mapping are available in Appendix F.

Characteristic	Details
Climate and landform	The mean annual rainfall within the local area is recorded as 807 millimetres. The application area is approximately 30 metres in the north with a slight rise to 35 meters to the south.
Soil description	The soil is mapped as Pinjarra P1d and P6b Phase described as: • **Pinjarra P1d:** flat to very gently undulating plain with deep acidic mottled yellow duplex (or seffective duplexw) soils. Shallow pale sand to sandy loam over clay; imperfect to poorly drained and moderately susceptible to salinity. • **Pinjarra P6b**: very gently undulating alluvial terraces and low rises contiguous with the plain, with deep moderately well to well drained soils associated with prior stream deposits. Soils are uniform brownish sands.
Land degradation risk	The soils mapped across the application area and surrounding are mapped as having a high risk of wind erosion, substrate acidification and water logging. The area is mapped as having a moderate risk of land degradation from salinity, and a low risk of water erosion.
Waterbodies	The desktop assessment and aerial imagery indicate that the application area is mapped within a multiple use palusplain wetland and a multiple use dampland basin.
Hydrogeography	Located within the Harvey Estuary_Harvey River catchment. The application area is not within any proclaimed areas under the Rights in Water and Irrigation Act 1914 or the Country Areas Water Supply Act 1947.
Flora	According to available databases, 31 records of conservation significant flora occur within the local area. Only one record, *Parsonsia diaphanophleba* (P4) occurs within one kilometre of the application area. Three species are found on the same soil type as the application area. Two priority flora species were recorded; *Grevillea bipinnatifida* subsp. *pagna* (priority 1) and *Chamaescilla gibsonii* (priority 3) within the survey area (Emerge, 2020).
Ecological communities	According to available databases, five TECs, and one Priority Ecological Community (PEC) occurs within the local area. The nearest recorded community is the *Corymbia calophylla - Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain TEC, located three kilometres north of the application area.
Fauna	According to available databases, 15 conservation significant fauna species occur within the local area, including ten bird species and four mammal species. The closest record is the forest red-tailed black cockatoo. The application area occurs within the known distribution of all three conservation significant black cockatoo species. There are five recorded known roost sites within the local area, but no recorded breeding sites.

B.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	38.45
Vegetation complex **					
Guildford complex	90513.13	4607.91	5.09	287.49	0.26
Local area					
10km radius	32,739.87	3,783.13	11.55	-	-

*Government of Western Australia (2019a)

**Government of Western Australia (2019b)

B.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix G.1), and biological survey information (Emerge, 2020), impacts to the following conservation significant flora required further consideration.

Species 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 (total)	Are surveys adequate to identify? [Y, N, N/A]
Parsonsia diaphanophleba	P4	Y	Y	Y	0.56	11	Y
Grevillea bipinnatifida subsp. *pagna*	P1	Y	Y	Y	4.78	14	Y
Synaphea sp. Pinjarra Plain (A.S. George 17182)	T	Y	Y	Y	4.95	1	Y
Synaphea odocoileops	P1	Y	Y	Y	5.55	8	Y
Schoenus capillifolius	P3	Y	Y	Y	6.28	4	Y
Eryngium sp. Ferox (G.J. Keighery 16034)	P3	Y	N	Y	6.52	1	Y
Angianthus drummondii	P3	Y	Y	Y	7.17	2	Y
Schoenus sp. Waroona (G.J. Keighery 12235)	P3	Y	Y	Y	7.55	3	Y
Synaphea stenoloba	T	Y	Y	Y	9.40	2	Y

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

B.4. 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]
Calyptorhynchus banksii naso (forest red-tailed black cockatoo)	VU	Y	Y	0.37	36	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]
Phascogale tapoatafa wambenger (south-western brush-tailed phascogale)	CD	N	Y	0.99	2	N/A
Hydromys chrysogaster (water-rat, rakali)	P4	N	Y	0.99	1	N/A
Falco peregrinus (peregrine falcon)	OS	N	N	0.99	1	N/A
Isoodon fusciventer (quenda)	P4	N	N	2.26	5	N/A
Zanda latirostris (Carnaby's cockatoo)	EN	Y	Y	3.56	19	N/A
Zanda baudinii (Baudin's cockatoo)	EN	Y	Y	6.70	1	N/A
Myrmecobius fasciatus (numbat)	EN	N	N	9.73	1	N/A

