



# Clearing Permit Decision Report

## 1 Application details and outcome

### 1.1. Permit application details

Permit number:	CPS 10159/1
Permit type:	Purpose permit
Applicant name:	City of Busselton
Application received:	20 April 2023
Application area:	39 native trees
Purpose of clearing:	Road upgrades and safety
Method of clearing:	Mechanical removal
Property:	North Jindong Road Reserve (PIN 11471104) Hairpin Road Reserve (PIN 11471113)
Location (LGA area/s):	City of Busselton
Localities (suburb/s):	North Jindong

### 1.2. Description of clearing activities

The application was received from the City of Busselton (the City) for a Purpose Permit to clear 39 native trees, consisting of *Corymbia calophylla* (marri), *Eucalyptus marginata* (jarrah) and *Xanthorrhoea sp.* trees within North Jindong Road Reserve (PIN 11471104) and Hairpin Road Reserve (PIN 11471113), North Jindong, for the purpose of road upgrades.

The City intend to seal, widen and complete maintenance on the road, to improve its safety and function (City of Busselton, 2023a). North Jindong Road and Hairpin Road are located within prime farming land areas adjacent to existing gravel quarries industries that attract multiple heavy haulage vehicles which utilise North Jindong Road as a key link to Bussell Highway. In addition to heavy vehicles usage, there has been significant growth in tourist traffic in the area considerably increasing the risk of collisions.

### 1.3. Decision on application

Decision:	Granted
Decision date:	9 October 2023
Decision area:	39 native trees, as depicted in Section 1.5, below.

### 1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and one submission was received. Consideration of the matters raised in the public submission is detailed in Appendix B.

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix C), relevant datasets (Appendix G.1.), a flora and vegetation survey (Appendix F), the clearing principles set out in Schedule 5 of the EP Act (Appendix D), relevant planning instruments and any other matters considered relevant to the assessment (Section 3). The Delegated Officer also took into consideration that the purpose of the clearing is to improve community safety and reduce the likelihood and/or severity of crashes by improving road width to accommodate

traffic volumes, increase sightlines/driver visibility and remove risks from falling branches and trees being in close proximity to the road.

The assessment identified that the proposed clearing will result in:

- The loss of 39 native trees, including 13 *Corymbia calophylla* (marri) trees with a diameter at breast height (DBH) greater than 500 millimetres, one marri tree with a DBH greater than 1000 millimetres, 21 native trees with a DBH less than 500 millimetres, one *Eucalyptus marginata* (jarrah) tree and four *Xanthorrhoea sp.* (grass trees);
- the loss of native vegetation that is suitable habitat for the Critically Endangered *Pseudocheirus occidentalis* (western ringtail possum), as well as *Zanda latirostris* (Carnaby's black cockatoo), *Zanda baudinii* (Baudin's black cockatoo) and *Calyptrorhynchus banksii naso* (forest red-tailed black cockatoo), collectively known as black cockatoos;
- loss of native vegetation within an extensively cleared landscape; and
- the potential introduction and spread of weeds and dieback into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values.

The Delegated Officer considered the 39 native trees proposed to be cleared to be part of a continuous track of vegetation within the road reserve. To minimise impacts to fauna, progressive one directional clearing is required and pre-inspection for western ringtail possums to allow individuals present at the time of clearing to move to adjacent vegetation. The planting of species suitable for black cockatoo and western ringtail possum foraging and breeding habitat will be undertaken to reduce impacts to black cockatoos and western ringtail possum. The likelihood of impact from weeds and dieback can be minimised by applying weed and dieback management measures.

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 is unlikely to have long-term adverse impacts on conservation significant fauna or flora species and can be minimised and 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 to reduce the impacts and extent of clearing;
- progressive one directional clearing;
- pre-clearing inspection for western ringtail possums;
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback; and
- a minimum of 75 native trees, including marri and jarrah trees, will be required to be planted and maintained within the road reserve, to mitigate the loss of 39 native trees that provide habitat value and significant remnant vegetation in an extensively cleared landscape.

## 1.5. Site map



Figure 1: Map of the northern application areas along North Jindong Road for clearing application CPS 10159/1. The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit.



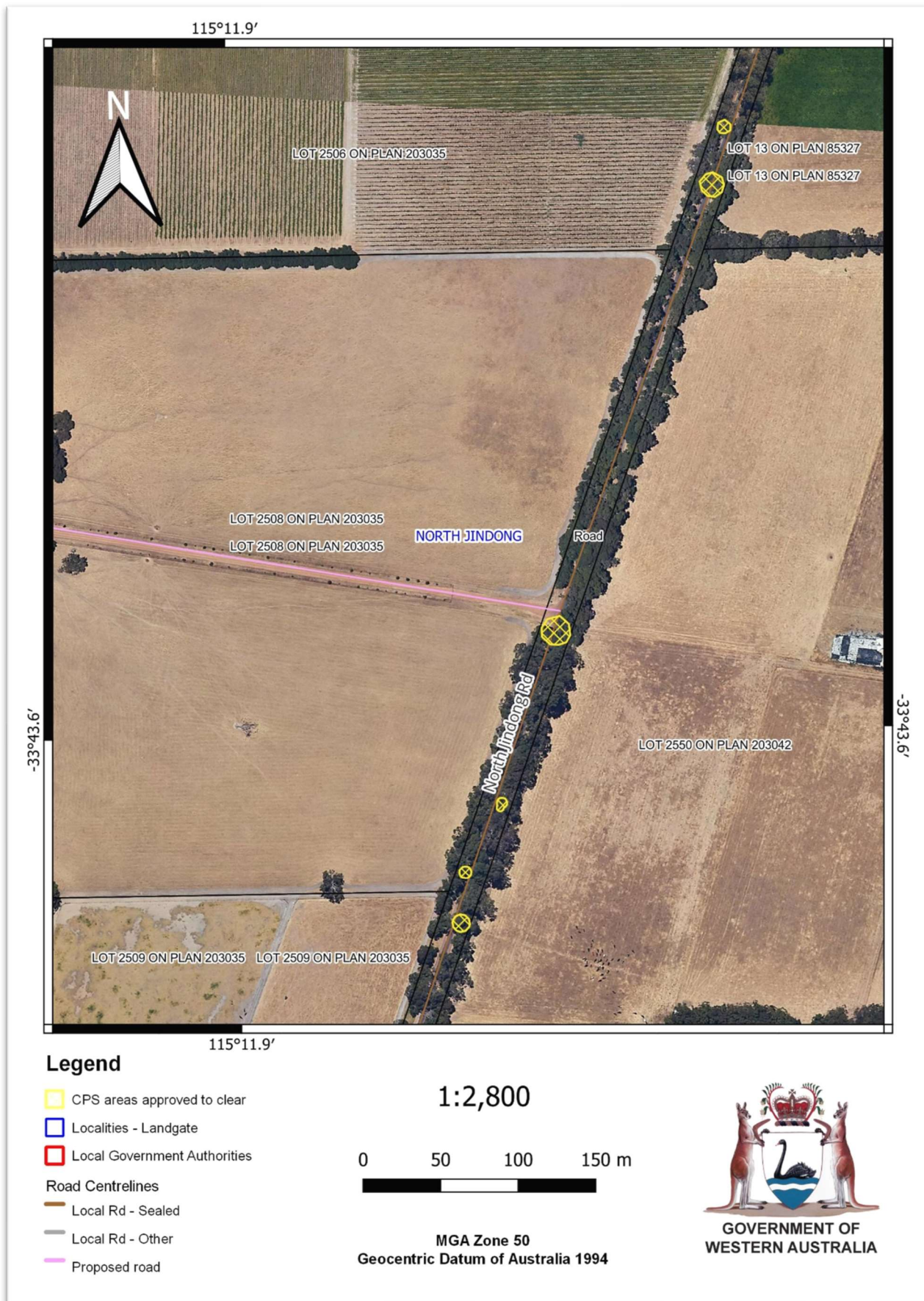


Figure 2: Map of the central application areas along North Jindong Road for clearing application CPS 10159/1. The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit.



