



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 9370/1
Permit Holder:	Shire of Murray
Duration of Permit:	From 14 October 2021 to 14 October 2031

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

PART I – CLEARING AUTHORISED

1. Clearing authorised (purpose)

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

2. Land on which clearing is to be done

Carrabungup Road Reserve – PIN 1369197, Nirimba
Carrabungup Road Reserve – PIN 1369187, Nirimba
Carrabungup Road Reserve – PIN 1369188, Nirimba
Lot 737 on Deposited Plan 133073, Nirimba

3. Clearing authorised

The permit holder must not clear more than 33 native trees incorporating 0.22 hectares of native vegetation within the areas cross-hatched yellow in Figure 1 (Maps A to C) of Schedule 1.

4. Period during which clearing is authorised

The permit holder must not clear any *native vegetation* after 14 October 2026.

5. Application

This permit allows the permit holder to authorise persons, including employees, contractors and agents of the permit holder, to clear native vegetation for the purposes of this permit subject to compliance with the conditions of this permit and approval from the permit holder.

PART II – MANAGEMENT CONDITIONS

6. 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.

7. Weed and dieback management

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

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

8. Vegetation management – revegetation

The permit holder must within 12 months of undertaking clearing authorised under this permit:

- (a) undertake deliberate *planting* of at least one hundred and ten (110) native trees of *local provenance* within the area cross-hatched red in Figure 1 of Schedule 2;
- (b) ensure plantings include the species; *Corymbia calophylla*, *Eucalyptus rudis*, *Casuarina obesa*, and *Melaleuca preissiana*;
- (c) ensure *planting* is undertaken at the *optimal time*;
- (d) undertake *weed* control and watering of *plantings* for at least three years post *planting*;
- (e) the permit holder must within 24 months of planting the at least one hundred and ten (110) native trees of *local provenance* in accordance with *condition 8(a)* of this permit;
 - (i) engage an *environmental specialist* to make a determination that the at least one hundred and ten (110) native trees will survive; and
 - (ii) if the determination made by the *environmental specialist* under *condition 8(e)(i)* that at least one hundred and ten (110) native trees will not survive, the permit holder must plant additional native trees that will result in at least one hundred and ten (110) native trees persisting within the area cross-hatched red in Figure 1 of Schedule 2.
- (f) where additional planting of native trees is undertaken in accordance with *condition 8(e)(ii)*, the permit holder must repeat the activities required by *condition 8(c)*, *8(d)* and *8(e)* of this permit.

PART III - RECORD KEEPING AND REPORTING

9. 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	<ul style="list-style-type: none">(a) the species composition, structure, and density of the cleared area;(b) the location where the <i>clearing</i> occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings;(c) the date that the area was cleared;(d) the size of the area cleared (in hectares);(e) the date construction activities commenced;(f) actions taken to avoid, minimise, and reduce the impacts and extent of <i>clearing</i> in accordance with <i>condition 6</i>;(g) actions taken to minimise the risk of the introduction and spread of <i>dieback</i> and <i>weeds</i> in accordance with <i>condition 7</i>.
2.	In relation to vegetation management- <i>revegetation</i>	<ul style="list-style-type: none">(a) <i>revegetation</i> activities undertaken in accordance with <i>condition 8</i> of this permit including:<ul style="list-style-type: none">(i) the date that <i>revegetation</i> activities commenced;(ii) the number of <i>plantings</i>;(iii) the species planted, including the numbers of each species planted;(iv) <i>weed</i> control and watering activities undertaken;(v) determinations by <i>environmental specialists</i>;(vi) the date and activities undertaken where additional <i>plantings</i> are required.

10. Reporting

- (a) The permit holder must provide to the *CEO*, on or before 31 December of each calendar year, a written report containing:

- (i) the records required to be kept under *condition 9*; and
- (ii) records of activities done by the permit holder under this permit between 1 July of the preceding calendar year and 30 June of the current calendar year.
- (b) If no clearing authorised under this permit has been undertaken, a written report confirming that no clearing under this permit has been undertaken, must be provided to the *CEO* on or before 31 December of each calendar year.
- (c) The permit holder must provide to the *CEO*, no later than 90 calendar days prior to the expiry date of the permit, a written report of records required under *condition 9*, where these records have not already been provided under *condition 10(a)*.

DEFINITIONS

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

Table 2: Definitions

Term	Definition
<i>CEO</i>	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> (WA).
<i>clearing</i>	has the meaning given under section 3(1) of the <i>EP Act</i> .
<i>condition</i>	a <i>condition</i> to which this clearing permit is subject under section 51H of the <i>EP Act</i> .
<i>dieback</i>	means the effect of <i>Phytophthora</i> species on native vegetation.
<i>environmental specialist</i>	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.
<i>fill</i>	means material used to increase the ground level, or to fill a depression.
<i>EP Act</i>	<i>Environmental Protection Act 1986</i> (WA)
<i>local provenance</i>	means native vegetation seeds and propagating material from natural sources within 30 kilometres and the same Interim Biogeographic Regionalisation for Australia (IBRA) subregion of the area cleared.
<i>mulch</i>	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
<i>native vegetation</i>	has the meaning given under section 3(1) and section 51A of the <i>EP Act</i> .
<i>optimal time</i>	means the period from May to July for undertaking <i>planting</i> .
<i>planting</i>	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species.
<i>revegetate/ed/ion</i>	means the re-establishment of a cover of <i>local provenance</i> native vegetation in an area using methods such as natural <i>regeneration</i> ,

Term	Definition
	<i>direct seeding</i> and/or <i>planting</i> , so that the species composition, structure and density is similar to pre-clearing vegetation types in that area.
<i>weeds</i>	means any plant – (a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i> ; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

END OF CONDITIONS



Mathew Gannaway
 MANAGER
 NATIVE VEGETATION REGULATION

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

20 September 2021

Schedule 1

The boundary of the areas authorised to be cleared are shown in the maps below (Figure 1; Maps A to C).

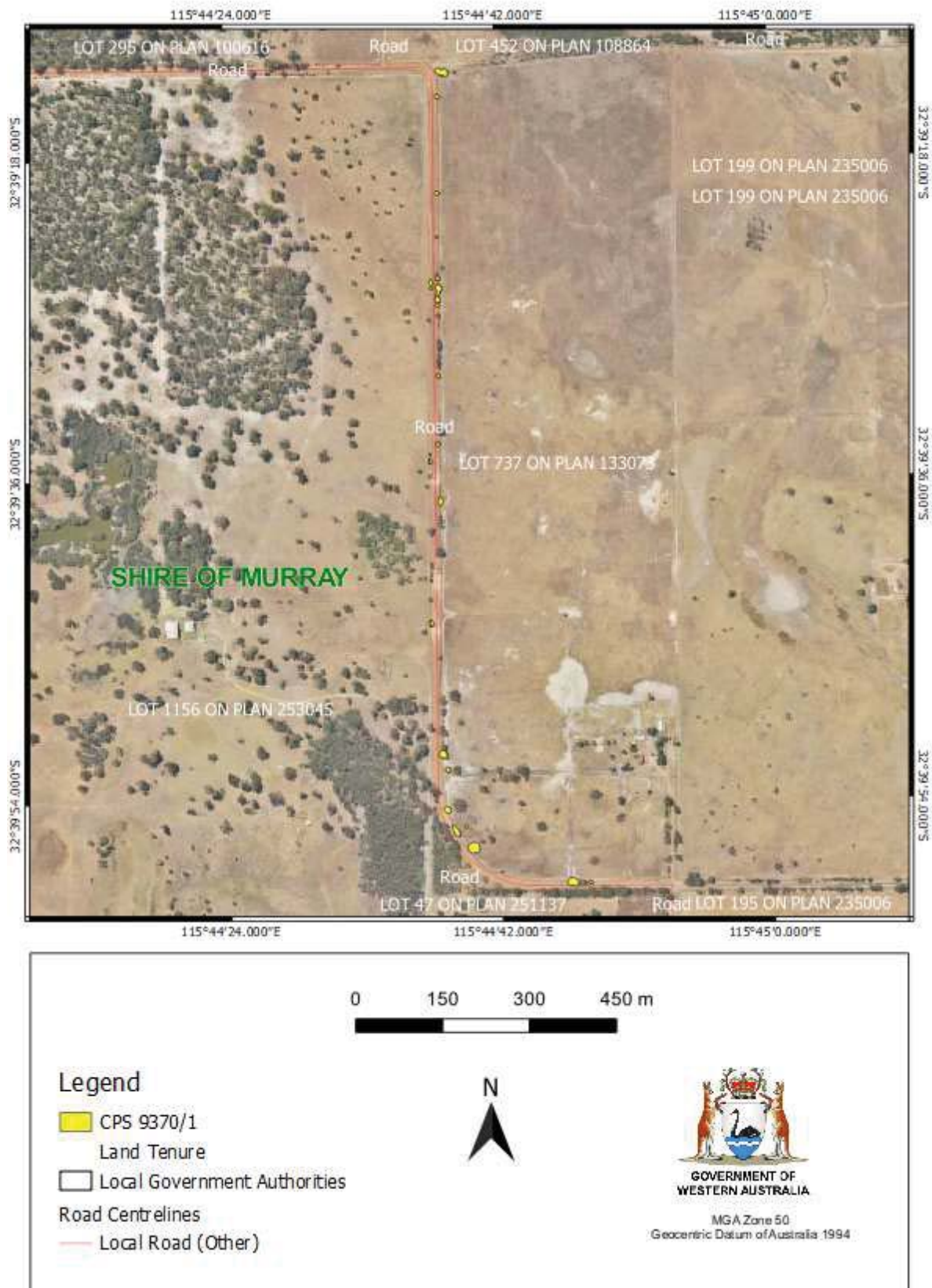


Figure 1: Map of the boundaries of the areas within which clearing may occur

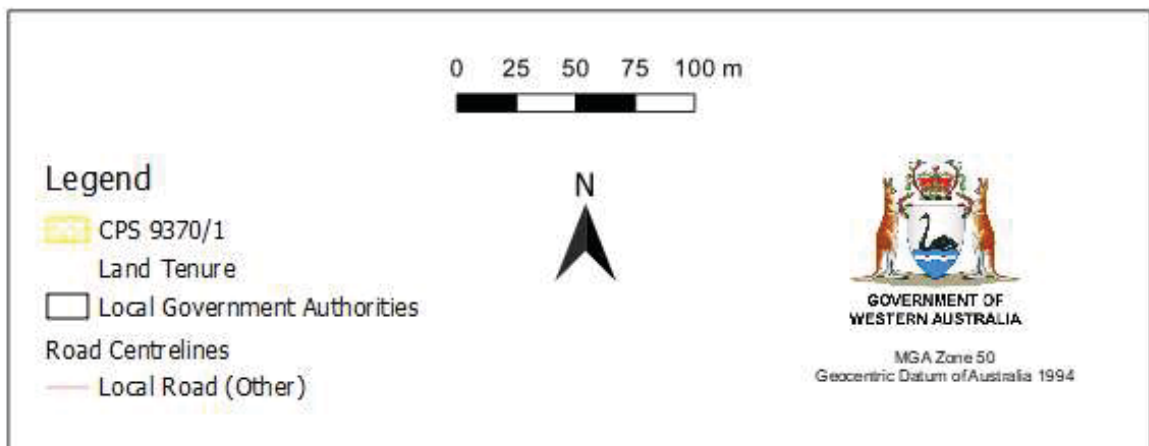


Figure 1: Map A

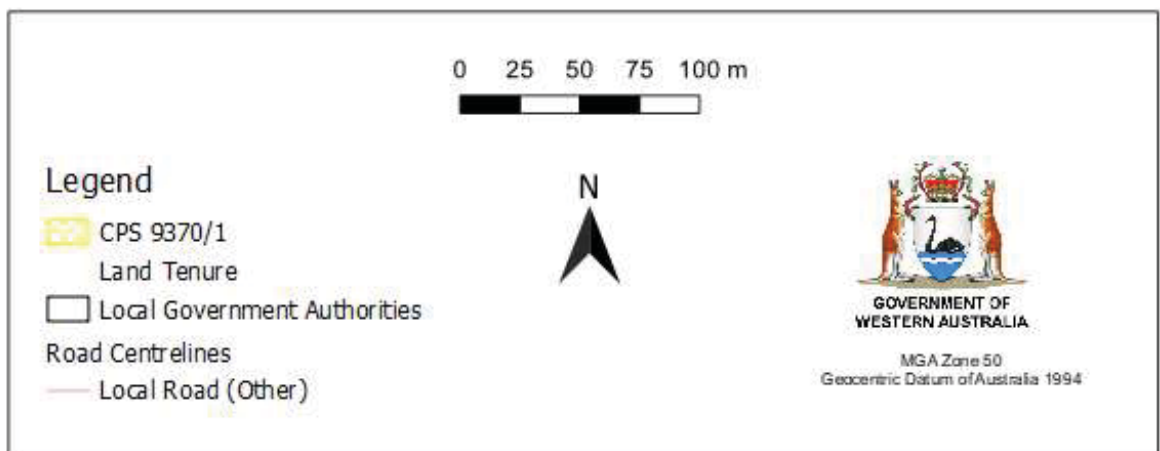


Figure 1: Map B

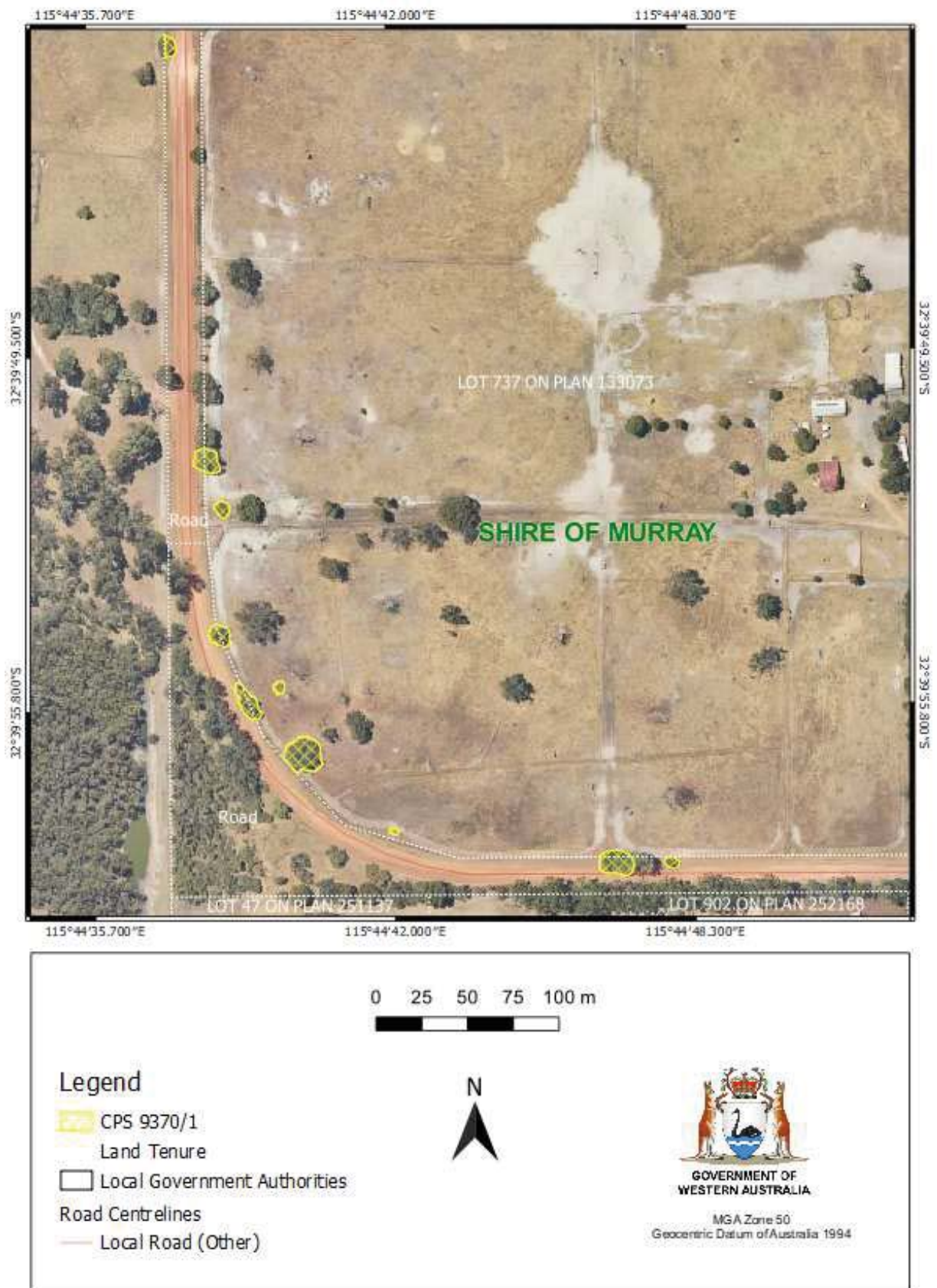


Figure 1: Map C

Schedule 2

The boundaries of the areas where specific *conditions* apply are shown in the map below (Figure 1; Maps A and B).