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

B.5. Land degradation risk table

Risk categories	213Pj_P1d	213Pj SWP6b
Wind erosion	10-30% of the map unit has a high to extreme hazard	>70% of the map unit has a high to extreme hazard
Water erosion	<3% of the map unit has a very high to extreme hazard	<3% of the map unit has a very high to extreme hazard
Salinity	30-50% of the map unit has a moderate or high hazard or is presently saline	<3% of the map unit has a moderate or high hazard or is presently saline
Subsurface Acidification	>70% of the map unit has a high susceptibility	>70% of the map unit has a high susceptibility
Flood risk	50-70% of the map unit has a high susceptibility	50-70% of the map unit has a high susceptibility
Water logging	10-30% of the map unit has a high to extreme hazard	>70% of the map unit has a high to extreme hazard
Phosphorus export risk	<3% of the map unit has a high to extreme hazard	<3% of the map unit has a high to extreme hazard

Appendix C. 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 contains vegetation representative of the '*Corymbia calophylla - Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain' (TEC, habitat for priority flora and significant habitat for black cockatoo species.	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 3.2.2, above.*

Assessment against the clearing principles	Variance level	Is further consideration required?
The area proposed to be cleared contains foraging habitat for black cockatoo species.		
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. No threatened flora species were recorded during the flora and vegetation survey conducted across the application area (Emerge, 2020).	Not likely to be at variance	Yes *Refer to Section 3.2.1 above.*
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 contains vegetation representative of the '*Corymbia calophylla - Xanthorrhoea preissii* woodlands and shrublands of the Swan Coastal Plain' TEC.	At variance	Yes *Refer to Section 3.2.1 above.*
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 type and native vegetation in the local area is inconsistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is considered to provide fauna linkage in the local area.	At variance	Yes *Refer to Section 3.2.3, 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 is over five kilometres from the proposed clearing area, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas.	Not likely to be 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 the application area interests two wetlands (palusplain and dampland), the vegetation proposed to be cleared is therefore considered to be growing in, or in association with, an environment associated with a watercourse or wetland.	At variance	Yes *Refer to Section 3.2.4, 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 moderately susceptible to wind erosion and substrate acidification. Noting the extent of the application area and that the final land use will be a sealed road, any impacts are considered to be minor and	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
temporary. The proposed clearing is not likely to have an appreciable impact on land degradation. To address this, a condition that construction works are to be completed within three months of the clearing will be placed on the permit.		
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: The application area intersects two wetlands. Given the small extent of vegetation proposed to be cleared, any change resulting from the clearing of native vegetation is considered to be minor and temporary. No long-term impacts on quality of surface and underground water are anticipated as a result of clearing native vegetation.	Not likely to be at variance	No
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. Two wetlands are recorded within the application area, the proposed clearing may therefore contribute to waterlogging. Given the small extent of vegetation proposed to be cleared, any impacts are considered to be minor.	Not likely to be at variance	No

Appendix D. 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.

Condition	Description
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 E. Offset calculator value justification