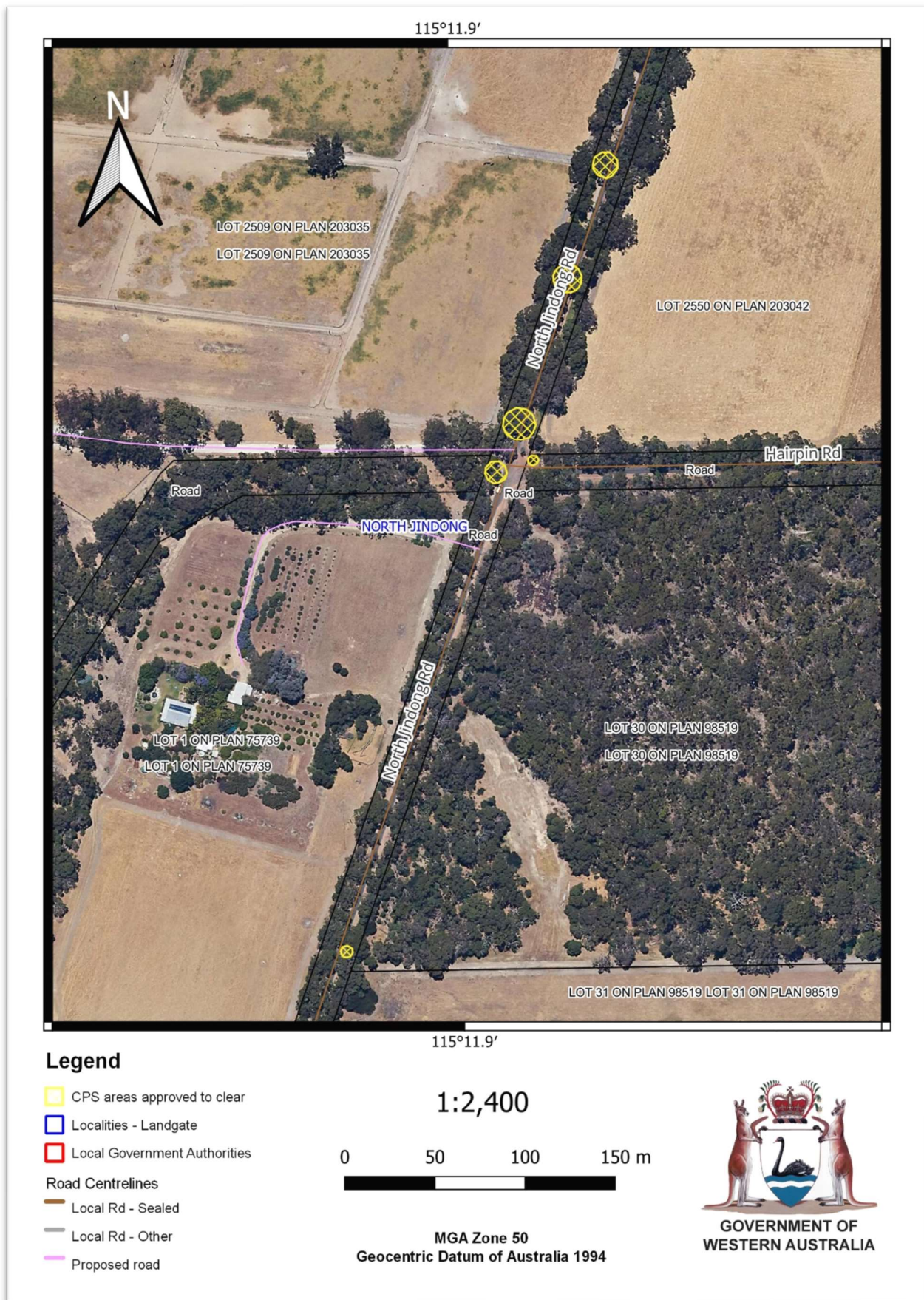


Figure 3: Map of the southern application areas along North Jindong Road for clearing application CPS 10159/1. The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit.

## 2 Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

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

Other legislation of relevance for this assessment include:

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

Relevant policies considered during the assessment include:

- *Environmental Offsets Policy* (2011)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013).
- *Procedure: Native vegetation clearing permits* (DWER, October 2019).
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016).
- *Environmental Offsets Guidelines* (August 2014).

## 3 Detailed assessment of application

### 3.1. Avoidance and mitigation measures

The City has progressed this project design with an emphasis on avoiding and minimising impacts to native vegetation. Where impacts cannot be directly avoided, they have been minimised and mitigated through design measures. Potential impacts will be managed prior to and during construction through the implementation of a construction management plan.

Due to the nature of the constraints associated with native vegetation along North Jindong Road the design process included the following measures to directly avoid or minimise impacts on roadside native vegetation (City of Busselton, 2023c):

- Commissioned a Flora and Fauna Survey along North Jindong Road (SLK 0.41-6.10) (Ecosystem Solutions, 2021) to identify environmental constraints and guide the project design.
- The site was walked with ecologists from Ecosystem Solutions to develop most effective route to minimise ecological impacts.
- The upgrade to North Jindong Road will include:
  - The majority of the roadway will be widened to the east to limit clearing to one side of the road and avoid disturbance where possible to the existing vegetation on the western road verge.
  - The design level of the road is approximately 250 millimetres above the existing level to minimise clearing required.
  - The design pavement width has been reduced from the typical 8.2 metres width to 8.0 metres including sealed.

The City have adopted a conservative approach to the upgrade of rural roads with the primary objective to minimise any increase to the road's original footprint without compromise to functionality and safety. This is largely achieved by implementing a reduced cross section and consistent 'design speed', that will result in a long-term outcome where all rural roads have a road environment where the overall geometrics constrain the vehicle speeds (City of Busselton, 2023c).

Prior to progressing with an application to clear native vegetation, the City conducted a feature survey of the project area focusing on collecting information relating the face of tree adjacent to the road (not the tree centroid and extrapolating the diameter) from which a concept design of the road alignment based on road engineering design principles is developed. This design phase is an iterative process that requires multiple site visits to adjust the alignment, sometimes this may only be 50 millimetres to minimise the clearing required. This is evident in selecting the three larger marri trees (SLK2610, 2696 and 2760) to avoid disturbing 150 lineal meters of vegetation on the opposite side of the road (City of Busselton, 2023c).

The City's proposal of a cross section with a 6.2 metre traffic lane and 0.9 metre unsealed shoulders for a total formation width of 8.0 metres, with no additional allowance for longitudinal drainage when compared to the 'Main Roads WA - Supplement to Austroads Guide to Road Design', recommends a minimum 7.0 metre traffic lane and 1.0 metre unsealed shoulders for a total formation width of 9.0 metres with clear zones is a significant investment in the retention of roadside vegetation. A longitudinal drain has not been proposed within the compromised cross section to further mitigate the clearing requirements noting however, in doing so this has a negative impact on future maintenance requirements and potentially a reduction in the 'life' of the road between rehabilitation due to water ingress and tree root intrusion into the road pavement (City of Busselton, 2023c).

The City's approach to the design speed is where a formal speed limit has not been implemented and therefore subject to the state default limit of 110 kilometres per hour, the City sets its design parameter for 80 kilometres per hour (City of Busselton, 2023c).

It is through this approach to rural road designs and an adaption of the recommendations of Austroads documentation, with a degree of acceptance for isolated locations to be of a lesser standard such as curve radii with appropriate treatments, the City is able to achieve network upgrades in keeping with transport needs whilst minimising social and environmental impacts (City of Busselton, 2023c).

As an example of the balance between the City's approach and full implementation of the Austroads documents is the variation in the roadside clear zones as mentioned above (City of Busselton, 2023c).

"A clear zone is the area adjacent to the traffic lane that should be kept free from features that would be potentially hazardous to errant vehicles. The clear zone is a compromise between the recovery area for every errant vehicle, the cost of providing that area and the probability of an errant vehicle encountering a hazard. The clear zone should be kept free of non-frangible hazards where economically and environmentally possible. Alternatively, hazards within the clear zone should be treated to make them safe or be shielded by a safety barrier (Austroads 2008a)" (City of Busselton, 2023c).

The clear zone recommendations contained with the Appendix F: Table 1: Clear Zone distances - MRWA, identifies a clear zone of 5.5 metres at 110 kilometres per hour and 3.5 metres at 80 kilometres per hour on straights based on a traffic volume less than 750 vehicles per day (VPD). The City's approach to a 'lesser speed' design and further acceptance of only clearing the vegetation identified as impacted by the road formation, clearly demonstrates the City's commitment to the environment and acceptance of a more holistic approach to the importance of road corridors and the function they provide in environmental habitats and linkages (City of Busselton, 2023c).

Notwithstanding the above, the City has a limited ability to reduce or remove the requirements identified within the Australian Standards, which largely relate to the installation of roadside furniture, signage and sightlines to driveways and intersections as a way of enhancing the safety of all road users. A review of the available crash data for the City of Busselton Local Government Area for the five year period up to 31 December 2022 highlights 111 crashes identified as hitting trees. Of this the following severity are noted, Fatality – 12, Hospitalisation – 30, Medical – 7, Property Damage Only (PDO) Major – 53 and PDO Minor – 9 (City of Busselton, 2023c).