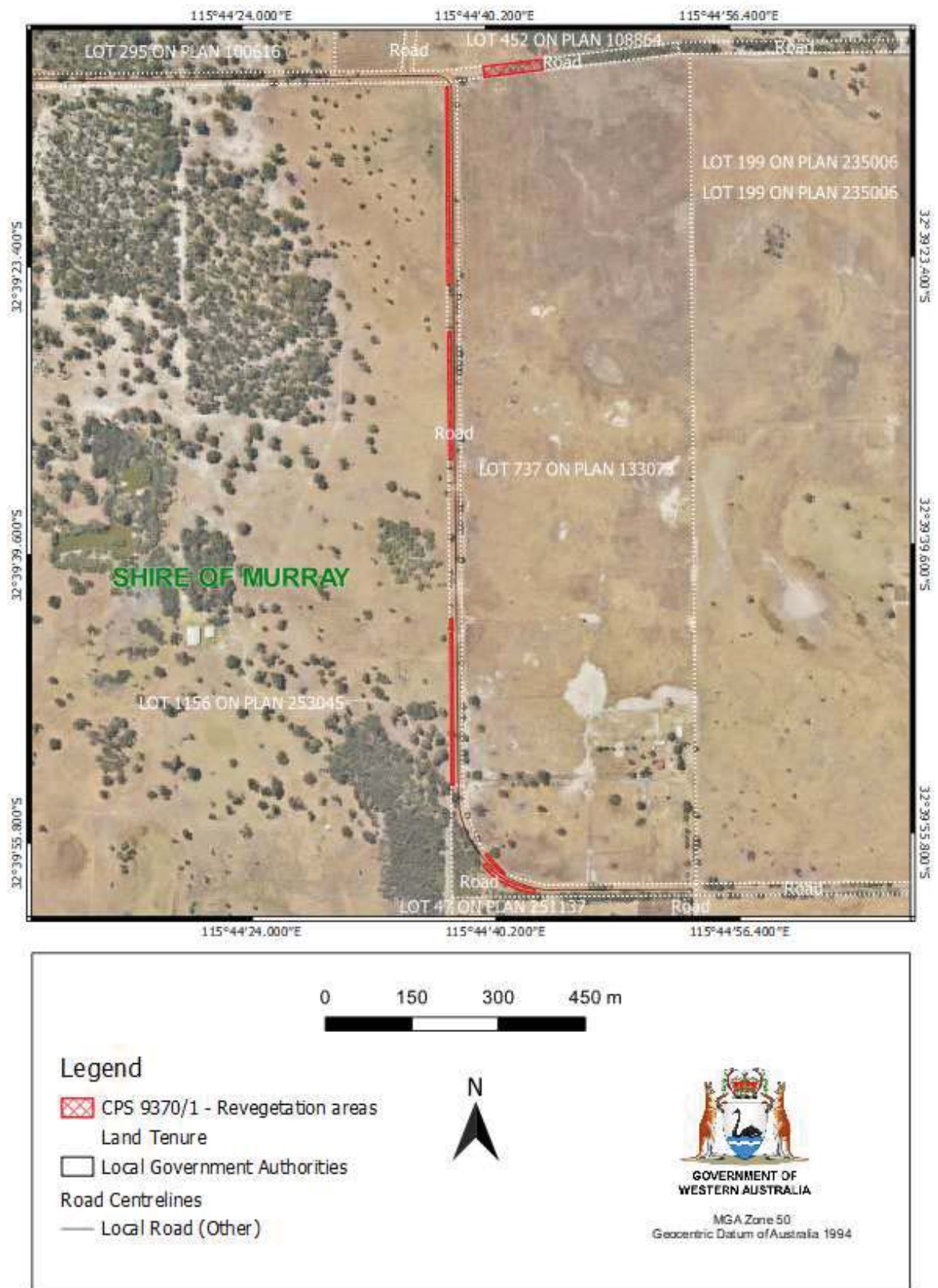


Figure 1: Map of the boundaries of the areas where specific *conditions* apply – Revegetation

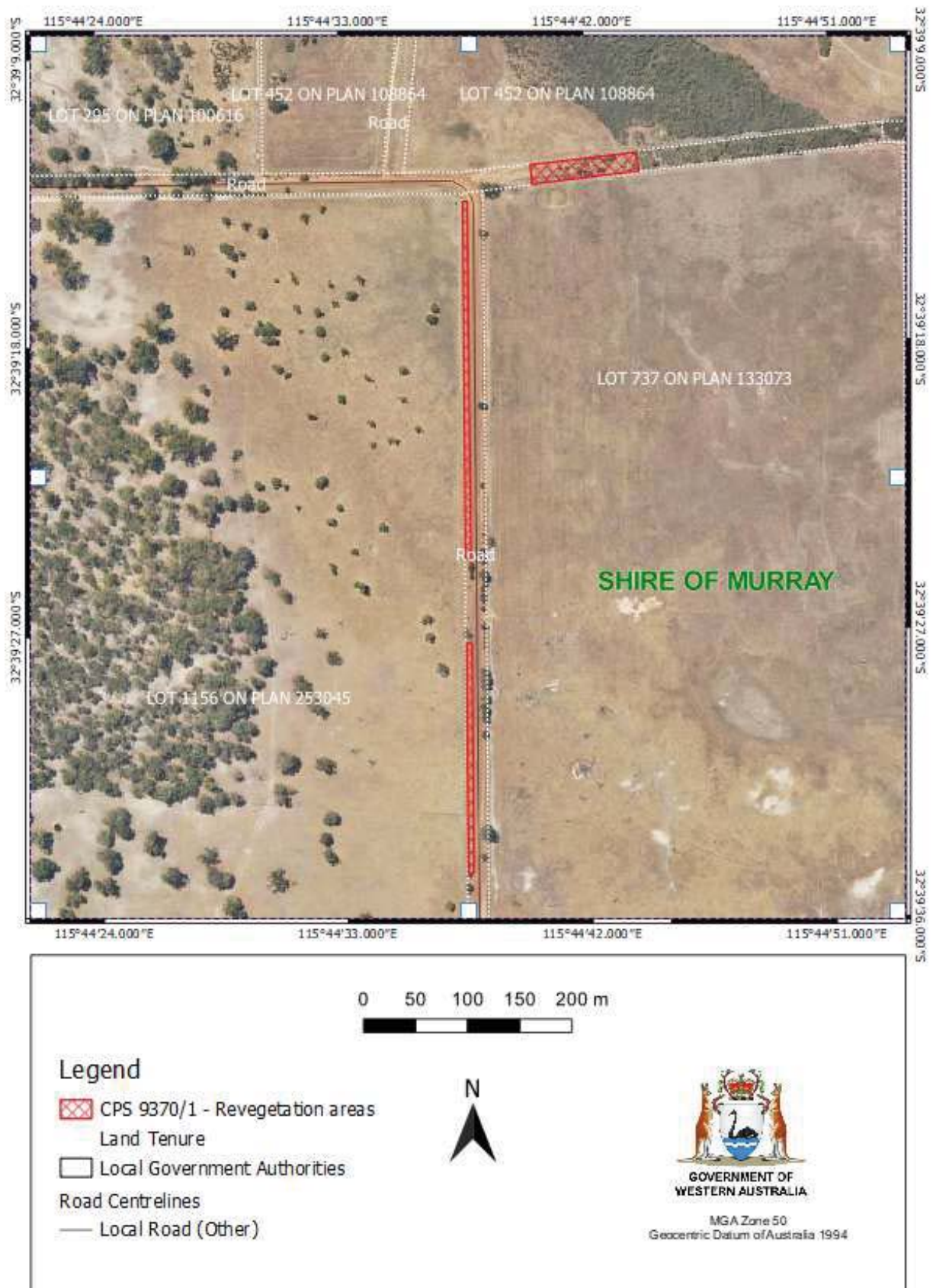


Figure 1: Map A

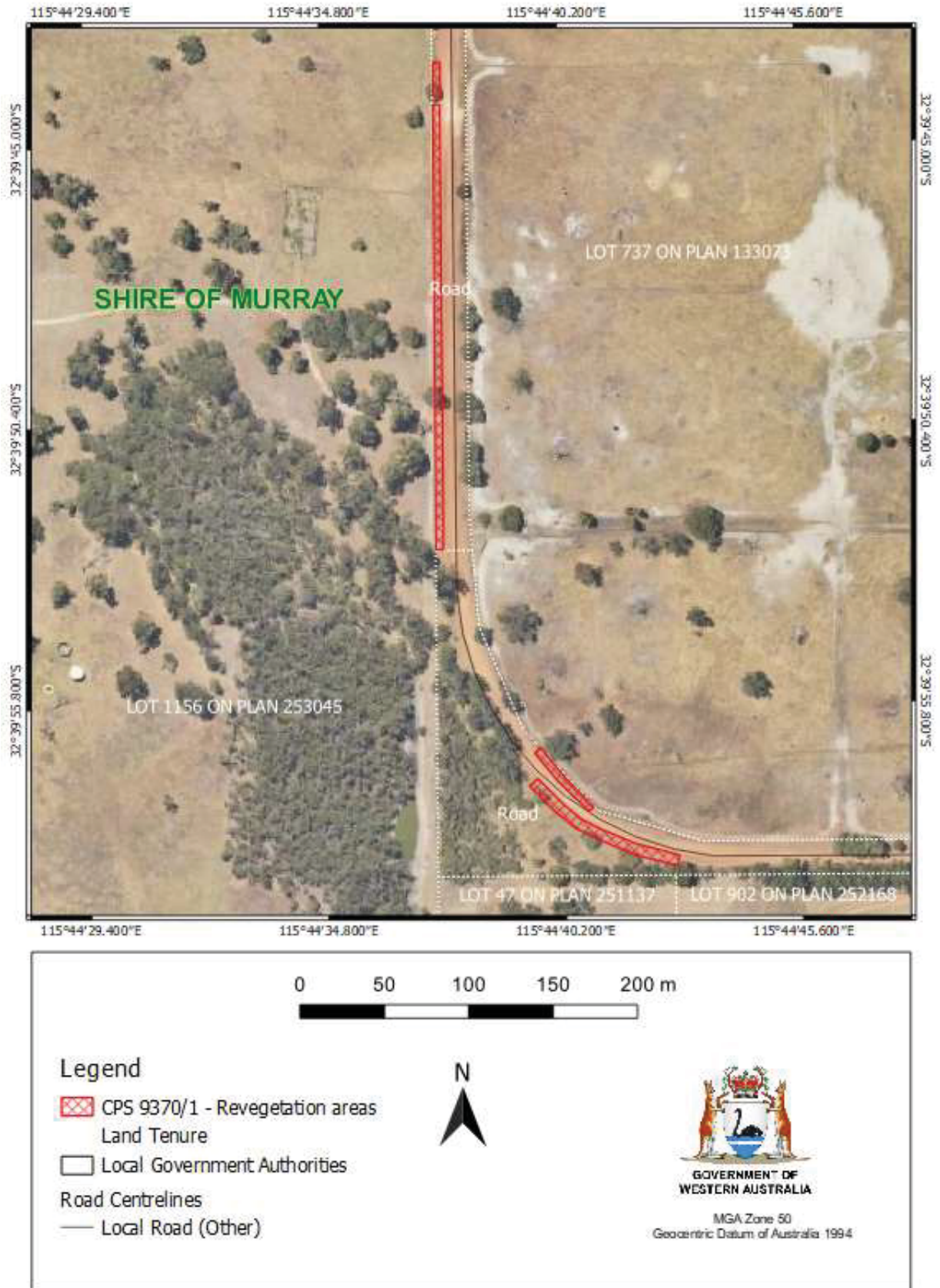


Figure 1: Map B



Clearing Permit Decision Report

1. Application details and outcome

1.1. Permit application details

Permit number:	CPS 9370/1
Permit type:	Purpose permit
Applicant name:	Shire of Murray
Application received:	02 August 2021
Application area:	33 native trees (revised), incorporating 0.22 hectares of native vegetation
Purpose of clearing:	Road construction and upgrades
Method of clearing:	Mechanical clearing and professional tree loppers.
Property:	Carrabungup Road Reserve (PINs 1369197, 1369187 and 1369188), Nirimba Lot 737 on Deposited Plan 133073, Nirimba
LGA area:	Shire of Murray
Localities:	Nirimba

1.2. Description of clearing activities

The Shire of Murray (the Shire) require the removal of 33 native trees to allow for road upgrades to Carrabungup Road, Nirimba, for public safety purposes. The removal of the trees will result in the clearing of up to 0.22 hectares of native vegetation in a completely degraded to degraded condition (Keighery 1994).

1.3. Decision on application and key considerations

Decision:	Granted
Decision date:	20 September 2021
Decision area:	33 native trees incorporating 0.22 hectares of native vegetation as depicted in Section 1.5.

1.4. Reasons for decision

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

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix B), relevant datasets (Appendix G2), representative photographs of the application area (Appendix E1), the results of flora and vegetation survey (Appendix A), the clearing principles set out in Schedule 5 of the EP Act (Appendix C), relevant planning instruments and any other matters considered relevant to the assessment (Section 3). The Delegated Officer also took into consideration the purpose of the clearing to improve public safety by upgrading Carrabungup Road, Nirimba.

The assessment identified that a review undertaken by the applicant of an initial road upgrade design that was presented in a previous native vegetation clearing application (CPS 9117/1) culminated in a revised alignment of Carrabungup Road. The revised alignment required the acquisition of adjacent tenure to avoid direct, and indirect, impacts to a conservation category wetland (CCW) and an associated threatened flora species. The review of the upgraded road alignment, design, and levels indicated that additional tree clearing was required to that presented in the previous application CPS 9117/1. After a further revision of the road design the number of trees that required removal was reduced from 55, incorporating approximately 0.47 hectares of native vegetation, down to 33 trees incorporating 0.22 hectares of native vegetation.

With appropriate drainage controls in place the revised alignment will avoid impacts to the CCW and associated threatened flora species, and the number of trees requiring removal has been minimised. The trees that are proposed to be cleared are not of sufficient size or species that would impact significant fauna habitat.

The proposed clearing may result in the inadvertent introduction or spread of weeds and dieback disease into adjacent native vegetation, and an overall reduction of vegetation cover in an extensively cleared landscape.

After consideration of the available information, as well as the applicant's avoidance, minimisation, and mitigation measures (Section 3.1), the Delegated Officer determined the proposed clearing can be managed to unlikely lead to an unacceptable risk to environmental values. The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise and reduce the impacts and extent of clearing;
- implement weed and dieback management measures to mitigate impacts to adjacent vegetation; and
- undertake deliberate planting of at least 110 locally-provenanced native trees within the Carrabungup Road reserve to mitigate the loss of native vegetation within an extensively cleared landscape including species that provide foraging habitat to threatened black cockatoo species.