E.1. Environmental value: Threatened Ecological Community

Calculation	Score (Area)	Rationale
Conservation significance		
Description	*Corymbia calophylla - Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain' (FCT3c) TEC	Flora and vegetation survey (Emerge, 2020) identified vegetation representative of the *Corymbia calophylla - Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain' (FCT 3c) TEC.
Type of environmental value	Ecological Community	Threatened ecological community
Conservation significance of environmental value	Threatened Ecological Community – Critically Endangered	Threatened ecological community - Critically Endangered
Landscape level value impacted	yes/no	Yes
Significant impact		
Description	*Corymbia calophylla - Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain' (FCT3c) TEC	Clearing of *Corymbia calophylla - Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain' (FCT 3c) TEC
Significant impact (hectares)	0.21	0.21 hectares within the application area is representative of the FCT 3c TEC
Quality (scale)	5.00	Survey identified application area is in very good to degraded (Keighery, 1994) condition. Contains high-value vegetation representative of a Critically Endangered TEC but comprises thin strips of roadside vegetation. May provide ecological linkage values.
Offset		
Description	Acquisition and conservation of native vegetation that is representative of the FCT3c TEC	Acquisition, conservation and vegetation management of native vegetation that is representative of the FCT3c TEC.
Proposed offset (area in hectares)	0.66	Area of the reserve determined to be representative of the FCT3c TEC during the survey.
Current quality of offset site	5.00	Survey identified that vegetation condition is in good condition (Keighery, 1994). Contains high-value vegetation representative of a Critically Endangered TEC but is an isolated remnant with limited connectivity to other remnant vegetation or areas of the conservation estate.
Future quality WITHOUT offset	5.00	Quality is unlikely to change without offset.
Future quality WITH offset	7.00	With the vegetation management conditions (weed management and infill planting) the vegetation is assumed to be improved from good to very good condition.
Time until ecological benefit (years)	6.00	Time for rehabilitation of vegetation to improve the condition of the TEC community

Confidence in offset result (%)	0.8	Confidence of success is 80%
Duration of offset implementation (maximum 20 years)	20.00	Covenant will conserve in perpetuity.
Time until offset site secured (years)	1.00	Time for covenant to be executed.
Risk of future loss WITHOUT offset (%)	15.0%	Currently recreation reserve,.
Risk of future loss WITH offset (%)	5.0%	To be placed under conservation covenant thus the risk of loss is considered to be low
Offset ratio (Conservation area only)	N/A	N/A
Landscape level values of offset?	N/A	N/A

E.2. Environmental value: Black cockatoo habitat

Calculation	Score (Area)	Rationale
Conservation significance		
Description	Carnaby's cockatoo and Baudin's cockatoo foraging habitat	Carnaby's cockatoo and Baudin's cockatoo foraging habitat
Type of environmental value	Species (flora/fauna)	Fauna habitat
Conservation significance of environmental value	Rare/threatened species - endangered	Endangered under the BC and EPBC Act
Landscape level value impacted	yes/no	Yes
Significant impact		
Description	Black cockatoo foraging habitat	Clearing of native vegetation that provides foraging habitat for Carnaby's cockatoo and Baudin's cockatoos.
Significant impact (hectares)	0.21	0.21 hectares within the application area contains preferred black cockatoo foraging species (marri).
Quality (scale)	5.00	Survey identified application area is in Very Good to Degraded (Keighery, 1994) condition. Preferred foraging resources within the application area are likely limited to individual marri trees throughout. May provide ecological linkage values.
Offset		
Description	Acquisition and conservation of native vegetation that provides foraging habitat for black cockatoos	Acquisition, conservation and vegetation management of native vegetation that is significant as a remnant within an area that has been extensively cleared (crown reserve 1453).
proposed offset (area in hectares)	0.54	Area of the reserve likely to provide foraging habitat for black cockatoo species based on vegetation mapping in the survey.
Current quality of offset site	5.00	Survey identified that vegetation is in Good condition (Keighery, 1994). Contains preferred foraging habitat (marri trees) and has potential to provide roosting and breeding habitat (not surveyed) but is an isolated remnant with limited connectivity to other remnant vegetation or areas of the conservation estate.
Future quality WITHOUT offset	5.00	Quality is unlikely to change without offset.
Future quality WITH offset	7.00	With the vegetation management conditions (weed management and infill planting) the vegetation is assumed to be improved from good to very good condition

Time until ecological benefit (years)	8.00	Time for foraging value to be realised
Confidence in offset result (%)	0.8	Confidence of 80%
Duration of offset implementation (maximum 20 years)	20.00	Covenant will conserve in perpetuity.
Time until offset site secured (years)	1.00	Time for covenant to be executed.
Risk of future loss WITHOUT offset (%)	15.0%	Currently recreation reserve.
Risk of future loss WITH offset (%)	5.0%	To be placed under conservation covenant thus the risk of loss is considered to be low
Offset ratio (Conservation area only)	N/A	NA
Landscape level values of offset?	N/A	NA