The additional data/information the City provided includes (City of Busselton, 2023c):

- Traffic data was collected in August 2019 with a daily traffic volume of 120 VPD based on a seven day average. Using the Main Roads WA road classification assessment guideline the VPD is adjusted to 'Passenger Car Unit equivalents' (PCU) this converts to 141.36.
- Crash statistics for the recorded crashes on this road section note a single PDO-Major severity where a vehicle left the carriage way and hit an object.
- Additional counter measure are assessed to supplement the road upgrade, they are not an effective alternative to the road upgrade itself:
  - o Reflectorized tape markers to mature trees. This has not been considered and no literature has been located for this. The City installs reflectorized guideposts in accordance to the requirements of Australian Standards (AS) 1742.2. This, coupled with reflectorized signage is considered appropriate usage of reflective markings. Where trees are considered to present a higher risk of impact than the remaining vegetation the City assesses for the installation of a vertical hazard marker, again under AS1742.2.
  - o White Edgeline - The installation of a white edgeline is only permissible with a centreline, as this is a regulatory control it requires the approval of Main Roads WA once a minimum of 300 VPD is achieved. Where a road has greater than 10 percent heavy vehicles, such as this, the distance between the centreline and the edgeline shall be a minimum of 3.2 metres.
  - o The use of roadside mirrors to further reduce clearing or enhance road safety is not well covered in Main Roads WA, Austroads or Australian Standard documents. However Vic Roads has prepared a comprehensive document on this subject which states that they should not be used where speeds are over 60 kilometres per hour (North Jindong Road is potentially 110 kilometres



- per hour) and should be considered only as a last resort where other treatments such as vegetation trimming, road realignment, etc. have been exhausted. The City considers the installation of mirrors in rural areas to present a significant safety risk to road users and does not support their use.
- o Concealed driveway signs. The erection of concealed driveway signage is considered suitable as an interim treatment on roads that are not being upgraded. A road upgrade should include the safe integration of property accesses with minimum sight distances covered under both Austroads and Australian Standards.

### Avoidance measures

In undertaking Rural Road Design in heavily vegetated areas the City have adopted a compromised road design ethos to minimise the clearing of vegetation (see Appendix F: Figure 11 - Typical Section A design). Designs do not include roadside drains (see Appendix F: Figure 11 - Typical Section B design) and quite often have trees remaining in/on the compacted shoulder within 3.9 metres of the centreline of the road (see Appendix F: Figure 13 - photo of Stage 1 – post clearing under permit CPS 9795/1) (City of Busselton, 2023b).

The difference in clearing impact is significantly reduced from an estimated 2.0 hectares (Typical Section B design) to the area applied 0.19 hectares (City of Busselton, 2023b).

When undertaking the proposed alignment design, City officers drafted multiple designs to avoid and minimise clearing using the following process (City of Busselton, 2023b):

1. Measure individual trees from existing centreline.
2. Design draft (Revision A) road alignment.
3. Remeasure individual trees from draft alignment and assess impacts (factoring in existing crossover sightlines).
4. Repeat until “best fit” alignment was found.

### Mitigation

The City have committed to planting 75 *Corymbia calophylla* (marri) and *Eucalyptus marginata* (jarrah) trees within the adjacent road reserve, to mitigate the loss of 39 native trees that provide habitat value and significant remnant vegetation in an extensively cleared landscape (Figures 4 to 6) (City of Busselton, 2023b).

The City are willing to relocate the *Xanthorrhoea Preissii* (grass trees) that have been included in the proposed clearing area. These grass trees will be relocated within the mitigation planting areas (Figures 4 to 6) (City of Busselton, 2023c).

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.

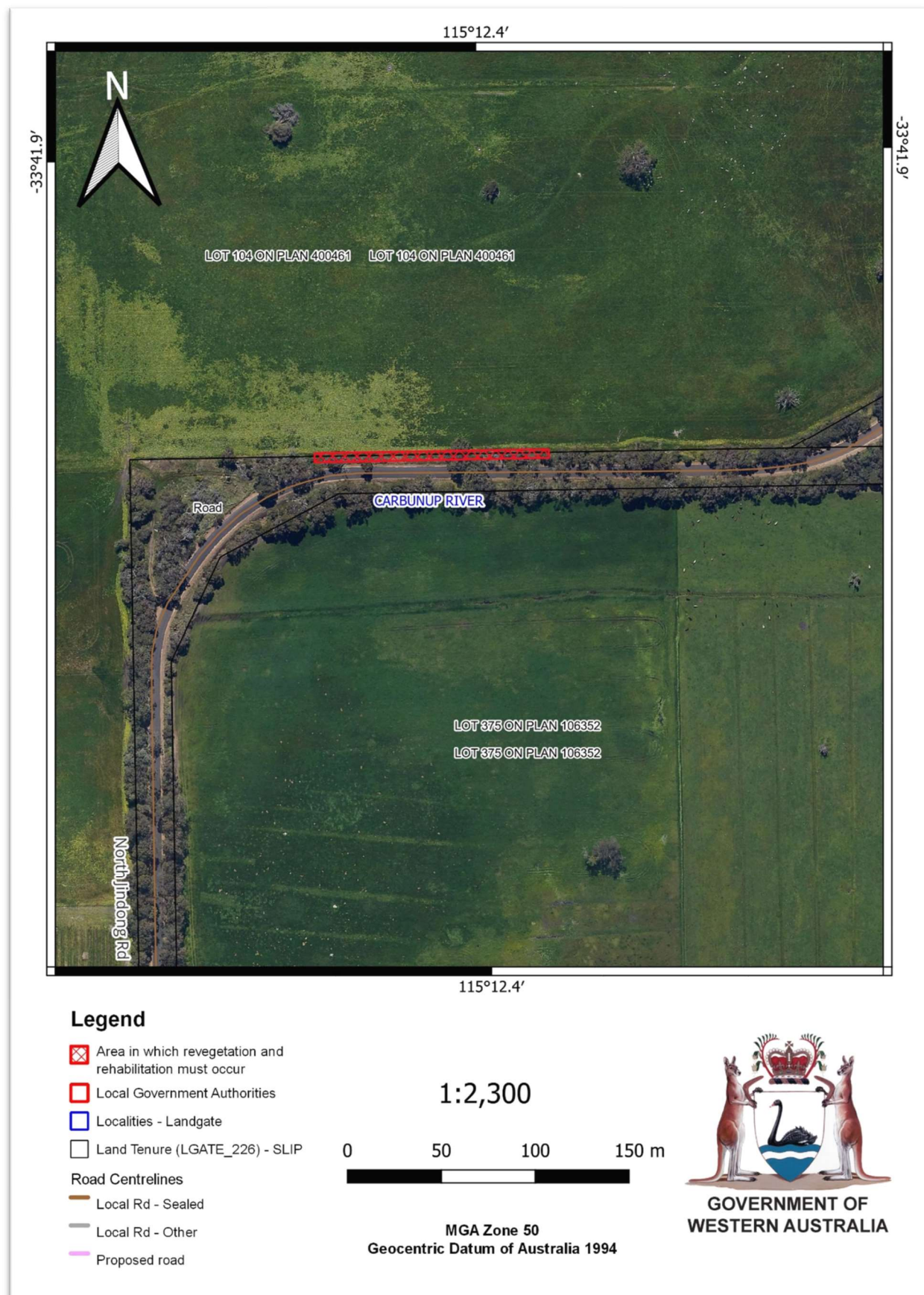


Figure 4: Map of the northern area along North Jindong Road (crosshatched red) where the City of Busselton have committed to planting of 75 *Corymbia calophylla* (marri) and *Eucalyptus marginata* (jarrah) trees and relocating four *Xanthorrhoea Preissii* (grass trees).