1.5. Site map

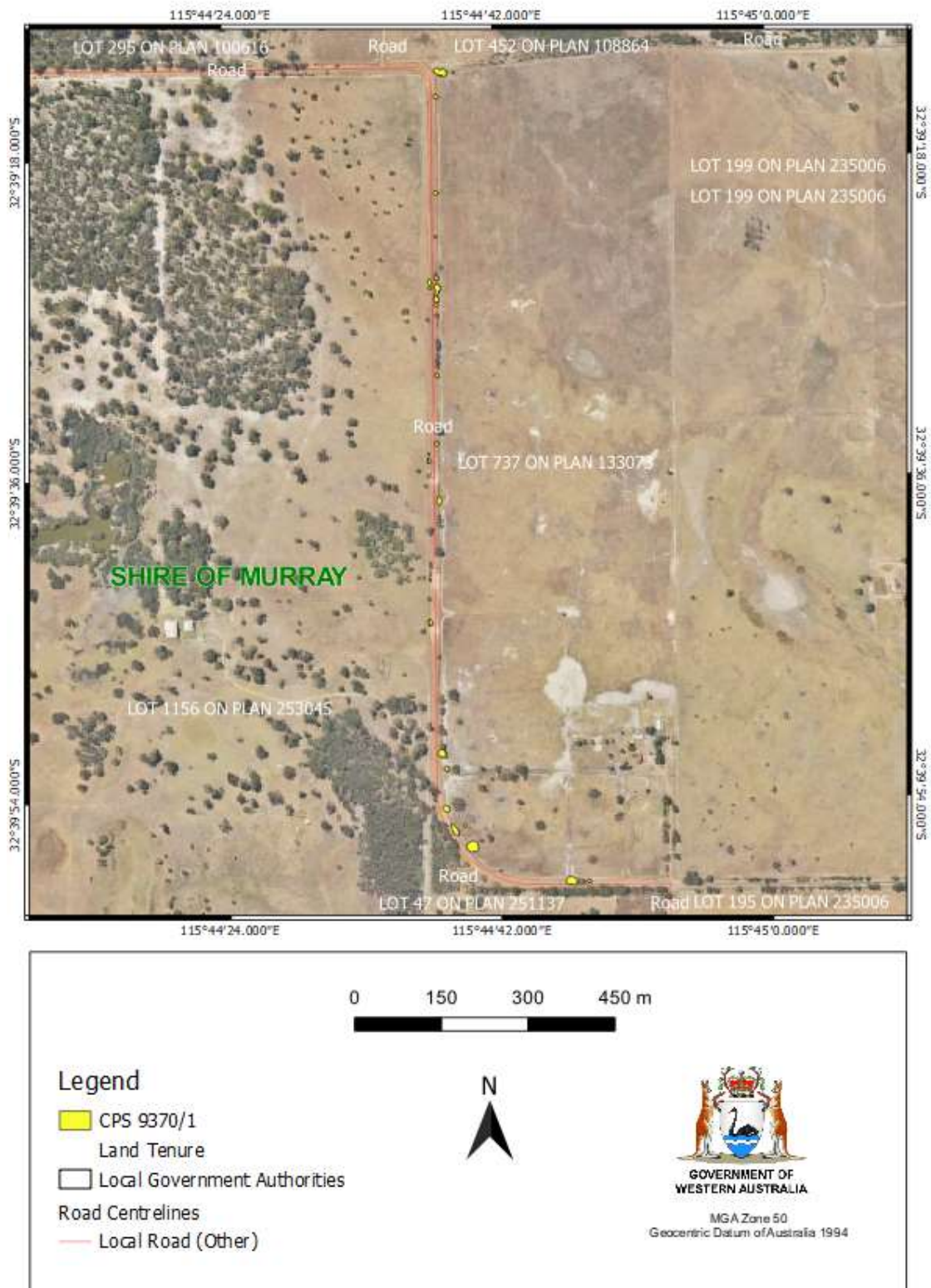


Figure 1. Map of the application area. The areas in yellow indicate the areas authorised to be cleared under the granted clearing permit.

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 (Section 1.3), 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)
- *Biosecurity and Agriculture Management Act 2007* (BAM Act),
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- 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 has provided both avoidance and mitigation strategies to minimise environmental impact of the proposed Carrabungup Road upgrade.

At the location of a right-angle bend that potentially impacts a CCW and an associated population of threatened flora (Section 3.2.2), adjacent freehold land is in the process of being acquired by the Shire (Section 3.3). The acquired land will accommodate the new alignment that avoids both the wetland and threatened flora population, as well as associated established Flooded Gums (*Eucalyptus rudis*) that provide an overstorey to the threatened flora population.

The realignment and design features will maintain the existing surface water hydrology and drainage, and provide a buffer between the new road and the CCW (Section 3.2.4). The Shire will partially remove the existing gravel road in this area and relocate the existing culverts to the new road alignment. Road construction will increase the super-elevation of the radius which drains to the eastern side of the road (Shire of Murray 2021b). That is, to the opposite side of the road to the CCW (Section 3.2.4).

The initial CPS 9370/1 application considered the removal of 55 native trees of various age classes to accommodate the road upgrade. On-site inspections with stakeholders identified 22 trees that could be avoided by finer-scale modifications to the design, reducing the total number required for clearing to 33 (Shire of Murray 2021c).

The Shire will mitigate the loss of these trees by planting appropriate native species within degraded areas of the Carrabungup Road reserve (Appendix F – Figure E). The Shire had committed to planting at a rate greater than two trees planted for each tree removed, with at least 110 native trees planted based on the initial number of trees proposed to be removed. With the reduction of proposed clearing down to 33 trees, the Shire have maintained the commitment of re-planting 110 native trees, equating to a replacement rate greater than three to one (Shire of Murray 2021c).

Evidence has been submitted by the applicant demonstrating the avoidance of impacts to a CCW, a population of threatened flora, and established Flooded Gums that provide an overstorey to that species. The applicant has also minimised the impacts to isolated trees.

Evidence of mitigation strategies have also been provided included engineering drawings and commitments to maintain the local hydrology, and a tree re-planting plan that considers re-planting locally-provenanced trees within degraded areas of the Carrabungup Road reserve at a rate greater than three to one.

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

3.2. Assessment of impacts on environmental values

The assessment against the clearing principles (Appendix C) identified that the impacts of the proposed clearing present a potential risk to the biological values of significant fauna and flora, remnant vegetation and wetlands. 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. Environmental value: biological values (fauna) – Clearing Principle (b)

Assessment: Vegetation over the application area consists of scattered trees over an either a completely degraded (0.24 hectares or 52 per cent), or degraded understorey (0.23 hectares or 48 per cent) (Emerge 2021). To the south and west of the application area at a right-angle bend of Carrabungup Road, a CCW occurs (Figure 2). The CCW is known as Munginup Swamp (sumpland UFI-3108). A mapped South West Regional Ecological Linkage parallels the application area approximately 100 metres to the west. This linkage extends to the north and south of the application area and connects to other mapped linkages.

The application area consists of four species of native trees consisting of five Marri (*Corymbia calophylla*) trees, seven Flooded Gum (*Eucalyptus rudis*) trees, twelve Swamp Sheoak (*Casuarina obesa*) trees and nine Paperbark (*Melaleuca preissiana*) trees (with possible juvenile *Melaleuca raphiophylla*) (Appendix E5). Two vegetation communities have been mapped over the application area and adjacent areas by Emerge (2021) (Appendix E4); a low open woodland of *Corymbia calophylla* or *Casuarina obesa* (CcCo), and a low open woodland to forest of *Eucalyptus rudis*, *Melaleuca raphiophylla*, and *M. preissiana*. The areas mapped as completely degraded consist of isolated trees over exotic weeds and grasses. The areas mapped as degraded contain isolated trees with the occasional native species in the understorey.

The application area is located within the modelled distribution of three threatened black cockatoo species. Black cockatoo habitat can be considered in terms of breeding habitat, night-roosting habitat, and foraging habitat (Commonwealth of Australia 2017). 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 six kilometres of an impact area (DSEWPaC 2012), and up to 12 kilometres (Commonwealth of Australia 2017). Night-roosts are usually located in the tallest trees of an area, and in close proximity to both a food supply and surface water (DAWE 2020a; Le Roux 2017). Black cockatoos show some fidelity to night-roosts, however, not all night-roosts are used in every year (DPaW 2013; Le Roux 2017).

No black cockatoo breeding sites have been recorded within 12 kilometres of the application area. No night-roosts have been recorded within six kilometres of the application area (DBCA 2019), with 15 night-roosts recorded between six and 12 kilometres of the application area (Appendix F – Figure A), of which four have been active since 2015.

Of the four species of trees occurring, Marri and Flooded Gum have the capacity to form breeding hollows suitable for black cockatoos. The majority of trees are juvenile or saplings with none large enough, or considered likely to bear hollows suitable for use by black cockatoos (Emerge 2021) (Appendix E1; Appendix E3). Photography of the trees of the application area provided by the applicant, including those outside of the area assessed by Emerge (2021), indicate that no sizeable trees occur that are likely to provide breeding habitat or night-roosts for black cockatoos (Appendices E1 and E2).

In terms of foraging habitat, Flooded Gum, Swamp Sheoak, and the *Melaleuca* species present, are not a preferred foraging resource for black cockatoos (Bamford 2013; Groom 2011; Johnstone *et al.* 2013; Le Roux 2017). All three black cockatoo species will forage on Marri fruit, but in particular Baudin's Cockatoo (*Calyptorhynchus baudinii*) (DSEWPaC 2012) that is listed as Endangered under the BC Act and EPBC Act. Although the application is within the modelled distribution for Baudin's Cockatoo, the species is more commonly associated with Jarrah-Marri forests of the Jarrah Forest bioregion (JAH) approximately 23 kilometres to the east, as well as the Jarrah-Marri-Karri (*Eucalyptus diversicolor*) forests of the Warren bioregion (WAR) further south (Commonwealth of Australia 2017; DBCA 2017).

The quality of black cockatoo foraging habitat varies depending upon how black cockatoos utilise the habitat in that particular location. Approximately 10,500 hectares of native vegetation within 12 kilometres of the application area has been mapped as providing potential black cockatoo foraging habitat (Appendix F – Figure A). This is predominantly focussed on large tracts of native vegetation in, and surrounding, Yalgorup National Park located over ten kilometres to the west where the majority of roosts are located (Appendix F – Figure A).

The original application considered the removal of 22 Marri trees, however, after an on-site inspection a number of trees were identified that could be avoided, the majority of which were Marri trees. Seventeen Marri trees were identified for avoidance leaving five that required removal (Appendix E1; Appendix E5).

Given the size of the clearing in relation to its position in the landscape, and the location of known roost sites and mapped foraging habitat, it is unlikely that five individual marri trees within the application area represent an important foraging resource to support black cockatoo populations utilising known roosts (Emerge 2021) (Appendix E3).

The Shire has committed to replace native trees removed by planting appropriate species, that include Marri, within degraded areas of the Carrabungup Road reserve at a rate greater than three trees planted for each tree removed

(Shire of Murray 2021b) (Section 3.1). This will counterbalance the loss of the minor foraging resource of five Marri trees impacted by proposed clearing.

Twenty-nine shorebirds, and wetland-inhabiting birds of conservation significance have been recorded from the local area. This is predominantly due to the presence of Lake Mealup and Lake Mclarty three to five kilometres to the south west, and the Peel-Harvey Estuary to the north and west. Most of these species have been recorded within these areas, but not within four kilometres of the application area. However, these species may utilise the nearby Munginup Swamp (UFI-3108) within 27 metres of the application area on the opposite side of Carrabungup Road (Appendix F – Figure B, and Figure D).

The Shire has realigned Carrabungup Road in this area. The removal of three overstorey trees on the opposite side Carrabungup Road to Munginup Swamp (Figure 2) is unlikely to impact Munginup Swamp wetland function. A high density of tree canopy will remain to the south west within Carrabungup Road reserve retaining a treed buffer between Munginup Swamp and the realigned Carrabungup Road (Figure 2). The Carrabungup Road trajectory and design have been revised to avoid Munginup Swamp (Shire of Murray 2021a), and the existing hydrology will be maintained (Shire of Murray 2021b). A mapped South West Regional Ecological Linkage that parallels the application area will not be severed. With these strategies in place the hydrological function of Munginup Swamp will be maintained and indirect impacts to wading shorebirds or any other wetland-inhabiting species are unlikely.

The Critically Endangered Western Ringtail Possum (*Pseudocheirus occidentalis*) has only been recorded from the west of the Peel Harvey Estuary, approximately eight kilometres distant to the application area, and is unlikely to occur. The threatened Chuditch (*Dasyurus geoffroii*), Priority 4 Western Brush Wallaby (*Notamacropus Irma*) and Conservation Dependant Brush-tailed Phascogale (SW) (*Phascogale tapoatafa wambenger*) require large areas of contiguous native vegetation, and occur predominantly where feral predator control is being implemented (Burbidge and McKenzie 1989). They are unlikely to occur in the disjunct remnant vegetation surrounding the application area. The Priority 3 reptiles *Ctenotus ora* and *Lerista lineata* are largely restricted to coastal sandplains and are unlikely to be present in the habitats present over the application area.

The Priority 4 Quenda (*Isoodon fusciventer*) is known from within four kilometres of the application area. Quenda require a dense understorey for cover (van Dyck and Strahan 2008), including exotic species, and any dense vegetation within the application area, particularly in the vicinity of Munginup Swamp could potentially be utilised. Quenda may intermittently frequent the application area, particularly from adjacent Munginup Swamp, however, the application area itself does not contain significant habitat for Quenda. The removal of overstorey trees with a degraded understorey is unlikely to impact the species.

Emerge (2021) recorded 31 non-native flora species over, or immediately adjacent to, the application area (Appendix E3). Grass and herb weed cover was high, and two weed species listed as a declared pests (S-22) pursuant to the BAM Act were recorded; *Moraea flaccida* (Cape Tulip) and *Zantedeschia aethiopica* (Arum Lily). Adjacent areas are susceptible to weed invasion and dieback disease (*Phytophthora* spp.) which the clearing process may exacerbate.

Conclusion: For the reasons set out above, and the avoidance and mitigation measures provided by the Shire (Section 3.1), it is considered that potential impacts of the proposed clearing on fauna and adjacent fauna habitat can be managed by the proposed realignment of Carrabungup Road, planting of black cockatoo foraging species, and by implementing appropriate weed and dieback control.

Conditions: To address potential impacts to adjacent areas from proposed road upgrades, and potential weed and dieback encroachment, the following management measures will be required as conditions on the clearing permit:

- Implement weed and dieback management measures to mitigate impacts to adjacent vegetation.
- Re-plant degraded areas of the Carrabungup Road reserve with locally-provenanced tree species at a ratio of at least 3:1 that include species that provide foraging habitat for black cockatoos.

3.2.2. Environmental value: biological values (threatened flora) – Clearing Principle (c)

Assessment: To the south and west of the application area at a right-angle bend of Carrabungup Road, a CCW known as Munginup Swamp occurs within 27 metres of the application at its closest point (Figure 2).

A population of a threatened flora species occurs in association with Munginup Swamp (WAH 1998-). The species is listed as Vulnerable under the BC Act (WA), as well as the EPBC Act (Commonwealth).

A flora and vegetation survey was undertaken by Emerge (2021) over the application area as well as the immediate surrounds. The one threatened flora species above was recorded. No other threatened or priority flora species were recorded, or are considered likely to occur, due to a lack of suitable habitat or because they were not recorded during the field survey (Emerge 2021) (Appendix E3).

The threatened flora species recorded outside of the application area prefers moist locations such as low-lying depressions in peaty and sandy clay swamps, and often emerges from standing water (DEWHA 2008). At this

location, the Shire has realigned Carrabungup Road to avoid the CCW and the associated threatened flora population by incorporating the road alignment into adjacent tenure (Lot 737 on Deposited Plan 133073). The realigned road is approximately 12 metres from the closest individual of the threatened flora species, located on the opposite (south west) side of the road (Figure 2). Importantly the overstorey tree species of predominantly Flooded Gums on the western side of Carrabungup Road, associated with the CCW and the threatened flora species, will not be disturbed (Figure 2) due to the realignment.