E.3. Environmental value: Significant remnant vegetation

Calculation	Score (Area)	Rationale
Conservation significance		
Description	Significant remnant vegetation (local area)	Vegetation association (Guildford complex) mapped across the application area retains less than 30 per cent of their pre-European vegetation extent. Vegetation in excellent to degraded condition (Keighery, 1994).
Type of environmental value	Vegetation/habitat	Vegetation considered significant as a remnant due to the highly cleared mature of the vegetation within the local area and provides foraging habitat for black cockatoos.
Conservation significance of environmental value	Terrestrial native vegetation complex - <30% extent remaining in the bioregion	Vegetation resembles the Guildford complex (5% extent remains for the Swan Coastal Plain). The vegetation within the local area is below the 30% threshold.
Landscape level value impacted	yes/no	yes
Significant impact		
Description	Clearing of native vegetation that is significant as a remnant within an area that has been extensively cleared	Clearing of native vegetation that is significant as a remnant within an area that has been extensively cleared.
Significant impact (hectares)	0.21	0.21 hectares within the application area is representative of the Guildford complex highly cleared vegetation association.
Quality (scale)	5.00	Survey identified application area is in Very Good to Degraded (Keighery, 1994) condition. Contains high-value vegetation representative of a Critically Endangered TEC but comprises thin strips of roadside vegetation. May provide ecological linkage values.
Offset		
Description	Acquisition and conservation of native vegetation that is significant as a remnant within an area that has been extensively cleared	Acquisition, conservation and vegetation management of native vegetation that is significant as a remnant within an area that has been extensively cleared (crown reserve 1453).
proposed offset (area in hectares)	1.89	Area of the reserve containing vegetation within an extensively cleared area based on vegetation mapping in the survey.

Current quality of offset site	5.00	Survey identified that vegetation condition is in Good condition (Keighery, 1994). Contains high-value vegetation representative of a Critically Endangered TEC and extensively cleared vegetation complex but is an isolated remnant with limited connectivity to other remnant vegetation or areas of the conservation estate.
Future quality WITHOUT offset	5.00	Quality is unlikely to change without offset.
Future quality WITH offset	7.00	With the vegetation management conditions (weed management and infill planting) the vegetation is assumed to be improved from good to very good condition
Time until ecological benefit (years)	6.00	Time for improvement in quality to be realised
Confidence in offset result (%)	0.8	Confidence of 80%
Duration of offset implementation (maximum 20 years)	20.00	Covenant will conserve in perpetuity.
Time until offset site secured (years)	1.00	Time for covenant to be executed.
Risk of future loss WITHOUT offset (%)	15.0%	Currently recreation reserve.
Risk of future loss WITH offset (%)	5.0%	To be placed under conservation covenant thus the risk of loss is considered to be low
Offset ratio (Conservation area only)	N/A	NA
Landscape level values of offset?	N/A	NA

Appendix F. Biological survey information (Emerge, 2020) and DWER site inspection report (DWER, 2020)

Flora and vegetation survey (Emerge, 2020)

Figure 3. Representative photo of plant community 'CcJs' (left) in very good to good condition (left) and community 'Cc' in degraded condition (Emerge, 2020) (Emerge, 2020)

Site inspection (DWER, 2020)

Fig 1. Application area – Very good condition

Fig 2. Application area – Very good condition

Fig 3. Application area – completely degraded condition

Fig 4. Application area – degraded condition

Fig 5. Soil type within application area

Fig 6. Evidence of cockatoo feeding

Figure 4. DWER site inspection photographs (DWER, 2020)

Fig 7. Application area – good to very good (left), completely degraded where area has been scraped back for road maintenance

Fig 8. Application area – Very good condition

Fig 9. Fallen log providing habitat for fauna

Fig 10. Small hollow in Marri tree within application area

Fig 11. Application area – Very good condition

Fig 12. Application area – Good condition

Figure 4. DWER site inspection photographs (DWER, 2020)

Appendix G. Sources of information

G.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)
- 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
- Wheatbelt Wetlands Stage 1 (DBCA-021)

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)

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