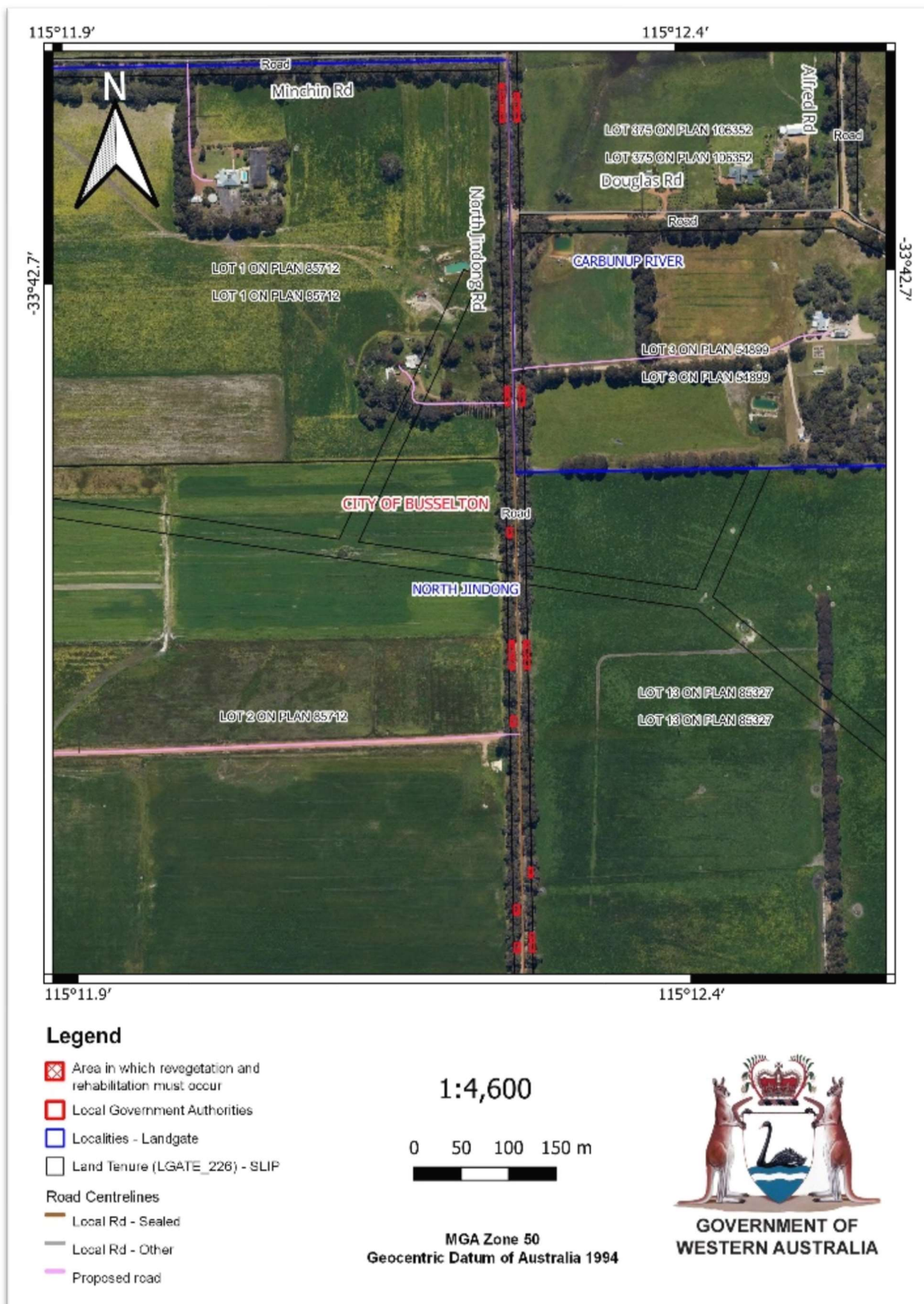


Figure 5: Map of the central areas along North Jindong Road (crosshatched red) where the City of Busselton have committed to planting of 75 *Corymbia calophylla* (marri) and *Eucalyptus marginata* (jarrah) trees and relocating four *Xanthorrhoea Preissii* (grass trees).



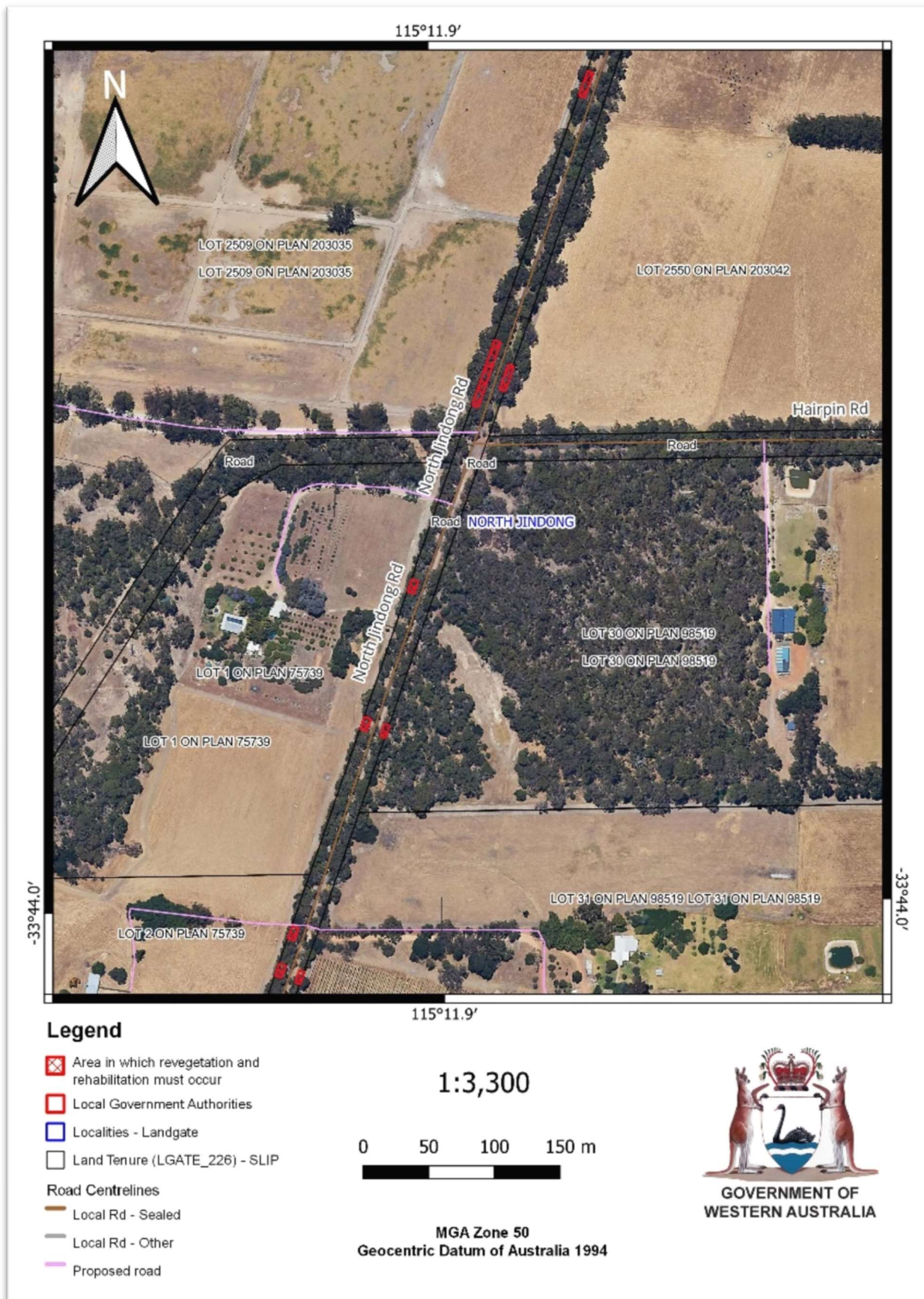


Figure 6: Map of the southern areas along North Jindong Road (crosshatched red) where the City of Busselton have committed to planting of 75 *Corymbia calophylla* (marri) and *Eucalyptus marginata* (jarrah) trees and relocating four *Xanthorrhoea Preissii* (grass trees).

### 3.2. Assessment of impacts on environmental values

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

The assessment against the clearing principles (Appendix D) identified that the impacts of the proposed clearing present a risk to conservation significant flora, fauna and significant remnant vegetation. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

#### 3.2.1. Biological values (flora) - Clearing Principles (a) and (c)

According to available databases, 46 conservation significant flora species were identified within the local area (10 kilometre radius of the application area), which include 13 threatened flora species and 33 priority flora species. The closest record of these flora species is the Priority three *Lasiopetalum laxiflorum*, identified 1.18 kilometres from the application area. The flora survey undertaken by Ecosystem Solutions in 2021, identified several Priority 3 *Loxocarya magna* plants throughout the survey area, along North Jindong Road. The closest was approximately 268 metres from one of the areas proposed to be cleared, with an additional three plants recorded amongst the application areas.

Although several threatened and priority species were likely to be found within the application area (see Appendix C.4. Flora analysis table), the 2021 flora field survey completed along North Jindong Road, North Jindong, by Ecosystem Solutions, found no Threatened flora or other priority flora species (Ecosystem Solutions, 2021).

The Flora survey was completed in September and October, an optimal time for many flowering species. However, this timing may have been outside the predominate flowering time for other flora species, which limits identification of all flora within the site (Ecosystem Solutions, 2021). The Delegated Officer considered that due to the clearing being limited to only 39 native trees, the timing of the flora survey was adequate to assess impacts to flora.

##### ***Loxocarya magna***

*Loxocarya magna* is classified as a Priority 3 conservation significant flora species in Western Australia. *Loxocarya magna* is a rhizomatous perennial sedge which grows approximately one metre high and over two and a half metres wide, in a compact, domed, upright position. The rhizomes appear white with grey hairs and are approximately five millimetres in diameter. *Loxocarya magna* is dioecious (with separate male and female plants). The female flower (styles) is pink, very feathery, straight or curled, approximately two to three millimetres long and emerge from upper bracts. The male flower is tubular, approximately six millimetre long, with white anthers in the spike that are between 11 to 17 millimetres long (Western Australian Herbarium, 1998-). *Loxocarya magna* occur mostly in the South-West Botanical Province, occurring throughout the Swan Coastal Plain, Jarrah Forest, Warren and Esperance Plains IBRA Regions. They are known to flower during September or November (Western Australian Herbarium, 1998-).

Seven *Loxocarya magna* plants were identified during the 2021 flora survey on North Jindong Road (Ecosystem Solutions, 2021). Of these seven records, four were located nearby the trees proposed to be cleared in clearing application CPS 10159/1 (Figure 7). Of these four records, three either appear to be mapped on the opposite side of the road or are a significant distance from the closest tree proposed to be cleared (Figure 7). The closest record appears to be approximately 2.68 metres from the boundary of the clearing application area. Noting the distance that these plants are from the trees being cleared and that the clearing is for trees with little disturbance to understorey, they are unlikely to be impacted by the proposed clearing.

Weeds have the potential to out-compete native flora and reduce the biodiversity of an area. They also have the potential to be spread during clearing and/or revegetation activities. Weed and dieback management measures will assist in mitigating impacts to the records of *Loxocarya magna* near the clearing area.