The Shire have provided appropriate evidence of actions to avoid and minimise impacts to threatened flora (Shire of Murray 2021a; Shire of Murray 2021b), and no other significant flora is likely to occur within or in the vicinity of the application area. Emerge (2021) recorded 31 non-native flora species over, or immediately adjacent to, the application area (Appendix E3). Adjacent areas are susceptible to weed invasion and dieback disease which the clearing process may exacerbate.



Figure 2: Conservation category wetland and threatened flora in the vicinity of the application area

Conclusion: For the reasons set out above, and the avoidance and mitigation measures provided by the Shire (Section 3.1), it is considered that potential impacts of the proposed clearing on threatened flora and adjacent habitat can be managed by the proposed realignment of Carrabungup Road, appropriate road design and construction to avoid alteration to surface hydrology, and by implementing appropriate weed and dieback control.

Conditions: To address potential secondary impacts to a known threatened flora population from proposed road upgrades, the following management measure will be required as a condition on the clearing permit:

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

3.2.3. Environmental value: significant remnant vegetation– Clearing Principle (e)

Assessment: The national objectives and targets for biodiversity conservation in Australia has a target to prevent the clearance of ecological communities with an extent below 30 per cent of that present prior to the year 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 Bioregion, (SWA) as described by Thackway and Cresswell (1995), and the Perth sub-region (SWA02). The Swan Coastal Plain bioregion has approximately 579,814 hectares of native vegetation remaining, equating to approximately 38.6 per cent of its original extent (Government of Western Australia 2019) (Appendix B3).

Regional Swan Coastal Plain vegetation complex descriptions of Heddle *et al.*, (1980) as updated by Webb *et al.* (2016) have been mapped over the application area with two complexes occurring:

- The major component in the central and southern sections of the application area is mapped as the Southern River complex (42). That is, an open woodland of *Corymbia calophylla* (Marri)-*Eucalyptus marginata* (Jarrah) - *Banksia* species with fringing woodland of *Eucalyptus rudis* (Flooded Gum)-*Melaleuca raphiophylla* (Swamp Paperbark) along creek beds. The Southern River complex retains approximately 18.4 per cent of its original extent.
- A minor component in the northern section of the application area is mapped as the Vasse complex (57). That is, a mixture of the closed scrub of *Melaleuca* species fringing woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca* species and open forest of *Eucalyptus gomphocephala* (Tuart) - *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri). The Vasse complex retains approximately 31.4 per cent of its original extent.

Two vegetation communities and areas containing predominantly non-native species or isolated paddock trees were described over the application area during the flora and vegetation assessment of Emerge (2021).

- Approximately 0.07 hectares (or 32 per cent) of the application area consists of the vegetation community CcCo. That is, a low open woodland of *Corymbia calophylla* or *Casuarina obesa* over occasional *Xanthorrhoea preissii* over sedgeland of *Baumea juncea* and *Lepidosperma longitudinale* over forbland **Watsonia meriana*, **Asphodelus fistulosus*, **Stachys arvensis* and **Lythrum hyssopifolia* over grassland of **Ehrharta spp.*, **Eragrostis curvula*, **Lolium sp.* and **Paspalum dilatatum* or bare ground.
- Approximately 0.04 hectares (or 18 per cent) of the application area consists of the vegetation community ErM. That is, a low open woodland to forest of *Eucalyptus rudis*, *Melaleuca raphiophylla*, *M. preissiana* over occasional *M. teretifolia* over sedgeland of *Typha sp.* and *Bolboschoenus caldwellii* over forbland **Watsonia meriana*, **Zantedeschia aethiopica*, **Oxalis pescaprae*, **Lotus subbiflorus* and **Lythrum hyssopifolia* over grassland of **Cynodon dactylon* and **Paspalum dilatatum* or bare ground.
- Approximately 0.11 hectares (or 50 per cent) of the application area consists of heavily disturbed areas and/or isolated native trees over exotic pasture grasses.

Remnant vegetation has been mapped regionally, and within the local area of a 10 kilometre radius of the application area. Approximately 5,675 hectares of mapped native vegetation remains, or approximately 24.5 per cent of its original extent (Appendix B3; Appendix F – Figure C).

The two vegetation communities described and mapped by Emerge (2021) contain structural components of both the Southern River complex and the Vasse complex. Their condition is either completely degraded (0.11 hectares, or 50 per cent of the application area) or degraded (0.11 hectares, or 50 per cent of the application area) according to the condition scale of Keighery (1994) (Appendix D).

The Vasse complex exceeds the 30 per cent retention threshold of the Commonwealth of Australia (2001) (Government of Western Australia 2019), and the Southern River complex falls below the 30 per cent retention threshold (Government of Western Australia 2019). Due to the mapped condition, the vegetation within the application area is not representative of the mapped vegetation complexes, nor is it considered significant as a remnant.

The 33 native trees proposed to be removed will be replaced by the Shire by planting appropriate species within degraded areas of the Carrabungup Road reserve at a rate greater than three trees planted for each tree removed, with the Shire committing to planting at least 110 native trees (Shire of Murray 2021b). Appropriate species are *Eucalyptus rudis*, *Corymbia calophylla*, *Casuarina obesa*, and *Melaleuca preissiana/raphiophylla*.

Emerge (2021) recorded 31 non-native flora species over, or immediately adjacent to, the application area. Adjacent native vegetation is susceptible to weed invasion and dieback disease which the clearing process may exacerbate, thereby reducing the condition of adjacent remnant vegetation.

Conclusion: For the reasons set out above, and the avoidance and mitigation measures provided by the Shire (Section 3.1), it is considered that potential impacts of the proposed clearing on remnant vegetation can be managed by implementing appropriate weed and dieback control, and the planting of appropriate species within the Carrabungup Road reserve.

Conditions: To address potential impacts to adjacent remnant vegetation from proposed road upgrades, and potential weed encroachment, the following management measures will be required as conditions on the clearing permit.

- Implement weed and dieback management measures to mitigate impacts to adjacent vegetation.
- Re-plant degraded sections of the Carrabungup Road reserve with locally-provenanced tree species at a ratio of at least 3:1.

3.2.4. Environmental value: wetlands and water resources – Clearing Principles (f) and (i)

Assessment: Wetlands listed under the Ramsar convention and within the Directory of Important Wetlands in Australia occur within the local area (Appendix B), including the Peel-Harvey Estuary and the Lake McLarty System. No drainage lines or watercourses intersect the application area. However, the entire application area is located within a mapped geomorphic wetland of the Swan Coastal Plain. That is, a multiple use wetland; Palusplain (UFI 15227) (Appendix F – Figure D).

A palusplain is simply a flat that is seasonally water-logged (Semeniuk and Semeniuk 2004). Multiple use wetlands are considered wetlands with few remaining important attributes and functions (EPA 2004; EPA 2008; Water and Rivers Commission 2001). The management objective should be to take all reasonable measures to retain the wetland's hydrological function (EPA 2008), but is not incompatible with clearing.

Proposed clearing is also located within 27 metres of a CCW, known as Munginup Swamp (UFI-3108), which occurs to the south west of the application area on the opposite side of Carrabungup Road (Figure 2). The presence of the CCW indicates the mapped area is considered to possess high conservation value (EPA 2008), and has likely been classified as such as it is part of a larger wetland. All vegetated areas of wetlands over 70 hectares on the Swan Coastal Plain have been classified as conservation category (EPA 2008). CCWs are those that support a high level of attributes and functions. These are the most valuable of wetlands and any activity that may lead to further loss or degradation is inappropriate. No development or clearing is considered appropriate.

Clearing of vegetation within 50 metres of a CCW is not consistent with EPA Guidance Statement No.33 (Chapter B4) (EPA 2008). The Department of Biodiversity, Conservation, and Attractions (DBCA) have advised that the existing hydrological function is vital to the long-term health of the Munginup Swamp, and its supporting vegetation communities (DBCA 2021) including a population of threatened flora (Section 3.2.2).

A drain currently parallels Carrabungup Road on the south west side immediately adjacent to the CCW. The Shire have realigned Carrabungup Road to avoid the CCW and the existing drain, and to maintain the existing hydrological function of Munginup Swamp (Shire of Murray 2021b). Road construction will increase the super-elevation of the Carrabungup Road radius, with drainage reporting to the inside of the curve. That is, to the east and opposite side to the threatened flora population and associated Munginup Swamp (Figure 3) (Shire of Murray 2021b).

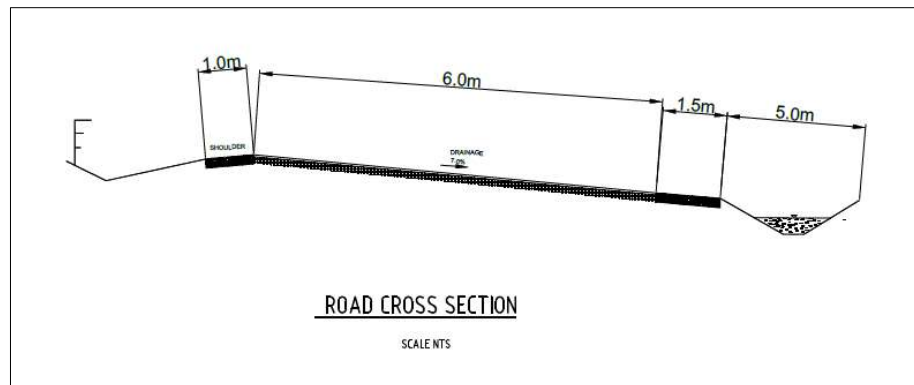


Figure 3: Screen shot of relevant engineering plan showing the cross-section for Carrabungup Road in the vicinity of Munginup Swamp (Shire of Murray 2021b)

Vegetation proposed to be cleared includes species considered riparian such as *Eucalyptus rudis* (Flooded Gum) and *Melaleuca* species (Appendix B1). The proposed clearing will impact riparian vegetation that is growing in, or in association with, an environment associated with a wetland. However, considering the size and completely degraded to degraded condition of the vegetation within the application area, the impact on environmental values is considered minor.

The 33 native trees proposed to be removed will be replaced by the Shire by planting appropriate species within degraded areas of the Carrabungup Road reserve at a rate greater than three trees planted for each tree removed. The Shire has committed to planting 110 native trees (Shire of Murray 2021b) that will include the riparian species *Eucalyptus rudis*, and *Melaleuca preissiana/rhaphiophylla*.

Emerge (2021) recorded 31 non-native flora species over, or immediately adjacent to, the application area. Riparian vegetation in the vicinity of the proposed clearing is susceptible to weed invasion and dieback disease which the clearing process may exacerbate.

Conclusion: For the reasons set out above, and the avoidance and mitigation measures provided by the Shire (Section 3.1), it is considered that potential impacts of the proposed clearing on wetland habitat can be managed by the proposed realignment of Carrabungup Road, planting a section of Carrabungup Road within a mapped multiple use or resource enhancement wetland with appropriate native riparian species including *Eucalyptus rudis* and *Melaleuca preissiana/rhaphiophylla*, and by implementing appropriate weed and dieback control.

Conditions: To address potential impacts to wetland habitat from proposed road upgrades, and potential weed encroachment, the following management measures will be required as conditions on the clearing permit.

- Implement weed and dieback management measures to mitigate impacts to adjacent areas.
- Re-plant a degraded section of the Carrabungup Road reserve within a mapped multiple use or resource enhancement wetland with locally-provenanced tree species including riparian species at a ratio of greater than 3:1.

3.3. Relevant planning instruments and other matters

Clearing Permit application CPS 9370/1 was advertised on the DWER website for a 14 day public comment period on 6 August 2021. No public submissions were received in relation to this application.

The Shire have revised the alignment of the Carrabungup Road upgrade to that associated with an earlier clearing permit (CPS 9117/1) that has now been applied to be surrendered by the Shire (Shire of Murray 2021d), and therefore no longer valid.

The Shire is the public authority that manages Carrabungup Road reserve (PINs 1369197, 1369187 and 1369188). A portion of the revised Carrabungup Road alignment that avoids a population of threatened flora and a CCW enters and exits adjacent tenure; Lot 737 on Deposited Plan 133073 (Lot 737) (Figure 1; Figure 2). The Shire have received authorisation to enter Lot 737 for the clearing purpose from the landowner (Shire of Murray 2021a), and have entered into a deed agreement with the landowner for the acquisition of land for road widening purposes (Shire of Murray 2021a).

The Carrabungup Road reserve is zoned a local road, and Lot 737 is zoned Rural along with other lands adjacent to Carrabungup Road reserve. The clearing purpose is consistent with the Shire of Murray Town Planning Scheme No. 4 (Shire of Murray 2021b).

The application area is located within the Murray Groundwater Area proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act). It is not located within any Surface Water Areas or Irrigation Districts proclaimed under the RIWI Act, or any *Country Areas Water Supply Act 1947* (CAWS Act) Clearing Control Catchments, or Public Drinking Water Source Areas. Groundwater will not be intercepted, the beds or banks of any watercourses will not be disturbed, and no other permitting by DWER is required.

A Registered Native Title Claim encompasses the application area. That is, Gnaala Karla Booja (WAD6274/1998), and the associated Gnaala Karla Booja Indigenous Land Use Agreement (ILUA) (WI2015/005). A Native Title Claim has also been filed that encompasses the application area. That is, the Single Noongar Claim - Area 1 (WAD6006/2003).

Spatial data indicates that no Registered Aboriginal Heritage sites listed in accordance with section 5 of the *Aboriginal Heritage Act 1972* (WA) occur within the proposed clearing area. Place ID 32696 (Djilba) is located approximately 750 metres to the north of 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.

Appendix A – Additional information provided by applicant

Information	Description
Application (Shire of Murray 2021a)	Native Vegetation Clearing Application CPS 9370/1, including representative photographs of the application area (Appendix E1).
Additional information regarding avoidance and minimisation measures (Shire of Murray 2021b)	Reduction, avoidance and minimisation information including road design, drainage, and planting within the Carrabungup Road reserve. This information was included in the consideration of avoidance and minimisation measures (Section 3.1) and within the assessment of environmental impacts (Section 3.2 and Appendix C).
Additional information regarding avoidance and minimisation measures (Shire of Murray 2021c)	Reduction of the number of individual trees required for clearing, from 55 to 33. Shapefiles and commitment to replant at least 110 native trees within the Carrabungup Road reserve.
Flora and Vegetation Assessment (Emerge 2021)	Detailed Flora and Vegetation Assessment Carrabungup Road, Nirimba (IBSA-2021-0038). Excerpts in Appendix B2, Appendix E2, and Appendix E3

Appendix B – 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.