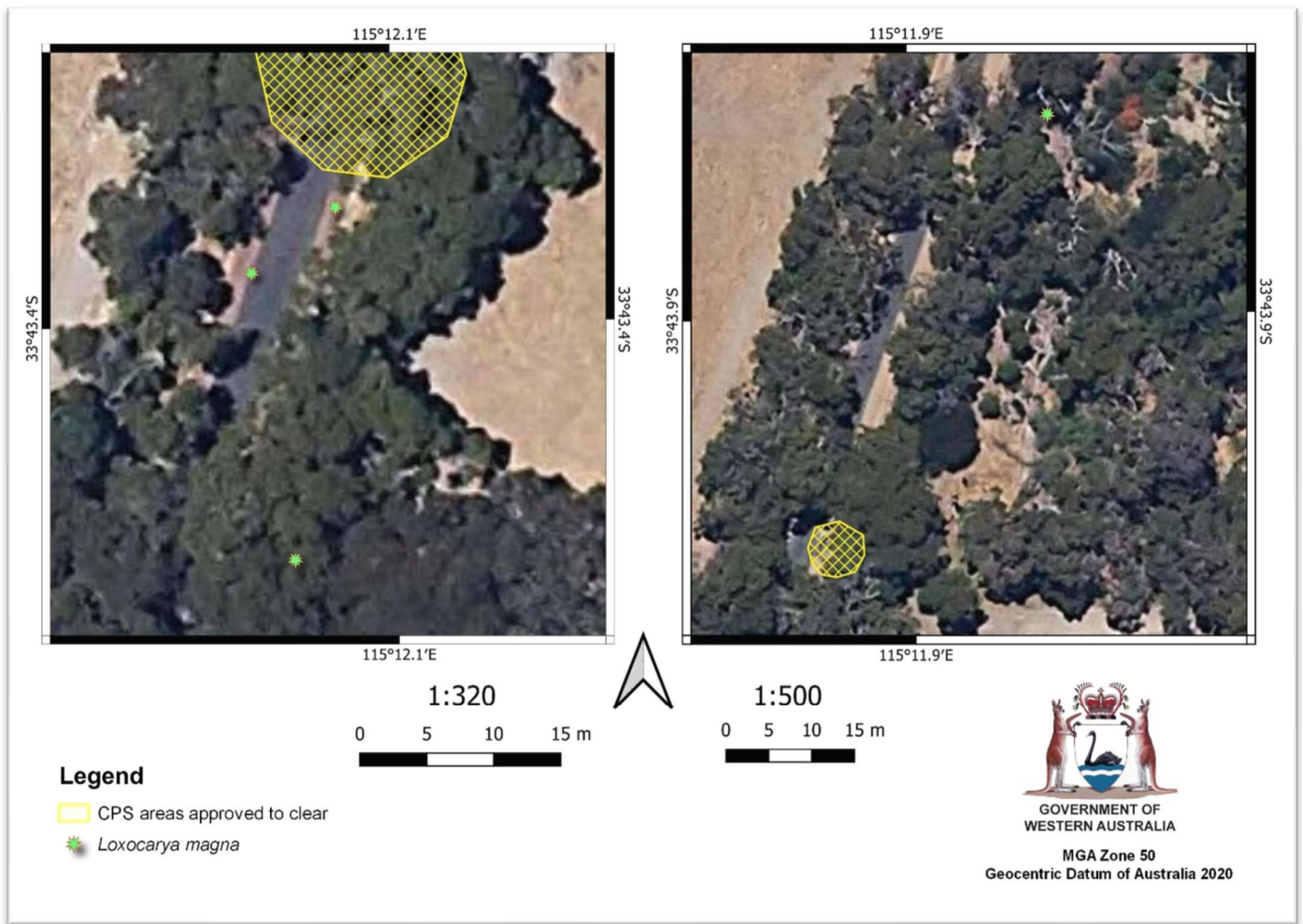


Figure 7: Locations of *Loxocarya magna* records identified during the 2021 flora and fauna survey in relation to CPS 10159/1 application area (Ecosystem Solutions, 2021).

#### Conclusion

The proposed clearing of 39 native trees is not likely to impact any Threatened or Priority flora. Potential impacts to biodiversity, as a result of the introduction and spread of weeds and dieback may be minimised by the implementation of a weed and dieback management condition.

#### Conditions

To address the above impacts, the following management measure will be required as a condition on the clearing permit:

- The permit holder is required to take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback.

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

##### Assessment

Within the local area (10 kilometre radius of the application area), 36 conservation significant fauna species have been recorded. Of these records, 24 species occur within marine waters, freshwater and/or are migratory birds, which are not represented within the application area.

The application area is likely to provide habitat for arboreal species recorded within the local area including, but not limited to; western ringtail possum, *Phascogale tapoatafa wambenger* (south-western brush-tailed phascogale), and black cockatoos. The application is not considered likely to provide suitable or significant habitat for ground dwelling fauna due to the limited understorey habitat. However the application area is likely to provide an ecological linkage for fauna moving through the landscape.

##### ***Pseudocheirus occidentalis* (western ringtail possum)**

Western ringtail possums are listed as Critically Endangered under the BC Act and the EPBC Act. The application area is within the Swan Coastal Management Zone for the western ringtail possum as described within the 'Western



Ringtail Possum Recovery Plan' (DPaW, 2017) (Figure 8). The management plan outlines strategies to slow the decline in population size, extent and area of occupancy through managing major threatening processes affecting the subpopulations and their habitats and allowing the persistence of the species in each of the identified key management zones: Swan Coastal Plain, southern forests and south coast (DPAW, 2017).

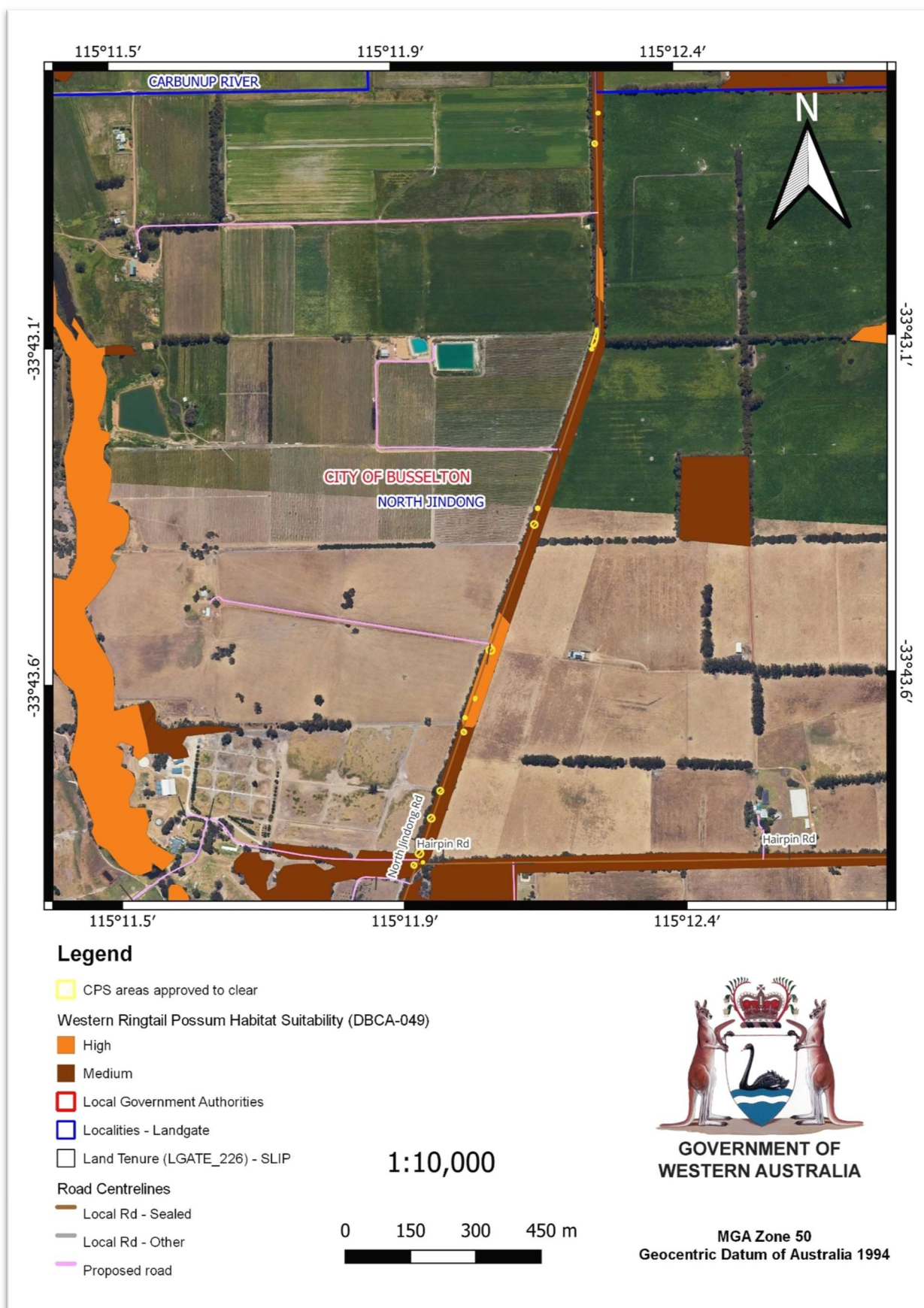


Figure 8: Map of the location of western ringtail possum habitat suitability within application area CPS 10159/1.