B.1 Site characteristics

Site characteristic	Details																								
Local context	<p>The application area is located within the Swan Coastal Plain IBRA Bioregion, (SWA) of Thackway and Cresswell (1995) and the Perth sub-region (SWA02).</p> <p>The proposed clearing is of native trees within the Carrabungup Road reserve and the adjacent Lot 737 on Deposited Plan 133073, Nirimba, within the Shire of Murray, and approximately 70 kilometres south of Perth.</p>																								
Vegetation description (Regional)	<p>Hedde <i>et al.</i>, (1980) as updated by Webb <i>et al.</i> (2016) produced regional vegetation mapping of complexes over the Swan Coastal Plain. Two complexes have been mapped over the application area:</p> <p>Central and Southern sections (Major – 28 trees)</p> <ul style="list-style-type: none"> Southern River complex (42): Open woodland of <i>Corymbia calophylla</i> (Marri) - <i>Eucalyptus marginata</i> (Jarrah) - Banksia species with fringing woodland of <i>Eucalyptus rudis</i> (Flooded Gum) - <i>Melaleuca raphiophylla</i> (Swamp Paperbark) along creek beds. <p>Northern section (Minor – 5 trees)</p> <ul style="list-style-type: none"> Vasse complex (57): Mixture of the closed scrub of Melaleuca species fringing woodland of <i>Eucalyptus rudis</i> (Flooded Gum) - Melaleuca species and open forest of <i>Eucalyptus gomphocephala</i> (Tuart) - <i>Eucalyptus marginata</i> (Jarrah) - <i>Corymbia calophylla</i> (Marri). 																								
Vegetation description (application area)	<p>Trees of the application consist of the species below.</p> <table border="1"> <thead> <tr> <th>Species</th> <th>CPS 9370/1 Application</th> <th>CPS 9370/1 Revision</th> <th>Avoided</th> </tr> </thead> <tbody> <tr> <td><i>Corymbia calophylla</i></td> <td>22</td> <td>5</td> <td>17</td> </tr> <tr> <td><i>Eucalyptus rudis</i></td> <td>8</td> <td>7</td> <td>1</td> </tr> <tr> <td><i>Casuarina obesa</i></td> <td>13</td> <td>12</td> <td>1</td> </tr> <tr> <td><i>Melaleuca preissiana</i></td> <td>12</td> <td>9</td> <td>3</td> </tr> <tr> <td>Total</td> <td>55</td> <td>33</td> <td>22</td> </tr> </tbody> </table> <p>Emerge (2021) describe three areas as occurring over the application area:</p> <ul style="list-style-type: none"> 0: Heavily disturbed areas comprising gravel road, non-native trees over weeds or bare ground CcCo: Low open woodland of <i>Corymbia calophylla</i> or <i>Casuarina obesa</i> over occasional <i>Xanthorrhoea preissii</i> over sedgeland of <i>Baumea juncea</i> and <i>Lepidosperma longitudinale</i> over forbland <i>*Watsonia meriana</i>, <i>*Asphodelus fistulosus</i>, <i>*Stachys arvensis</i> and <i>*Lythrum hyssopifolia</i> over grassland of <i>*Ehrharta</i> spp., <i>*Eragrostis curvula</i>, <i>*Lolium</i> sp. and <i>*Paspalum dilatatum</i> or bare ground ErM: Low open woodland to forest of <i>Eucalyptus rudis</i>, <i>Melaleuca raphiophylla</i>, <i>M. preissiana</i> over occasional <i>M. teretifolia</i> over sedgeland of <i>Typha</i> sp. and <i>Bolboschoenus caldwellii</i> over forbland <i>*Watsonia meriana</i>, <i>*Zantedeschia aethiopica</i>, <i>*Oxalis pes-caprae</i>, <i>*Lotus subbiflorus</i> and <i>*Lythrum hyssopifolia</i> over grassland of <i>*Cynodon dactylon</i> and <i>*Paspalum dilatatum</i> or bare ground. 	Species	CPS 9370/1 Application	CPS 9370/1 Revision	Avoided	<i>Corymbia calophylla</i>	22	5	17	<i>Eucalyptus rudis</i>	8	7	1	<i>Casuarina obesa</i>	13	12	1	<i>Melaleuca preissiana</i>	12	9	3	Total	55	33	22
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Vegetation condition	<p>The trees over the application area are located in either completely degraded or degraded areas utilising the data of Emerge (2021) and condition rankings of Keighery (1994) (Appendix D).</p> <table border="1"> <thead> <tr> <th data-bbox="431 730 899 783">Vegetation condition</th> <th data-bbox="899 730 997 783">Area (ha)</th> <th data-bbox="997 730 1127 783">Per cent</th> </tr> </thead> <tbody> <tr> <td data-bbox="431 783 899 852">Completely degraded / Isolated Trees</td> <td data-bbox="899 783 997 852">0.11</td> <td data-bbox="997 783 1127 852">50%</td> </tr> <tr> <td data-bbox="431 852 899 884">Degraded</td> <td data-bbox="899 852 997 884">0.11</td> <td data-bbox="997 852 1127 884">50%</td> </tr> </tbody> </table>					Vegetation condition	Area (ha)	Per cent	Completely degraded / Isolated Trees	0.11	50%	Degraded	0.11	50%																														
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Degraded	0.11	50%																																										
Soil description	<p>The soil types have been mapped over the application area.</p> <p>North: Pinjarra P2 Phase (213Pj_P2)</p> <ul style="list-style-type: none"> Flat to very gently undulating plain with deep alkaline mottled yellow duplex soils which generally consist of shallow pale sand to sandy loam over clay. <p>Central and south: Bassendean B4 Phase (212Bs_B4)</p> <ul style="list-style-type: none"> Broad poorly drained sandplain with deep grey siliceous sands or bleached sands, underlain at depths generally greater than 1.5 m by clay or less frequently a strong iron-organic hardpan. <p>South – East: Bassendean B3 Phase (212Bs_B3)</p> <ul style="list-style-type: none"> Closed depressions and poorly defined stream channels with moderately deep, poorly to very poorly drained bleached sands with an iron-organic pan, or clay subsoil. Surfaces are dark grey sand or sandy loam. 																																											
Land degradation risk	<p>Land degradation risk for the Pinjarra (North) and Bassendean (Central and south) Systems is summarised in the table below (DPIRD 2017), and is expressed as the percentage of the mapped unit having a high to extreme risk.</p> <table border="1"> <thead> <tr> <th data-bbox="431 1419 651 1524" rowspan="2">Aspect</th> <th colspan="4" data-bbox="651 1419 1179 1461">Risk</th> </tr> <tr> <th colspan="2" data-bbox="651 1461 899 1524">Central and south (Bassendean)</th> <th colspan="2" data-bbox="899 1461 1179 1524">North (Pinjarra)</th> </tr> </thead> <tbody> <tr> <td data-bbox="431 1524 651 1556">Wind erosion</td> <td data-bbox="651 1524 792 1556">M1</td> <td data-bbox="792 1524 899 1556">10-30%</td> <td data-bbox="899 1524 997 1556">L2</td> <td data-bbox="997 1524 1179 1556">3-10%</td> </tr> <tr> <td data-bbox="431 1556 651 1587">Water Erosion</td> <td data-bbox="651 1556 792 1587">L1</td> <td data-bbox="792 1556 899 1587"><3%</td> <td data-bbox="899 1556 997 1587">L1</td> <td data-bbox="997 1556 1179 1587"><3%</td> </tr> <tr> <td data-bbox="431 1587 651 1619">Salinity risk</td> <td data-bbox="651 1587 792 1619">L2</td> <td data-bbox="792 1587 899 1619">3-10%</td> <td data-bbox="899 1587 997 1619">M2</td> <td data-bbox="997 1587 1179 1619">30-50%</td> </tr> <tr> <td data-bbox="431 1619 651 1650">Phosphorus export</td> <td data-bbox="651 1619 792 1650">H2</td> <td data-bbox="792 1619 899 1650">>70%</td> <td data-bbox="899 1619 997 1650">L1</td> <td data-bbox="997 1619 1179 1650"><3%</td> </tr> <tr> <td data-bbox="431 1650 651 1682">Waterlogging</td> <td data-bbox="651 1650 792 1682">H2</td> <td data-bbox="792 1650 899 1682">>70%</td> <td data-bbox="899 1650 997 1682">H2</td> <td data-bbox="997 1650 1179 1682">>70%</td> </tr> <tr> <td data-bbox="431 1682 651 1734">Flooding</td> <td data-bbox="651 1682 792 1734">L2</td> <td data-bbox="792 1682 899 1734">3-10%</td> <td data-bbox="899 1682 997 1734">L2</td> <td data-bbox="997 1682 1179 1734">3-10%</td> </tr> </tbody> </table> <p>L = Low M = Medium H = High</p> <p>Acid sulphate soil risk is rated at moderate to low risk over the application area.</p>					Aspect	Risk				Central and south (Bassendean)		North (Pinjarra)		Wind erosion	M1	10-30%	L2	3-10%	Water Erosion	L1	<3%	L1	<3%	Salinity risk	L2	3-10%	M2	30-50%	Phosphorus export	H2	>70%	L1	<3%	Waterlogging	H2	>70%	H2	>70%	Flooding	L2	3-10%	L2	3-10%
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Site characteristic	Details
Waterbodies	<p>Proposed clearing is:</p> <ul style="list-style-type: none"> • Within a Geomorphic Wetland of the Swan Coastal Plain: <ul style="list-style-type: none"> ○ Multiple use wetland – Palusplain (UFI 15227) • Within 27 metres of a Geomorphic Wetland of the Swan Coastal Plain: <ul style="list-style-type: none"> ○ Conservation category wetland (CCW) – Sumpland (UFI-3108) - Munginup Swamp. <p>Within the local area:</p> <ul style="list-style-type: none"> • The Peel-Yalgorup System (Ref 36) is a Ramsar listed wetland system that has been mapped regionally within 750 metres to the north of the application area. • The Peel-Harvey Estuary (WA087) is a wetland system listed within the Directory of Important Wetlands in Australia mapped regionally within 250 metres to the north of the application area. • The Lake McLarty System (WA083) is a wetland system listed within the Directory of Important Wetlands in Australia mapped regionally within 725 metres to the west of the application area.
Hydrogeography	<p>The application area:</p> <ul style="list-style-type: none"> • Is located within the Murray Groundwater Area proclaimed under the RIWI Act; • Is <u>not</u> located within any Surface Water Areas or Irrigation Districts proclaimed under the RIWI Act; • Is <u>not</u> located within any CAWS Act Clearing Control Catchments; and • Is <u>not</u> located within any Public Drinking Water Source Areas. <p>Groundwater has been mapped at 500-1,000 TDS/Mg/L (that is, fresh)</p>
Conservation areas	<p>The Application Area does not intersect with any DBCA managed lands. DBCA lands of interest (PIN 445384) are located within 250 metres to the west of the application area (in the northern section), with Austin Bay Nature Reserve vested in the Conservation and Parks Commission located approximately 750 metres to the north.</p>
Climate and Landform	<p>The south west of Western Australia experiences a Mediterranean climate of hot dry summers and cool wet winters, and the proposed clearing area is situated within the 'Temperate – distinctly dry and warm summer' Köppen climate class (Commonwealth of Australia 2005). An average of 680.6 millimetres (mm) of rainfall is recorded annually from the Pinjarra South weather station.</p> <p>The site occurs on the Swan Coastal Plain, which is the geomorphic unit that characterises much of the Perth metropolitan area. The site is not known to contain any restricted landforms or unique geological features.</p>

B.2 Ecosystem, flora and fauna analysis

With consideration for the site characteristics set out above, relevant datasets (Appendix G2), the following conservation significant ecological communities, flora and fauna species may be impacted by the clearing.

Eight ecological communities of conservation significance have been mapped within ten kilometres of the application area. The Priority 3 Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region has been mapped within 20 metres of a portion of the application area in the vicinity of the right angle bend and Munginup Swamp (UFI-3108). Banksia species do not occur in the application area and the vegetation is not representative of the Priority 3 Banksia Dominated Woodlands of the Swan Coastal Plain, or any other TEC or PEC (Emerge 2021) (Appendix E3).

ID	Ecological Community (Common Name)	WA Status	Comm. Status
SCP3a	<i>Corymbia calophylla</i> - <i>Kingia australis</i> woodlands on heavy soils, Swan Coastal Plain (floristic community type 3a as originally described in Gibson <i>et al.</i> (1994))	CR	EN
SCP10a	Shrublands on dry clay flats (floristic community type 10a as originally described in Gibson <i>et al.</i> (1994))	EN	CR
SCP3b	<i>Corymbia calophylla</i> - <i>Eucalyptus marginata</i> woodlands on sandy clay soils of the southern Swan Coastal Plain (floristic community type 3b as originally described in Gibson <i>et al.</i> (1994))	VU	
SCP15	Forests and woodlands of deep seasonal wetlands of the Swan Coastal Plain (floristic community type 15 as originally described in Gibson <i>et al.</i> (1994))	VU	
SCP07	Herb rich saline shrublands in clay pans (floristic community type 7 as originally described in Gibson <i>et al.</i> (1994))	VU	CR
Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	P3	EN
Coastal Saltmarsh	Subtropical and Temperate Coastal Saltmarsh	P3	VU
Tuart woodlands	Tuart (<i>Eucalyptus gomphocephala</i>) woodlands and forests of the Swan Coastal Plain	P3	CR

Likelihood of occurrence table (TECs PECs) (Emerge 2021)

emerge ASSOCIATES		Conservation Significant Communities Likelihood of Occurrence Carabungup Road, Nirimba				Page 1	
Code	Community name	TEC/PEC	Level of significance		Likelihood of occurrence		
			WA	EPBC Act	Prior to survey	Post survey	
SCP10a	Shrublands on dry clay flats (floristic community type 10a as originally described in Gibson <i>et al.</i> (1994))	TEC	EN	CR	Possible	Unlikley	
Tuart woodlands	Tuart (<i>Eucalyptus gomphocephala</i>) woodlands and forests of the Swan Coastal Plain	TEC/PEC	P3	CR	Possible	Unlikley	
SCP07	Herb rich saline shrublands in clay pans (floristic community type 7 as originally described in Gibson <i>et al.</i> (1994))	TEC	VU	CR	Possible	Unlikley	
SCP3a	<i>Corymbia calophylla</i> - <i>Kingia australis</i> woodlands on heavy soils, Swan Coastal Plain (floristic community type 3a as originally described in Gibson <i>et al.</i> (1994))	TEC	CR	EN	Unlikley	Unlikley	
SCP3c	<i>Corymbia calophylla</i> - <i>Xanthorrhoea preissii</i> woodlands and shrublands, Swan Coastal Plain (floristic community type 3c as originally described in Gibson <i>et al.</i> (1994))	TEC	CR	EN	Unlikley	Unlikley	
Clifton-microbialite	Stromatolite like freshwater microbialite community of coastal brackish lakes (Lake Clifton)	TEC	CR		Unlikley	Unlikley	
SCP15	Forests and woodlands of deep seasonal wetlands of the Swan Coastal Plain (floristic)	TEC	VU		Possible	Unlikley	
Coastal Saltmarsh	Subtropical and Temperate Coastal Saltmarsh	TEC/PEC	P3	VU	Unlikley	Unlikley	
Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	PEC	P3	EN	Unlikley	Unlikley	
SCP25	Southern <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> woodlands	PEC	P3		Possible	Unlikley	
Note: TEC=threatened ecological community, PEC=priority ecological community, CR=critically endangered, EN=endangered, VU=vulnerable, P3=priority 3, P4=priority 4							

Nine threatened flora taxa have been identified from within ten kilometres of the application area (Table below).

Taxon	Status (WA)	No. of Records	Closest Distance (km)
<i>Caladenia huegelii</i>	CR	8	7.3
<i>Drakaea elastica</i>	CR	5	2.7
<i>Synaphea</i> sp. Fairbridge Farm (D. Papenfus 696)	CR	4	9.7
<i>Synaphea stenoloba</i>	CR	5	1.4
<i>Diuris purdiei</i>	EN	8	6.5
<i>Drakaea micrantha</i>	EN	1	7.4
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	EN	2	9.7
<i>Diuris drummondii</i>	VU	4	0.02
<i>Diuris micrantha</i>	VU	1	8.9

Thirty-one priority flora taxa have been identified from within ten kilometres of the application area (Table below).

Taxon	Status (WA)	No. of Records	Closest Distance (km)
<i>Grevillea bipinnatifida</i> subsp. <i>pagna</i>	P1	1	9.9
<i>Acacia benthamii</i>	P2	2	2.8
<i>Caladenia swartziorum</i>	P2	1	8.2
<i>Craspedia</i> sp. <i>Waterloo</i> (G.J. Keighery 13724)	P2	1	5.9
<i>Eryngium pinnatifidum</i> subsp. <i>Umbraphilum</i> (G.J. Keighery 13967)	P2	2	2.8
<i>Grevillea manglesii</i> subsp. <i>ornithopoda</i>	P2	2	7.5
<i>Phyllangium palustre</i>	P2	3	2.7
<i>Amanita drummondii</i>	P3	1	8.6
<i>Blennospora doliiformis</i>	P3	6	5.3
<i>Chamaescilla gibsonii</i>	P3	3	3.8
<i>Dillwynia dillwynioides</i>	P3	26	4.2
<i>Eryngium pinnatifidum</i> subsp. <i>Palustre</i> (G.J. Keighery 13459)	P3	1	3.4
<i>Eryngium</i> sp. <i>Ferox</i> (G.J. Keighery 16034)	P3	2	6.6
<i>Eryngium</i> sp. <i>Subdecumbens</i> (G.J. Keighery 5390)	P3	1	9.9
<i>Hemigenia microphylla</i>	P3	2	3.8
<i>Jacksonia gracillima</i>	P3	1	9.4
<i>Meionectes tenuifolia</i>	P3	2	2.7
<i>Myriophyllum echinatum</i>	P3	3	2.6
<i>Schoenus</i> sp. <i>Waroona</i> (G.J. Keighery 12235)	P3	2	3.8
<i>Sphaerolobium calcicola</i>	P3	1	4.7
<i>Stylidium paludicola</i>	P3	3	8.6
<i>Acacia semitrullata</i>	P4	1	7.8
<i>Caladenia speciosa</i>	P4	2	7.6
<i>Conostylis pauciflora</i> subsp. <i>pauciflora</i>	P4	5	5.1
<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>	P4	1	8.4
<i>Ornduffia submersa</i>	P4	6	2.6
<i>Rumex drummondii</i>	P4	4	2.7
<i>Schoenus natans</i>	P4	3	5.3
<i>Stylidium longitubum</i>	P4	5	5.5
<i>Tripterococcus</i> sp. <i>Brachylobus</i> (A.S. George 14234)	P4	3	5.1
<i>Trithuria australis</i>	P4	2	5.6

Likelihood of occurrence table (Significant flora) (Emerge 2021)

Species name		Level of significance		Life strategy	Habitat	Flowering period	Likelihood of occurrence (Prior to survey)	Likelihood of occurrence (Post survey)
		WA	EPBC Act					
<i>Diuris micrantha</i>		VU	V	PG	Dark grey-black sandy clay-loam in winter wet depressions or swamps. Often in shallow standing water.	Aug/Sep-early Oct	Possible	Unlikely
<i>Diuris drummondii</i>		VU	V	PG	In low-lying depressions in peaty and sandy clay swamps.	Nov-Jan	Likely	Recorded
<i>Drakaea micrantha</i>		EN	V	PG	Open sandy patches often adjacent to winter-wet swamps.	Sept- early Oct	Unlikely	Unlikely
<i>Eleocharis keigheryi</i>		VU	V	P	Clay or sandy loam in freshwater creeks and transient waterbodies such as seasonally wet clay pans.	Aug-Dec	Unlikely	Unlikely
<i>Eucalyptus argutifolia</i>		VU	V	P	Shallow soils over limestone. Slopes or gullies of limestone ridges, outcrops	Mar-Apr	Unlikely	Unlikely
<i>Caladenia huegelii</i>		CR	E	PG	Well-drained, deep sandy soils in lush undergrowth in a variety of moisture levels.	Sep-early Nov	Possible	Unlikely
<i>Diuris purdiei</i>		EN	E	PG	Sand to sandy clay soils in areas subject to winter inundation.	late September to mid-October, but only after a summer or early autumn fire (Brown et al., 1998)	Possible	Unlikely
<i>Andersonia gracilis</i>		VU	E	P	Seasonally damp, black sandy clay flats near or on the margins of swamps.	Sep-Nov	Unlikely	Unlikely
<i>Drakaea elastica</i>		CR	E	PG	Bare patches of sand within otherwise dense vegetation in low-lying areas alongside winter-wet swamps. Typically in banksia woodland or thickets of <i>Kunzea glabrescens</i> .	late Sep-Oct/Nov, survey Jul-Aug	Unlikely	Unlikely
<i>Synaphea stenoloba</i>		CR	E	P	Swampy loam in depressions that are occasionally inundated.	Aug but mainly Sep-Oct	Unlikely	Unlikely

	WA	EPBC Act				(Prior to survey)	(Post survey)
<i>Synaphea sp. Pinjarra Plain (A.S. George 17182)</i>	EN	CR	P	White grey clayey sand on edges of seasonally inundated low lying areas.	Sep-Oct	Possible	Unlikely
<i>Synaphea sp. Serpentine (G.R. Brand 103)</i>	CR	CR	P	Seasonally damp areas, loam - sand.	Sep-Oct	Possible	Unlikely
<i>Synaphea sp. Fairbridge Farm (D. Papenfus 696)</i>	CR	CR	P	Low woodland on grey, clayey sand with lateritic pebbles (Pinjarra Plain) near winter wet flats.	Sep-Nov	Unlikely	Unlikely
<i>Grevillea bipinnatifida subsp. pagna</i>	P1	-	P	Grey sandy clay and loam, ironstone. Seasonal wetlands, swamps, roadsides.	Aug or Oct-Nov	Possible	Unlikely
<i>Caladenia swartziorum</i>	P2	-	PG	Winter-wet creeklines and plains (limited information)	Oct	Possible	Unlikely
<i>Cardamine paucijuga</i>	P2	-	A	Winter wet areas, sand or clay	Sep-Oct	Possible	Unlikely
<i>Eryngium pinnatifidum subsp. Umbraphilum (G.J. Keighery 13967)</i>	P2	-	A/P	Winter wet, clay, sand or limestone soils.	Oct-Nov	Possible	Unlikely
<i>Trithuria australis</i>	P2	-	A	Seasonally wet areas. Edge of wetlands. Grey clay, clay over sand. Sand over laterite.	Oct-Nov	Possible	Unlikely
<i>Chamaescilla gibsonii</i>	P3	-	P	Clay to sandy clay in winter-wet flats, shallow water-filled claypans.	Sep	Possible	Unlikely
<i>Dillwynia dillwynioides</i>	P3	-	P	Winter wet depressions on sandy soils	Aug - Dec	Possible	Unlikely
<i>Eryngium pinnatifidum subsp. Palustre (G.J. Keighery 13459)</i>	P3	-	P	Grey brown sand or clay in winter wet flats.	Sep-Nov	Possible	Unlikely
<i>Hemigenia microphylla</i>	P3	-	P	Sandy clay, peaty clay, granite. Winter-wet depressions.	Sep-Dec	Possible	Unlikely
<i>Jacksonia gracillima</i>	P3	-	P	Sand, often adjacent to winter wet areas	Sep-Dec	Possible	Unlikely
<i>Schoenus sp. Waroona (G.J. Keighery 12235)</i>	P3	-	A	Clay or sandy clay. Winter-wet flats.	Oct-Nov	Possible	Unlikely
<i>Acacia semitrullata</i>	P4	-	P	White/grey sand, sometimes over laterite, clay sometimes in sandplains, swampy areas.	May-Oct	Possible	Unlikely
<i>Rumex drummondii</i>	P4	-	P	Winter-wet disturbed areas.	Aug-Nov	Possible	Unlikely
<i>Acacia benthamii</i>	P2	-	P	Sand, typically on limestone breakaways	Aug - Sept	Unlikely	Unlikely
<i>Blennospora doliformis</i>	P3	-	A	Grey or red clay soils over ironstone. Seasonally-wet flats.	Oct-Nov	Unlikely	Unlikely

	WA	EPBC Act				(Prior to survey)	(Post survey)
<i>Tripterococcus</i> sp. <i>Brachylobus</i> (A.S. George 14234)	P4	-	P	Winter-wet areas on grey sand.	Oct-Feb	Possible	Unlikely
<i>Conostylis pauciflora</i> subsp. <i>pauciflora</i>	P4	-	P	Grey sand, limestone. Hillslopes, consolidated dunes.	Aug-Oct	Unlikely	Unlikely
<i>Craspedia</i> sp. <i>Waterloo</i> (G.J. Keighery 13724)	P2	-	P	Winter wet flats with clay and sandy clay in wandoo woodland.	Aug-Sep	Unlikely	Unlikely
<i>Eryngium</i> sp. <i>Ferox</i> (G.J. Keighery 16034)	P3	-	P	Winter wet flats on clay	Oct-Mar	Unlikely	Unlikely
<i>Eryngium</i> sp. <i>Subdecumbens</i> (G.J. Keighery 5390)	P3	-	A	Clay in seasonal wetlands.	Sep-Nov	Unlikely	Unlikely
<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>	P4	-	P	Loam on flats and hillsides.	Jul-Sep	Unlikely	Unlikely
<i>Grevillea manglesii</i> subsp. <i>ornithopoda</i>	P2	-	P	Red-brown loam over clay	Sep-Nov	Unlikely	Unlikely
<i>Meionectes tenuifolia</i>	P3	-	P	Clay loam in seasonally wet areas.	Oct-Dec	Unlikely	Unlikely
<i>Myriophyllum echinatum</i>	P3	-	A	Clay in winter-wet flats.	Nov	Unlikely	Unlikely
<i>Ornduffia submersa</i>	P4	-	A	Sandy clay in inundated wetland/creek.	Aug-Nov	Unlikely	Unlikely
<i>Phyllangium palustre</i>	P2	-	A	Winter-wet claypans, low-lying seasonal wetlands on clay	Oct-Nov	Unlikely	Unlikely
<i>Schoenus natans</i>	P4	-	A	Aquatic, in winter-wet depressions.	Oct	Unlikely	Unlikely
<i>Sphaerolobium calcicola</i>	P3	-	P	White-grey-brown sand, sandy clay over limestone, black peaty sandy clay. Tall dunes, winter-wet flats, interdunal swamps, low-lying areas.	Jun/Sep-Nov	Unlikely	Unlikely
<i>Stylidium aceratum</i>	P3	-	A	Sandy soils in swamp heathland.	Oct-Nov	Unlikely	Unlikely
<i>Stylidium longitubum</i>	P4	-	A	Sandy clay, clay. Seasonal wetlands.	Oct-Dec	Unlikely	Unlikely
<i>Stylidium paludicola</i>	P3	-	P	Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland	Oct-Dec	Unlikely	Unlikely
<i>Stylidium periscelanthum</i>	P3	-	P	Loamy clay, moist soils pockets on wet flats and low granitic hills.	Sep-Oct	Unlikely	Unlikely
<i>Stylidium roseonatum</i>	P3	-	A	Swamps	Oct	Unlikely	Unlikely
<i>Stylidium torticarum</i>	P3	-	P	Sandy clay and clay loam over laterite adjacent to creeklines, depressions, and beneath breakaways in heath or mallee shrubland.	Sep-Nov	Unlikely	Unlikely
<i>Caladenia speciosa</i>	P4	-	PG	White, grey or black sand.	Sep-Oct	Possible	Unlikely

Forty birds, six mammals, and two reptiles of conservation significance have been recorded from within ten kilometres of the application area (Table below).

Common Name	Taxon	Status (WA)	No. of Records	Closest Distance (km)	Comment
Curllew Sandpiper	<i>Calidris ferruginea</i>	CR	79	4.6	Shorebird
Great Knot	<i>Calidris tenuirostris</i>	CR	10	4.6	Shorebird
Eastern Curlew	<i>Numenius madagascariensis</i>	CR	13	2.5	Shorebird
Red Knot	<i>Calidris canutus</i>	EN	17	5.3	Shorebird
Lesser Sand Plover	<i>Charadrius mongolus</i>	EN	2	5.3	Shorebird
Greater Sand Plover	<i>Charadrius leschenaultii</i>	VU	11	5.4	Shorebird
Common Sandpiper	<i>Actitis hypoleucos</i>	MI	1	6.3	Shorebird
Ruddy Turnstone	<i>Arenaria interpres</i>	MI	6	4.6	Shorebird
Sharp-tailed Sandpiper	<i>Calidris acuminata</i>	MI	74	4.6	Shorebird
Sanderling	<i>Calidris alba</i>	MI	7	5.3	Shorebird
Pectoral Sandpiper	<i>Calidris melanotos</i>	MI	13	4.6	Shorebird
Red-necked Stint	<i>Calidris ruficollis</i>	MI	131	3.9	Shorebird
Long-toed Stint	<i>Calidris subminuta</i>	MI	24	5.1	Shorebird
Latham's Snipe	<i>Gallinago hardwickii</i>	MI	1	4.9	Shorebird
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	MI	2	5.4	Shorebird
Bar-tailed Godwit	<i>Limosa lapponica</i>	MI	51	4.9	Shorebird
Black-tailed Godwit	<i>Limosa limosa</i>	MI	31	4.9	Shorebird
Little Curlew	<i>Numenius minutus</i>	MI	1	5.5	Shorebird
Whimbrel	<i>Numenius phaeopus</i>	MI	9	5.9	Shorebird
Ruff (Reeve)	<i>Philomachus pugnax</i>	MI	12	4.8	Shorebird
Pacific Golden Plover	<i>Pluvialis fulva</i>	MI	8	4.6	Shorebird
Grey Plover	<i>Pluvialis squatarola</i>	MI	48	6.8	Shorebird
Wood Sandpiper	<i>Tringa glareola</i>	MI	6	5.2	Shorebird
Common Greenshank	<i>Tringa nebularia</i>	MI	134	0.9	Shorebird
Marsh Sandpiper	<i>Tringa stagnatilis</i>	MI	37	4.6	Shorebird
Australasian Bittern	<i>Botaurus poiciloptilus</i>	EN	3	8.0	Wetland
Blue-Billed Duck	<i>Oxyura australis</i>	P4	21	0.8	Wetland
Glossy Ibis	<i>Plegadis falcinellus</i>	MI	26	4.6	Wetland
White-winged Tern	<i>Chlidonias leucopterus</i>	MI	8	5.1	Tern
Common Tern	<i>Sterna hirundo</i>	MI	1	8.0	Tern
Crested Tern	<i>Thalasseus bergii</i>	MI	59	3.8	Tern
Peregrine Falcon	<i>Falco peregrinus</i>	OS	9	4.6	Raptor
Fork-tailed Swift	<i>Apus pacificus</i>	MI	1	9.1	Aerial
Osprey	<i>Pandion cristatus</i>	MI	3	7.5	Raptor
Letter-winged Kite	<i>Elanus scriptus</i>	P4	1	9.1	Raptor
Masked Owl (Southwest)	<i>Tyto novaehollandiae novaehollandiae</i>	P3	2	4.6	Owl
Carnaby's Cockatoo	<i>Calyptorhynchus latirostris</i>	EN	273	3.6	Cockatoo
Baudin's Cockatoo	<i>Calyptorhynchus baudinii</i>	EN	6	4.8	Cockatoo
Forest Red-tailed Black Cockatoo	<i>Calyptorhynchus banksii naso</i>	VU	72	2.4	Cockatoo
Western Ringtail Possum	<i>Pseudocheirus occidentalis</i>	CR	155	7.9	Mammal
Chuditch	<i>Dasyurus geoffroii</i>	VU	3	6.0	Mammal
Brush-tailed Phascogale (SW)	<i>Phascogale tapoatafa wambenger</i>	CD	4	8.0	Mammal
Water-Rat	<i>Hydromys chrysogaster</i>	P4	4	8.6	Mammal
Quenda	<i>Isodon fusciventer</i>	P4	54	3.5	Mammal
Western Brush Wallaby	<i>Notamacropus irma</i>	P4	1	6.5	Mammal
Coastal Plains Skink	<i>Ctenotus ora</i>	P3	2	2.5	Reptile
Perth Slider	<i>Lerista lineata</i>	P3	1	8.8	Reptile

B.3 Vegetation extent

Factor	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current percentage remaining within all DBCA managed land (%)
IBRA Bioregion					
Swan Coastal Plain	1,501,222	579,814	38.6	153,955	10.3
Vegetation complex					
Southern River complex (42)	58,781	10,832	18.4	940	1.6
Vasse complex (57)	15,692	4,927	31.4	2,294	14.6
Local area (10 km)					
Remnant vegetation	23,175	5,675	24.5		