Vegetation communities critical to the species include long unburnt mature remnants of *Agonis flexuosa* (peppermint) woodlands with high canopy continuity and high foliage nutrients (high in nitrogen and low toxin levels); *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) forests and woodlands with limited anthropogenic disturbance (unlogged or lightly logged, and a low intensity and low frequency fire history), that are intensively fox-baited and have low indices of fragmentation; coastal heath, jarrah/marri woodland and forest, peppermint woodlands, myrtaceous heaths and shrublands, *Eucalyptus megacarpa* (bullich) dominated riparian zones and karri forest. Any habitat where western ringtail possums occur naturally are considered critical and worthy of protection (DPAW, 2017).

According to available mapping and databases, there are 1207 records of western ringtail possums within the local area (10 kilometre radius of the application area). During the Ecosystem Solutions 2021 survey, thirteen sightings of western ringtail possums and eight potential dreys were recorded. The closest observed drey was approximately 6.89 metres south-southwest from the most northern area proposed to be cleared and the closest western ringtail possums record is approximately 230 metres north of the most northern area proposed to be cleared. None of the records were located within the tree proposed to be cleared, however it is evident that western ringtail possums are using the vegetation in the road reserve to move through the landscape and breed (Figure 9) (Ecosystem Solutions, 2021). Suitable hollows and known dreys were identified in the surrounding areas, however, none within the application area or within the trees proposed to be cleared. Dreys were located predominantly within remnant Peppermint woodland to the north of the Site and adjacent to Minchin Road and the soak to the east (Ecosystem Solutions, 2021).

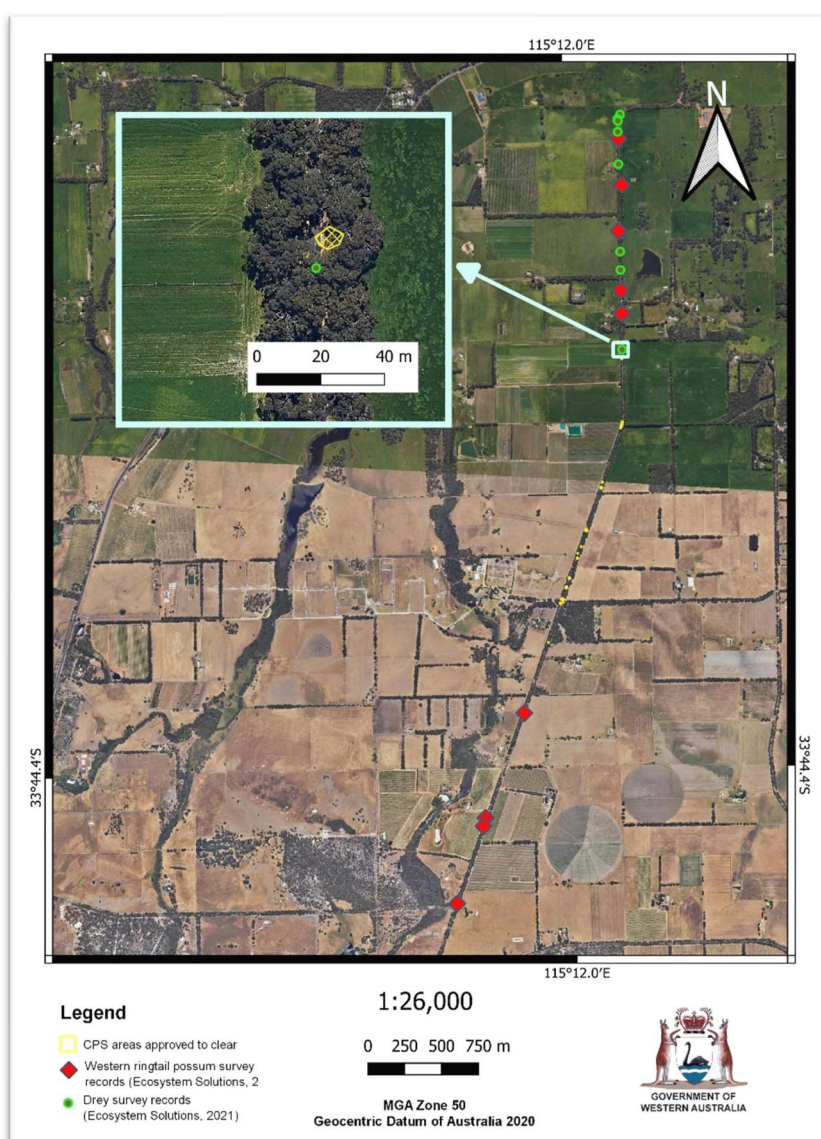


Figure 9: Map of the location of western ringtail possum sightings and dreys recorded during Ecosystem Solutions 2021 survey (Ecosystem Solutions, 2021).

Considering the application area is restricted to individual marri and jarrah trees, with suitable habitat remaining within the road reserve, the application area is not likely to provide significant habitat for the western ringtail possum. North Jindong Road may act as an ecological linkage between larger remnants of native vegetation within the local area.



Western ringtail possums may traverse the application area moving between the larger remnants. Deaths to individuals that may be present at the time of clearing is the greatest threat. Pre-clearance inspections will ensure that impacts to individuals are minimised. Planting of marri and jarrah trees within the road reserve will also ensure ecological linkage values will persist.

### **Black cockatoo species**

*Zanda latirostris* (Carnaby's black cockatoo), *Zanda baudinii* (Baudin's black cockatoo) and *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo) are listed as endangered and/or vulnerable under the BC Act and EPBC Act. The application area is within the known distribution of all three black cockatoo species and is mapped as black cockatoo foraging habitat in the Swan Coastal Plain (Figure 10). While habitat requirements for the three species of black cockatoos differ, the requirements in general can be categorised as breeding habitat, foraging habitat and night roosting habitat. It must be noted that *Calyptorhynchus* sp. (white-tailed black cockatoo) have been recorded in the local area. These records were obtained when the data collector could not definitively distinguish if they spotted a Baudin's or Carnaby's cockatoo, therefore the *Calyptorhynchus* sp. (white-tailed black cockatoo) category was created to incorporate these records.

### Breeding habitat

Breeding habitat for the species of black cockatoos is described within the referral guidelines for three threatened black cockatoo species (DAWE, 2022). Marri trees are noted as a common breeding tree species to all three black cockatoos (DAWE, 2022). The 2021 Flora and Fauna survey found a total of 1,284 potentially significant trees with a diameter at breast height (DBH) greater than 500 millimetres, with 14 containing hollows and 44 containing potential hollows, when taking into consideration the entire survey area. No trees containing hollows or potential hollows are included in the area proposed to be cleared (Ecosystem Solutions, 2021).

According to available databases, the closest confirmed forest red-tailed black cockatoo breeding site is approximately 12.00 kilometres to the north-west of the application area and the closest confirmed white-tailed black cockatoo breeding site is approximately 27.60 kilometres south-south-east of the application area.

### Foraging habitat

Foraging habitat differs between the three species of black cockatoos:

- *Zanda baudinii* (Baudin's cockatoo) - Primarily seeds of Marri, rarely Jarrah, in woodlands and forest, and seeds of native proteaceous plant species (for example, *Banksia* spp. and *Hakea* spp.). During the breeding season feed primarily on native vegetation, particularly Marri (seeds, flowers, nectar and grubs). Also insects and insect larvae; pith of *Anigozanthos flavidus* (kangaroo paw); tips of *Pinus* spp.; *Macadamia* spp., almonds and pecans; seeds of apples and pears; and persimmons.
- *Zanda latirostris* (Carnaby's cockatoo) - Native shrubland, kwongan heathland and woodland on seeds, flowers and nectar of native proteaceous plant species (*Banksia* spp., *Hakea* spp. and *Grevillea* spp.), as well as *Callistemon* spp. and marri. Also seeds of introduced species including *Pinus* spp., *Erodium* spp., wild radish, canola, almonds, macadamia and pecan nuts; insects and insect larvae; occasionally apples and persimmons; and liquidambar.
- *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo) - Primarily seeds of Jarrah and Marri in woodlands and forest, and edges of Karri forests, including Wandoo and Blackbutt. Forages on *Allocasuarina* cones, fruits of Snottygobble (*Persoonia longifolia*) and Mountain Marri (*C. haematoxylon*). Other less important foods include Blackbutt, Bullich, *Allocasuarina fraseriana*, *Hakea* spp., Tuart, Redheart Moit (*E. decipiens*) and Bushy Yate (*E. lehmanni*). Also some introduced eucalypts such as River Red Gum (*E. camaldulensis*) and Rose Gum (*E. grandis*). On the Swan Coastal Plain, often feeds on introduced Cape Lilac (*Melia azedarach*), *E. caesia*, *E. erythrocorys*, Lemon-scented Gum and Kaffir Plum (*Harpephyllum caffrum*).