Appendix C – Assessment against the Clearing Principles

Assessment against the Clearing Principles	Variance level	Is further consideration required?
Environmental value: biological values		
<p><u>Principle (a):</u> “Native vegetation should not be cleared if it comprises a high level of biodiversity.”</p> <p><u>Assessment:</u> Native vegetation over the application area is in a completely degraded to degraded condition with little to no native ground cover. A total of 16 native and 31 non-native (weed or planted) species were recorded by Emerge (2021) over the application area and surrounds. The application area is depauperate with non-native species out-numbering native species by a factor of 2 to 1. Vegetation is not representative of any TEC or PEC (Emerge 2021), and no priority flora taxa were recorded, or are likely to occur, over the application area (Emerge 2021). The native vegetation of the application area does not comprise a high level of biodiversity.</p>	Not at variance	No
<p><u>Principle (b):</u> “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.”</p> <p><u>Assessment:</u> Marri (<i>Corymbia calophylla</i>) and Flooded Gum (<i>Eucalyptus rudis</i>) are the only native eucalypts occurring. They are unlikely to provide roosting or breeding habitat for threatened black cockatoo species due to their size, and negligible foraging habitat. Munginup Swamp (UFI-3108) is located on the opposite side of Carrabungup road to where clearing is proposed to occur. Twenty-nine wading shorebirds, and wetland-inhabiting birds, of conservation significance, as well as the Priority 4, Quenda (<i>Isodon fusciventer</i>) have been recorded in the local area. Munginup Swamp will be avoided and the existing hydrology will be maintained.</p>	Not likely to be at variance	Yes Section 3.2.1
<p><u>Principle (c):</u> “Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</p> <p><u>Assessment:</u> One threatened flora species (Vulnerable) was recorded during a flora and vegetation survey over the application area and surrounds by Emerge (2021). These were recorded on the opposite side of Carrabungup road to where clearing is proposed to occur, and associated with Munginup Swamp (UFI-3108). No other threatened species were recorded or are considered likely to occur due to a lack of suitable habitat or because they were not recorded during the field survey (Emerge 2021). The Shire of Murray have provided an avoidance and mitigation strategy whereby Munginup Swamp and the associated threatened flora species will be avoided, and the existing hydrology maintained.</p>	Not likely to be at variance	Yes Section 3.2.2
<p><u>Principle (d):</u> “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.”</p> <p><u>Assessment:</u> Five TECs endorsed by the Western Australian Minister for Environment have been mapped within 10 kilometres of the application area. Native vegetation proposed to be cleared is unlikely to comprise the whole, or a part of, or be necessary for the maintenance of a TEC.</p>	Not at variance	No
Environmental values: significant remnant vegetation and conservation areas		

Assessment against the Clearing Principles	Variance level	Is further consideration required?
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u> Two vegetation complexes as described by Heddle <i>et al.</i>, (1980) and updated by Webb <i>et al.</i> (2016) have been mapped over the application area (Appendix B2): the Southern River complex (42) and the Vasse complex (57). The Vasse complex exceeds national targets at a 31.4 per cent retention rate. However, the Southern River complex has a retention rate at 18.4 percent. Approximately 24.5 per cent of native vegetation is retained within a ten kilometres radius of the application area.</p>	May be at variance	Yes Section 3.2.3
<p><u>Principle (h):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.”</i></p> <p><u>Assessment:</u> The application area does not intersect with any DBCA managed lands. Given the separation distances to conservation reserves in the local area, the proposed clearing is not likely to have an impact on the environmental values of adjacent or nearby conservation areas.</p>	Not at variance	No
Environmental values: land and water resources		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u> Proposed clearing is located within a Geomorphic Wetland of the Swan Coastal Plain. That is, a multiple use wetland; Palusplain (UFI 15227). Proposed clearing is also located within 27 metres of a CCW, known as Munginup Swamp which occurs on the opposite side of Carrabungup road to where clearing is proposed to occur. Munginup Swamp will be avoided and the existing hydrology will be maintained. Vegetation proposed to be cleared includes flora species considered as riparian vegetation.</p>	At variance	Yes Section 3.2.4
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u> Standard and staged road construction methodologies will be employed, including strategies for drainage controls and water erosion (Section 3.1) to minimise water-logging (rated at a high risk - Appendix B1). Eutrophication is not likely to be a risk in consideration of the final land use as a public road. Soils will not be excavated at depth and any impacts to surrounding landscapes, soils and drainage can also be managed through appropriate design (Section 3.1). Noting the extent of the proposed clearing, the condition of the vegetation, and management prescription employed (Section 3.1) proposed clearing is not likely to cause appreciable land degradation.</p>	Not likely to be at variance	No
<p><u>Principle (i):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.”</i></p> <p><u>Assessment:</u> Soils will not be excavated at depth and risks to groundwater are low. Munginup Swamp occurs to the west and south of the application area on the opposite side of Carrabungup Road. Any changes to drainage or surface hydrology associated with the road design may impact the quality of surface water associated with Munginup Swamp. The Shire of Murray have provided avoidance and drainage management design to mitigate potential impacts.</p>	Not likely to be at variance	Yes Section 3.2.4

Assessment against the Clearing Principles	Variance level	Is further consideration required?
<p><u>Principle (j)</u>: <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</i></p> <p><u>Assessment</u>: Standard and staged road construction methodologies will be employed, including strategies for drainage controls and water erosion (Section 3.1). Noting the extent of the proposed clearing and management prescriptions employed, the proposed clearing of native vegetation is not likely to cause, or exacerbate, the incidence or intensity of flooding.</p>	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.

Measuring Vegetation Condition for the South West and Interzone Botanical Province (Keighery, 1994)

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

Appendix E –Photographs and biological survey excerpts

E.1 Vegetation of the application area (Shire of Murray 2020a)









E.2 Vegetation of the application area and surrounds (Emerge 2021)



Plate 1: Plant community CcCo in 'degraded' condition



Plate 2: Plant community ErM in 'degraded' condition



Plate 3: Predominantly non-native species or bare ground in 'completely degraded' condition

5 Discussion

The site has been subject to significant past disturbance and modification. Approximately 87% of the site was mapped as being in 'completely degraded' condition with approximately 0.2% in 'good – degraded' condition and 13% in 'degraded' condition.

5.1 Threatened and priority flora

The timing of the survey was optimal for detecting the threatened or priority flora with potential to occur in the site. Two visits were conducted and the site was traversed comprehensively.

Generally, wetland habitats are present in the site that could provide habitat for a variety of threatened and priority flora with preferences for poorly drained, sandy clay or loamy soiled habitats (refer Section 4.2.1). However, the degree of disturbance reduces the likelihood that any such species would occur. Nevertheless, *Diuris drummondii* was recorded in particularly disturbed area growing out of a dense patch of *Cynodon dactylon* (couch) and *Watsonia meriana* (bulbil watsonia). *D. drummondii* prefers moist locations often emerging from standing water (Department of the Environment 2008). The level of weed cover amongst the *D. drummondii* individuals does not appear to have a negative impact on the plants as they appeared healthy and in full flower.

Given there is historical records of *D. drummondii* in the site it seems likely that this population is relative stable in this location. A total of 307 individuals were recorded, compared to approximately 200 in the historic record in the same location. Records for the species were collected inside and outside of the site. Due to spatial error associated with GPS points the number of *D. drummondii* individuals within the site cannot be reported precisely. Nevertheless, the species was only recorded in one part of the site and is not considered to currently occur elsewhere in the site based on habitat preferences and outcomes of the current survey.

5.2 Vegetation condition

Classifying the condition of vegetation within the site was relatively straight forward. Most of the patches of plant communities CcCo and ErM have been severely modified by historic disturbances. Due to the presence of native overstorey in most patches these plant communities were still recognisable as 'woodland' and so were classed as being in 'degraded' condition. Due to the high weed cover these patches are considered to be at the lower end of the 'degraded' category.

At a fine scale small patches of plant communities CcCo and ErM with native sedges were classified as being in 'good' condition. Small patches are difficult to characterise because as the scale of mapping reduces the vegetation condition improves as plants are mapped in isolation. However, single plants do not represent a vegetation community and so at some point there is little gained in terms of values by focussing on small patches. The small patches in 'good' condition in the site were mapped but are not considered to have significant value as remnants of native vegetation.

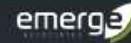
5.3 Weeds

Weed cover within the site was high which is a result of the history of disturbance.

The two declared pests recorded, one leaf cape tulip and arum lily, are currently listed by the DPIRD in an 'exempt' keeping category (s-22) and so there is no requirement to take action to manage these weeds under the BAM Act.

Detailed Flora and Vegetation Assessment

Carrabungup Road, Nirimba



6 Conclusions

Native and non-native plants occur on the margins of the site but the majority comprises non-vegetated unsealed road.

One threatened flora species, *Diuris drummondii* (tall donkey orchid), was recorded during the survey. A total of 307 individuals were recorded of which 47 provisionally occur within the site. No other threatened or priority species were recorded or are considered to occur due to a lack of suitable habitat or because they were not recorded during the field survey.

The site contains approximately 0.48 ha of native vegetation (plant communities CcCo and ErM) present in predominately 'degraded' condition. The remainder of the site comprises unsealed road, bare ground or 'completely degraded' non-native vegetation (3.31 ha/87%).

Native eucalypts within site have potential to provide a relatively minor foraging resource for threatened species of black cockatoo along with other ecological services.

Grass and herb weed cover was high across the site. Two declared pests were recorded, **Moraea flaccida* (one leaf cape tulip) and **Zantedeschia aethiopica* (arum lily), which are listed in the exempt keeping category under the BAM Act for which no permit or conditions are required.

Detailed Flora and Vegetation Assessment

Carrabungup Road, Nirimba



Executive Summary

The Shire of Murray engaged Emerge Associates (Emerge) to undertake a detailed flora and vegetation survey along section of Carrabungup Road in Nirimba (referred to herein as the 'site'). Emerge were engaged to conduct a detailed assessment to provide information on the flora and vegetation values to inform a clearing permit application.

As part of the assessment a desktop review of relevant background information was completed and a field survey was undertaken in September and December 2020. During the field survey an assessment was made on the type, condition and values of vegetation across the site.

Outcomes of the survey include the following:

- The site contains approximately 0.48 ha of native vegetation (plant communities **CcCo** and **ErM**) present in predominately 'degraded' condition.
- The remainder of the site comprises unsealed road, bare ground or 'completely degraded' non-native vegetation (3.31 ha/87%).
- One threatened flora species, *Diuris drummondii* (tall donkey orchid), was recorded during the survey. A total of 307 individuals were recorded of which 47 provisionally occur within the site.
- No other threatened or priority species were recorded or are considered to occur due to a lack of suitable habitat or because they were not recorded during the field survey.
- No threatened or priority ecological communities occur within the site.
- Native eucalypts within site have potential to provide a relatively minor foraging resource for threatened species of black cockatoo along with other ecological services.
- Grass and herb weed cover was high across the site. Two declared pests were recorded, **Moraea flaccida* (one leaf cape tulip) and **Zantedeschia aethiopica* (arum lily), which are listed in the exempt keeping category under the *Biosecurity and Agriculture Management Act 2007* for which no permit or conditions are required.

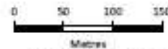
E.4 Mapping (Emerge 2021)



Figure 5: Plant Communities

Project: Detailed Flora and Vegetation Assessment
 Carraburup Road, Nimba
 Client: Shire of Murray

Plan Number: EP20-102(05)-F17
 Drawn: GAR
 Date: 22/01/2021
 Checked: TAA
 Approved: TAA
 Date: 02/02/2021



Scale: 1:6,000@A4
 GDA 1994 MGA Zone 50



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used.
 © Landgate (2020), Source: Imagery date: 10/06/2020



Figure 6: Vegetation Condition

Project: Detailed Flora and Vegetation Assessment
 Carrabungup Road, Nimba
Client: Shire of Murray

Plan Number: 19726-102(05)-F 18
Drawn: GAB
Date: 22/01/2021
Checked: TAA
Approved: TAA
Date: 02/02/2021



0 50 100 150
 Metres
 Scale: 1:6,000@A4
 GDA 1994 MGA Zone 50



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used.
 ©Landgate (2020). Aerialmap Imagery date: 11/08/2010

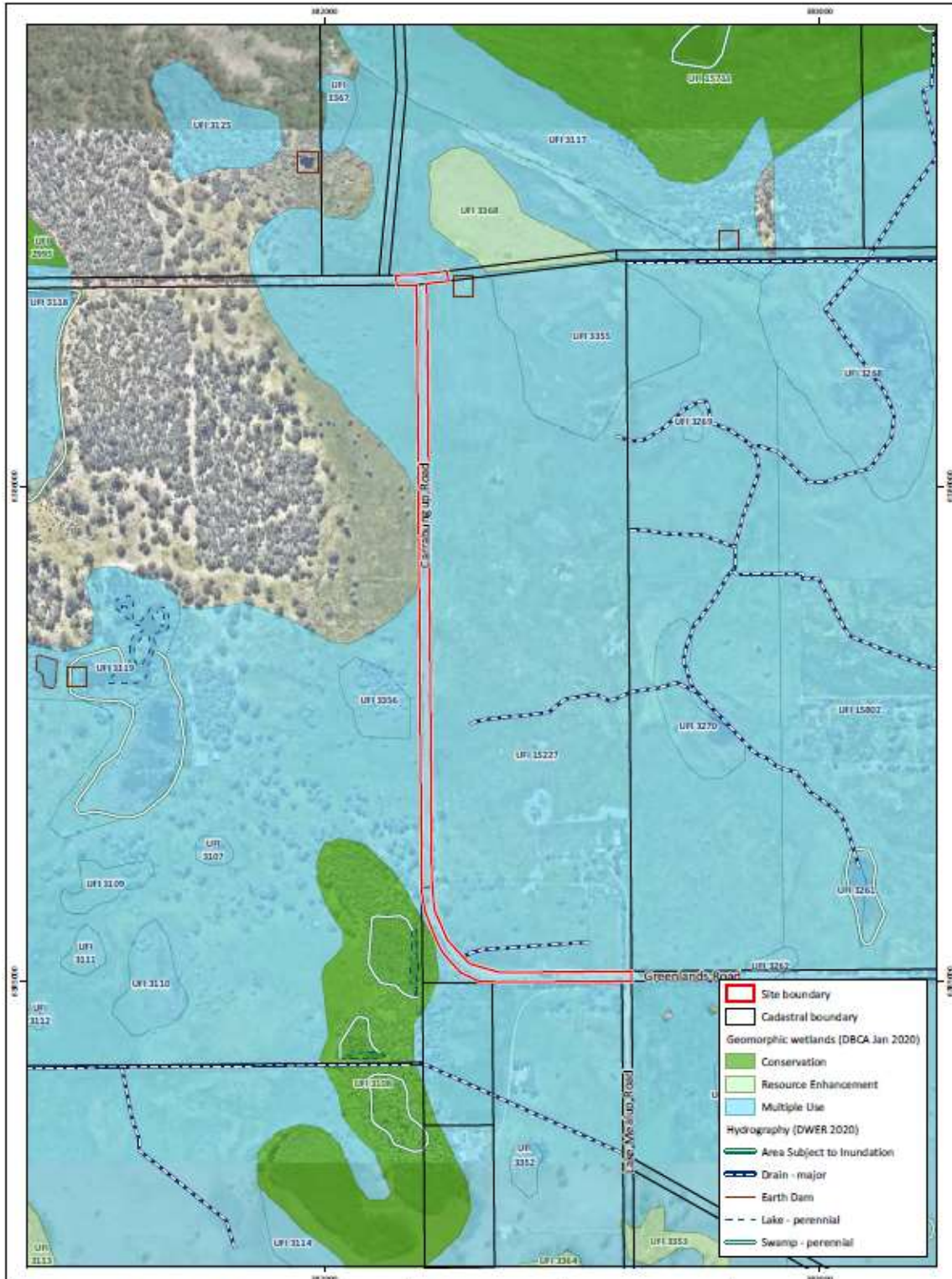


Figure 2: Hydrological Features

Project: Detailed Flora and Vegetation Assessment
Carrabungup Road, Nimba
Client: Shire of Murray

Plan Number: EP95-102(03)-434
Drawn: GAB
Date: 22/01/2021
Checked: TAA
Approved: TAA
Date: 02/02/2021



0 100 200 300
Metres
Scale: 1:10,000@A4
GDA 1994 MGA Zone 50



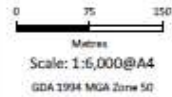
While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used.
© Australia 2020. Neotoma Imagery date: 10/06/2020



Figure 4: Conservation Significant Flora

Project: Detailed Flora and Vegetation Assessment
 Carrabungup Road, Nimba
 Client: Shire of Murray

Plan Number: EP20-102(05)-F18
 Drawn: GAR
 Date: 22/11/2021
 Checked: TAA
 Approved: TAA
 Date: 02/12/2021