The Flora and Fauna survey provided with the application (Ecosystem Solutions, 2021) noted the vegetation types within the application area include woodlands of marri. Noting the above listed foraging preferences of black cockatoo species, the application area will provide foraging habitat for all three black cockatoos.

Food resources within the range of roost sites are important to sustain populations of black cockatoos, and foraging resources should therefore be viewed in the context of the proximity to the known night roosting sites to the application area. Available databases show that there are nine records of black cockatoo roost sites within the local area but no mapped breeding locations. Black cockatoos will generally forage up to 12 kilometres from an active breeding site. Following breeding, they will flock in search of food, usually within six kilometres of a night roost (Commonwealth of Australia, 2012), but may range up to 20 kilometres.

There are six records of black cockatoo roosts within 10 kilometres of the application area, with the closest record being approximately 1.21 kilometres from the application area. There are no confirmed black cockatoo breeding trees within the application area (Ecosystem Solutions, 2021), however, with roosts being identified within approximately



1.21 kilometres of the application area, it is possible that the application area and surrounds are used as foraging habitat to support a roosting population. Due to the application area being within the foraging distance of known roosts, the proposed clearing of 39 native trees that provide suitable foraging habitat in an extensively cleared landscape is significant.



Figure 10: Location of mapped black cockatoo foraging habitat within application area CPS 10159/1.

#### Night Roost sites

Black cockatoo night roosts are usually located in the tallest trees of an area, and in close proximity to both a food supply and surface water (Commonwealth of Australia, 2012). There are seven roosts mapped within the local area of the application area, with the closest being 1.94 kilometres away. Given Ecosystem Solutions 2021 survey found a total of 1,284 potentially significant trees with a diameter at breast height (DBH) greater than 500 millimetres, it is likely that black cockatoos utilise the immediately adjacent area which includes the application area, for night roosting (Ecosystem Solutions, 2021).

#### ***Phascogale tapoatafa wambenger* (south-western brush-tailed phascogale)**

In south-west WA, *Phascogale tapoatafa wambenger* (south-western brush-tailed phascogales) are known to occur in dry sclerophyll forests and open woodlands that contain hollow bearing trees, with records less common in higher rainfall areas. This species is said to occur in highest densities in Perup/Kingston area, Collie River valley, and near Margaret River and Busselton (DEC, 2012). According to available databases, this species has been recorded 33 times within the local area (10 kilometres from the application area), with the closest record approximately 2.03 kilometres from the application area. The survey of the application area (Ecosystem Solutions, 2021) did not observe any signs of this species, however, they may use the road reserve to traverse between larger remnants of native vegetation. Impacts to individuals present at the time of clearing remain the greatest threat. Slow, directional clearing will mitigate impacts to individuals present at the time of clearing (Ecosystem Solutions, 2021).

#### **Ecological linkage**

The application area may function as an ecological linkage for fauna, including south-western brush-tailed phascogale and western ringtail possums, to move between larger remnants of native vegetation within the local area. The ecological linkage values will not likely be severed by the proposed clearing, noting native vegetation will remain with the road reserve.

#### Conclusion

Based on the above assessment, the application area includes suitable habitat for black cockatoos and western ringtail possum. The proposed clearing may also result in potential impacts on individuals of these species and south-western brush-tailed phascogales that may be present at the time of clearing. Slow, directional clearing and a pre-clearance inspection of the trees being cleared will mitigate impacts to individuals that may be present at the time of clearing.

The City have agreed to mitigation planting of marri and jarrah trees within North Jindong road reserve to mitigate impacts to fauna. The mitigation planting proposed was input into the WA Environmental Offsets Metric Calculator to determine the ratio required to mitigate the loss of 39 native trees that are suitable habitat for conservation significant fauna. From this, 59 native trees are required to be planted to mitigate the loss. The City have proposed to plant 75 marri and jarrah trees within the road reserve, which exceeds the minimum required. The City will be required to ensure the survival of at least 75 marri and jarrah trees. The proposed planting was determined to be a suitable mitigation measure. A significant residual impact does not remain following the mitigation planting. DWER considers the mitigation planting aligns with the WA Environmental Offsets Policy (2011) and WA Environmental Offsets Guideline (2014).

For the reasons set out above, it is considered that the impacts of the proposed clearing on biological values can be managed through the avoidance, minimisation and mitigation measures committed to by the applicant including conditions as specified in the permit.

#### Conditions

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

- Planting and ensuring the survival of at least 75 marri and jarrah trees within the road reserve.
- Slow, directional clearing towards adjacent native vegetation.
- A fauna specialist to be present to monitor clearing and to take steps as specified in the permit conditions if nominated fauna species are present during the clearing.

#### **3.2.3. Significant remnant vegetation - Clearing Principle (e)**

##### Assessment

The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearance of ecological communities with an extent below 30 per cent of that present pre-1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001). The application area is located within the Swan Coastal Plain Interim Biogeographic Regionalisation of Australia (IBRA) bioregion, which retains approximately 38.62 per cent of its pre-European vegetation extent (Government of Western Australia, 2019b). The mapped Swan Coastal Plain vegetation 'Abba complex' retains approximately 6.54 per cent of its pre-European

native vegetation extent within the bioregion (Government of Western Australia, 2019a). The extent of native vegetation remaining within the local area is 18.57 per cent. The Abba vegetation complex (30) and native vegetation remaining within the local area both retain less than 30 per cent of the original extent of native vegetation. Noting the local area and the mapped Abba vegetation complex is less than the 30 per cent threshold and the application area functions as an ecological linkage that contains habitat for fauna, the application area is considered to be a significant remnant within an extensively cleared landscape.

#### Conclusion

Due to the presence of suitable habitat for conservation significant fauna, the proposed clearing is impacting a significant remnant of native vegetation within an extensively cleared landscape. The mitigation measures proposed by the applicant through the revegetation of at least 75 native trees does not result in a significant residual impact, according to calculations made using the WA Environmental Offsets Metric Calculator (see section 3.2.2). Weed and dieback management measures will minimise impacts to the surrounding native vegetation.

#### Conditions:

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

- Planting and ensuring the survival of at least 75 marri and jarrah trees within the road reserve.
- Take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback.

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

The application area is located within the Busselton-Capel Groundwater Area - 32 proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act), and within the South West Carburnup River catchment, Busselton Coast Basin – Basin No 610, but not within a proclaimed surface water area. As no watercourses are present within the application area, approvals under the RIWI Act are not required.

The application area is located within the boundaries of the registered South West Boojarah #2 Indigenous Land Use Agreement (WI2017/013). No Aboriginal Heritage Places have been mapped within the application area.

There are six Aboriginal Heritage Places within the local area (10 kilometre radius from the centre of the area proposed to be cleared) with the closest being Marybrook 1 Camp (Place ID - 23) (approximately 6.7 kilometre north of the application site) and the next closest being Busselton Fringe Camp (Place ID - 676) (approximately 8.5 kilometre north-northeast of the application site). It is the permit holder's responsibility to ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

**End**



## Appendix A. Additional information provided by applicant

Summary of comments	Consideration of comment
The City provided additional avoidance, minimisation and mitigation measures in response to DWER's request for further information (City of Busselton, 2023b)	The additional information provided was considered in <i>Avoidance and mitigation measures</i> (see Section 3.1).
The City provided further avoidance, minimisation and mitigation in response to DWER's request for further information (City of Busselton, 2023c)	The additional information provided was considered in <i>Avoidance and mitigation measures</i> (see Section 3.1).

## Appendix B. Details of public submissions

Summary of comments	Consideration of comment
Street verge has remnant native trees and plants that should be conserved	<p>The Delegated Officer took into consideration that the vegetation within the area proposed to be cleared functions as an ecological linkage and is located within an extensively cleared landscape.</p> <p>The applicant has undertaken extensive efforts to minimise the amount of native vegetation required to be cleared (see Section 3.1).</p> <p>The Delegated Officer determined that mitigation planting of 75 native trees within the road reserve was adequate to counterbalance the significant residual impact of the clearing within an extensively cleared landscape that provided habitat for fauna.</p>
Mature marri trees close to road could be preserved	The Delegated Officer relies on the expert advice of the City and Main Roads in purposefully surveying the stretch of North Jindong Road and Hairpin Road in order to determine the minimum clearing requirements, whilst ensuring public safety. As far as practicable, roadside vegetation has been retained (see Section 3.1).
Balga grass trees could be relocated	The City have committed to relocate the <i>Xanthorrhoea preissii</i> (grass trees) that have been included in the proposed clearing area, where possible. These grass trees will be relocated within the mitigation planting areas (see Section 3.1: Figures 4 to 6).
There is no refuge for wildlife flora or fauna if clearing beyond that already completed, is allowed	The Delegated Officer had regard for impacts that the proposed clearing may have on conservation significant flora and fauna. Pre-clearance surveys of the area being cleared will be undertaken to ensure minimal impact to fauna that may be present at the time of clearing. The entire road reserve is not being cleared, with native vegetation to remain within the road reserve that would facilitate the movement of fauna. The assessment is detailed further in Section 3.2.1 and 3.2.3 of this report.
Properties adjacent to the road have been cleared	The Delegated Officer identified that the proposed clearing occurs within an extensively cleared landscape. As a result, the assessment concluded that mitigation planting was required to counterbalance the significant residual impact of clearing within the extensively cleared landscape.
Low traffic use as these are minor roads. No crash data at this site to date	The Delegated Officer relies on the expert advice of the City and Main Roads in purposefully surveying the stretch of North Jindong Road and Hairpin Road in order to determine the minimum clearing requirements, whilst ensuring public safety. As far as practicable, roadside vegetation has been retained. It has been

Summary of comments	Consideration of comment
	identified that the close proximity to the expanded road surface will increase both the likelihood and severity of potential vehicular impacts. Clearing of the road shoulder has been considered a critical aspect to key safety upgrades along North Jindong Road and Hairpin Road. Road safety data has been captured by the City in determining the clearing requirements (see Section 3.1).
Fire safety risk is small scale due to isolated vegetation	The Delegated Officer noted this, however has not considered it an important factor in the assessment of this clearing permit application.