While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used.
 ©Landgate (2020). Newsmap Imagery data: 10/06/2021

E.5 Summary of trees

Tree ID	Regional Complex	Regional ID	Veg. type	Vegetation Condition	Species
8	Southern River	42	CcCo	Degraded	<i>Casuarina obesa</i>
21	Southern River	42	CcCo	Degraded	<i>Casuarina obesa</i>
22	Southern River	42	CcCo	Degraded	<i>Casuarina obesa</i>
23	Southern River	42	CcCo	Degraded	<i>Casuarina obesa</i>
24	Southern River	42	CcCo	Degraded	<i>Casuarina obesa</i>
25	Southern River	42	CcCo	Degraded	<i>Casuarina obesa</i>
26	Southern River	42	CcCo	Degraded	<i>Casuarina obesa</i>
27	Southern River	42	CcCo	Degraded	<i>Casuarina obesa</i>
28	Southern River	42	CcCo	Degraded	<i>Casuarina obesa</i>
29	Vasse	42	CcCo	Degraded	<i>Casuarina obesa</i>
33	Southern River	42	CcCo	Degraded	<i>Casuarina obesa</i>
36	Vasse	42	CcCo	Degraded	<i>Casuarina obesa</i>
5	Southern River	42	ErM	Degraded	<i>Corymbia calophylla</i>
18	Southern River	42	CcCo	Degraded	<i>Corymbia calophylla</i>
43	Southern River	42	CcCo	Degraded	<i>Corymbia calophylla</i>
44	Southern River	42	CcCo	Degraded	<i>Corymbia calophylla</i>
52	Southern River	42	CcCo	Degraded	<i>Corymbia calophylla</i>
30	Vasse	42	ErM	Degraded	<i>Eucalyptus rudis</i>
31	Vasse	42	ErM	Degraded	<i>Eucalyptus rudis</i>
32	Vasse	42	O	Paddock	<i>Eucalyptus rudis</i>
40	Southern River	42	ErM	Degraded	<i>Eucalyptus rudis</i>
41	Southern River	42	ErM	Degraded	<i>Eucalyptus rudis</i>
46	Southern River	57	O	Paddock	<i>Eucalyptus rudis</i>
51	Southern River	42	ErM	Degraded	<i>Eucalyptus rudis</i>
3	Southern River	42	ErM	Degraded	<i>*Melaleuca preissiana</i>
4	Southern River	42	ErM	Degraded	<i>*Melaleuca preissiana</i>
6	Southern River	42	ErM	Degraded	<i>*Melaleuca preissiana</i>
7	Southern River	42	ErM	Degraded	<i>*Melaleuca preissiana</i>
35	Southern River	42	ErM	Degraded	<i>*Melaleuca preissiana</i>
37	Southern River	57	O	Paddock	<i>*Melaleuca preissiana</i>
38	Southern River	57	O	Paddock	<i>*Melaleuca preissiana</i>
39	Southern River	57	O	Paddock	<i>*Melaleuca preissiana</i>
55	Southern River	42	ErM	Degraded	<i>*Melaleuca preissiana</i>

** Melaleuca preissiana and/or Melaleuca raphiophylla*

Appendix F – Figures (A to E)

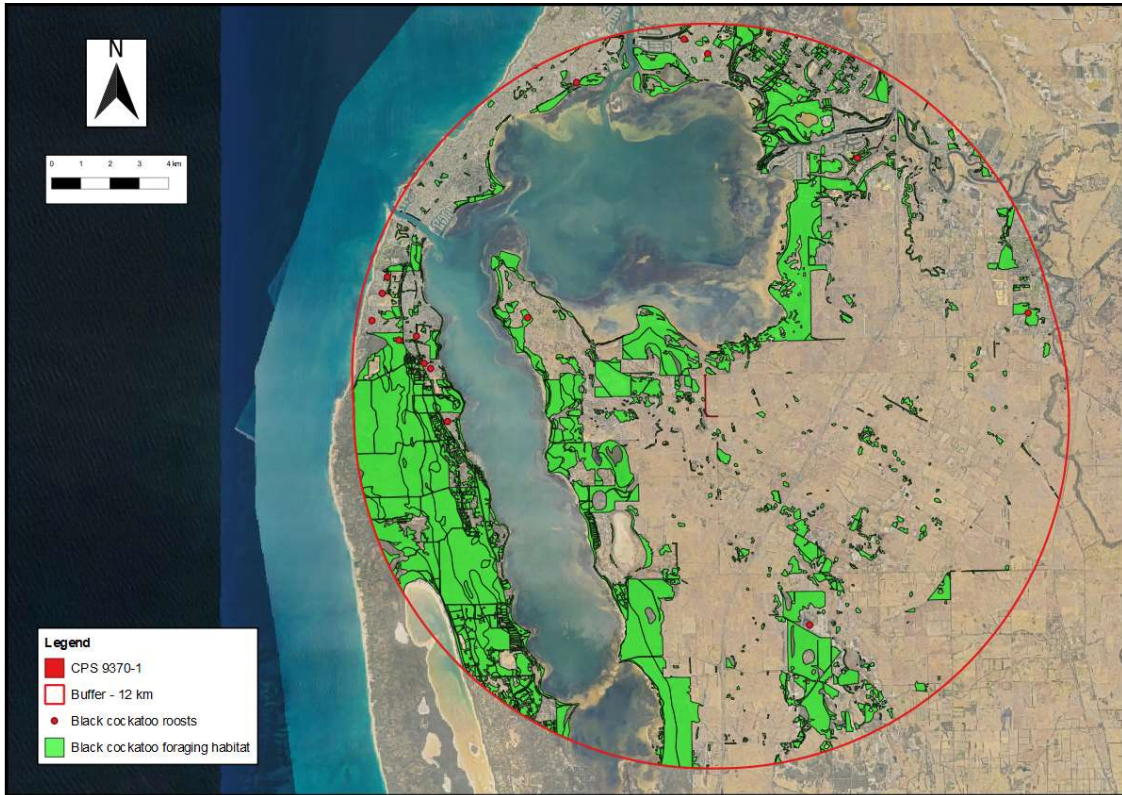


Figure A: Mapped black cockatoo foraging habitat and night-roosts within 12 kms of the application area



Figure B: Conservation category wetland and threatened flora in the vicinity of the application area

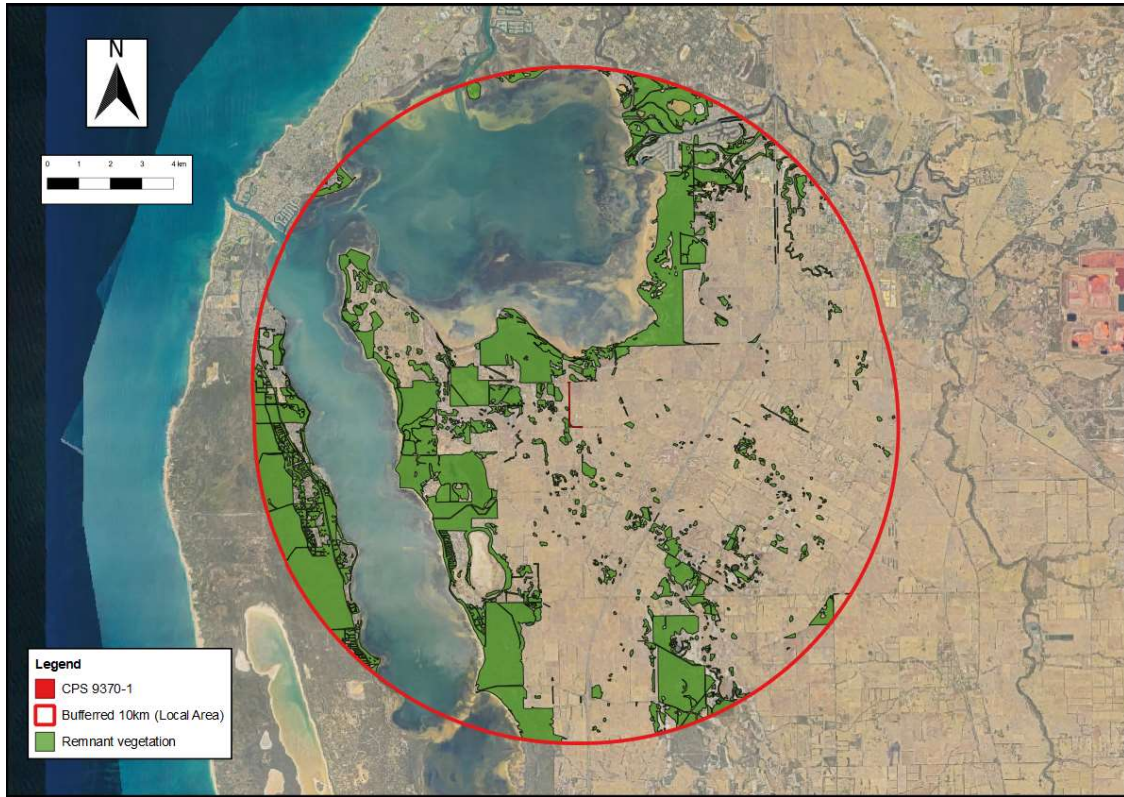


Figure C: Mapped remnant vegetation within 10 kilometres of the application area

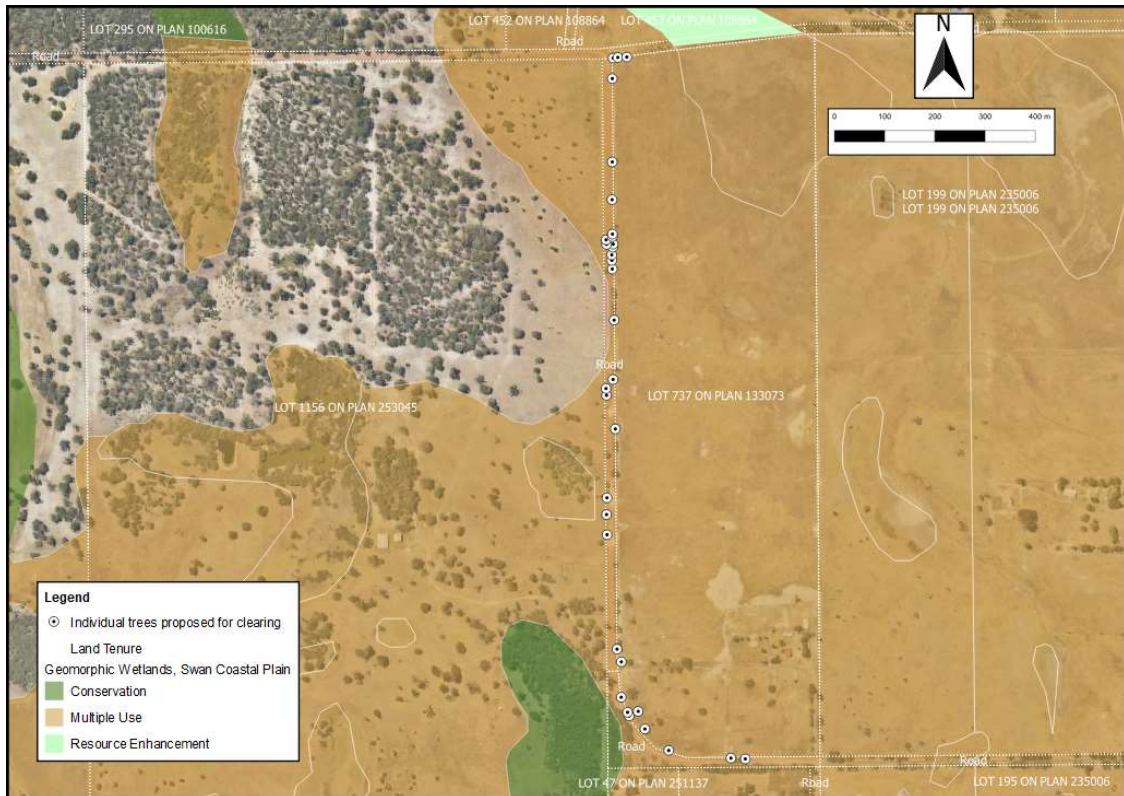


Figure D: Geomorphic wetlands in the vicinity of the proposed clearing

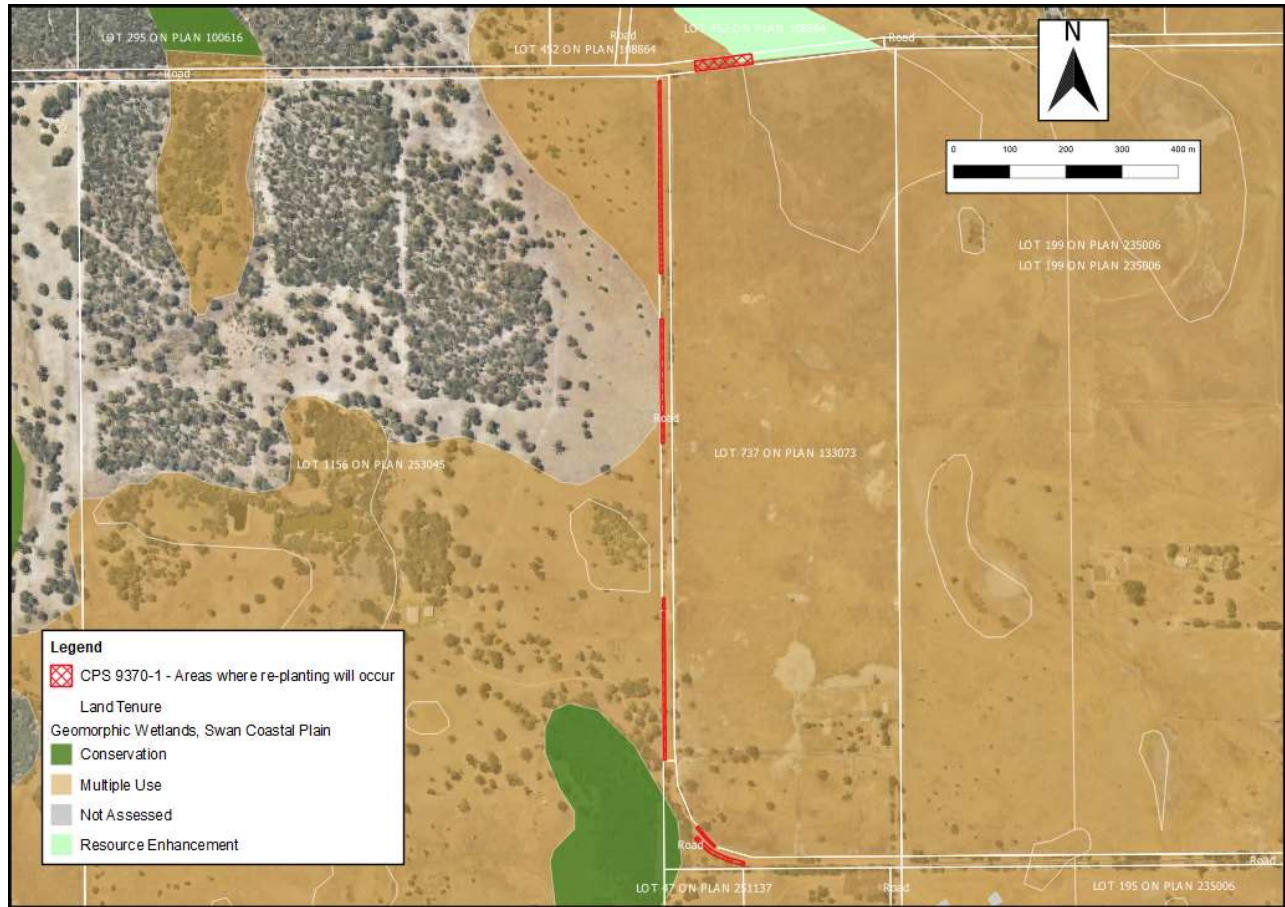


Figure E: Areas where re-planting is proposed to occur (Shire of Murray 2021b)

Appendix G – References and databases

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G.2 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)
- Pre-European Vegetation Statistics
- Remnant Vegetation, All Areas
- Native Vegetation Extent (DPIRD-005)
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- 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:

- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)