## Appendix C. 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 D.

### C.1. Site Characteristics

Characteristic	Details
Local context	<p>The application area is a portion of North Jindong Road, North Jindong, within the City of Busselton. The native vegetation, comprised of 39 native trees proposed to be cleared, is located along a road reserve within the intensive land use zone of Western Australia. The application area includes areas of remnant vegetation and previously cleared areas. The surrounding area consists of rural lots with extensive areas that have been cleared for agricultural purposes, with small patches of remnant and planted vegetation. The proposed clearing area contributes to habitat linkages in a north south direction between parcels of native vegetation.</p> <p>Aerial imagery and spatial data indicate the local area (10 kilometre radius from the centre of the area proposed to be cleared) retains approximately 18.57 percent of the original remnant vegetation cover.</p>
Ecological linkage	<p>The application area may function as an ecological linkage for fauna moving between larger remnants of native vegetation within the local area.</p> <p>North Jindong Road was surveyed in June 2010 and allocated as a roadside conservation – road centreline (DBCA-030) area, with weeds identified, including – kikuyu, tagasaste, victorian teatree, watsonia and gladiolus.</p>
Conservation areas	The closest conservation area is located approximately 320 metres east of the application area, which is an area with an 'agreement to reserve in perpetuity' (Object ID – 186) under DPIRD Conservation Covenants.
Vegetation description	<p>There is minimal understorey where the trees are proposed to be cleared. The vegetation within the road reserve has been severely impacted by disturbance, with signs of clearing, historic grazing and the presence of invasive weeds (Ecosystem Solutions, 2021). Representative photos of the proposed clearing areas supplied by the applicant (City of Busselton, 2022b) are available in Appendix F.</p> <p>The two mapped vegetation types over the application area are described as:</p> <ul style="list-style-type: none"> <li>Pinjarra (1136) Woodland southwest vegetation association, which is described as jarrah, marri and <i>Eucalyptus marginata</i> (wandoo), <i>Corymbia calophylla</i>, <i>Eucalyptus wandoo</i>. (Shepherd et al, 2001)</li> <li>Abba vegetation complex (30), which is described as a mixture of open forest of <i>Corymbia calophylla</i>, <i>Eucalyptus marginata</i> (Jarrah) - Banksia species and woodland of <i>Corymbia calophylla</i> with minor occurrences of <i>Corymbia haematoxylon</i> woodland of <i>Eucalyptus rudis</i> and <i>Melaleuca</i> species along creeks and on flood plains (Webb et al. 2016).</li> </ul> <p>The mapped vegetation type (Abba vegetation complex) retains approximately 6.54 per cent of the original extent (Government of Western Australia, 2019a).</p>

Characteristic	Details
Vegetation condition	<p>Vegetation survey provided by the applicant indicates the vegetation within the application area is in Degraded to Completely Degraded condition (Keighery, 1994). The vegetation within the road reserve has been severely impacted by disturbance, with signs of clearing, historic grazing and the presence of invasive weeds (Ecosystem Solutions, 2021).</p> <p>The full Keighery (1994) condition rating scale is provided in Appendix E. Photos of the application area provided by the City are available in Appendix F.</p>
Climate and landform	<p>Rainfall: 1100 millilitres per annum and 1200 millilitres per annum Evapotranspiration: 800 millilitres per annum.</p> <p>Located at approximately 35 metres Australian Height Datum (AHD) to the south, the area slopes to the north at a lower elevation of 15 metres AHD.</p>
Soil description	<p>The application area is located within two soil systems, with the northern and southern 82 percent of the application areas being located within the 213AbAB1 Abba Flats Phase, which is described as having flats and low rises with sandy grey-brown duplex (Abba) and gradational (Busselton) soils. The central application areas (18 percent of the application area), just below an unnamed private driveway (Object ID – 266362) is mapped as 213AbABw Abba wet flats Phase which is described as having Winter wet flats and slight depressions with sandy grey-brown duplex (Abba) and gradational (Busselton) soils (DPIRD, 2019).</p>
Land degradation risk	<p>For detailed land degradation risk factors for both soil systems found within the application area, see Section B.3. of the report.</p> <p>The clearing of 39 native trees is not likely to lead to an increased risk of land degradation.</p>
Waterbodies	<p>No wetlands or waterways are mapped as occurring within the application area.</p> <p>The nearest waterway is major river Carburnup River, which meanders parallel to the west of North Jindong Road, and is located approximately 360 metres at its closest point.</p>
Hydrogeography	<p>The application area is in the Coastal Plain hydrological zone which occupies the western portion of the Perth Basin. Major aquifers: Leederville, Yarragadee and Cockleshell Gully Fms. The eastern Yoganup Fm, is a major recharge area that discharge to the Indian Ocean.</p> <p>The application area is not located within a proclaimed surface water area, however, Geographe Bay Rivers Surface Water Area lays approximately 2.3 kilometres south and 3.2 kilometres west of the area proposed to be cleared. The application area does lie within the Busselton-Capel Groundwater Area - UFI 32, proclaimed under the RIWI Act.</p> <p>According to available databases, the groundwater salinity is 500-1000 milligrams to litres total dissolved solids within the application areas.</p>
Flora	<p>Available databases indicate that there are 46 conservation significant flora records within the local area, 33 of which are priority listed species, five listed as Critically Endangered, five listed as Endangered and three listed as Threatened. The closest to the application area being Priority two species <i>Lasiopetalum laxiflorum</i>, recorded approximately 1.18 kilometres away.</p> <p>From a flora survey conducted by Ecosystem Solutions (2021), four Priority three <i>Loxocarya magna</i> records were found within the road reserve with the closest being approximately 2.68 metres from one of the areas proposed to be cleared (Ecosystem Solutions, 2021).</p>
Ecological communities	<p>There are ten conservation significant ecological communities within the local area, with one of these being located within 300 metres of the application area.</p> <p>The closest mapped Banksia WL SCP - Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region which is listed as Endangered under the EPBC Act is located approximately 269 metres east of the most northern area proposed to be cleared.</p> <p>None of the ecological communities have been mapped as occurring within the application area. No conservation significant ecological communities were noted within the application area during the flora survey (Ecosystem Solutions, 2021).</p>
Fauna	<p>There are records of 36 conservation significant fauna species found in the local area. Eighteen of these are migratory birds which are unlikely to utilise the application area. Seven of these species are oceanic or freshwater species, which would not utilise the</p>



Characteristic	Details
	<p>habitats within the application area. Of these 36 conservation significant fauna species, five are priority listed fauna, 30 are on the Threatened fauna list under the EPBC Act and one is classified under 'Specially Protected – other specially protected'.</p> <p>The application area lies within the mapped distribution area for all three black cockatoo species. There are six records of black cockatoo roosts within 10 kilometres of the application area, with the closest record being approximately 1.21 kilometres from the application area. There are no confirmed black cockatoo breeding trees within the application area (Ecosystem Solutions, 2021), however, with roosts being identified within approximately 1.21 kilometres of the application area, it is possible that the application area and surrounds are used as foraging habitat by roosting populations.</p> <p>The closest confirmed forest red-tailed black cockatoo breeding site is approximately 12.00 kilometres to the north-west of the application area and the closest confirmed white-tailed black cockatoo breeding site is approximately 27.60 kilometres south-south-east of the application area.</p> <p>The application area is mapped within medium to high suitable habitat for western ringtail possums.</p> <p>The fauna table C.5. in this report, provides an analysis of the species identified within the local area.</p>

## C.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
<b>IBRA bioregion**</b>					
Swan Coastal Plain	1,501,221.93	579,813.47	38.62	29.81	17.98
<b>Vegetation complex*</b>					
Swan Coastal Plain – Abba_30	50,892.78	3,326.20	6.54	183.20	0.36
<b>Remnant vegetation</b>					
Remnant vegetation mapped within 10 km	33,058.09	6,138.28	18.57	-	-

\*Government of Western Australia (2019a)

\*\*Government of Western Australia (2019b)

## C.3. Land degradation

Risk	213AbABw - Abba wet flats Phase	213AbAB1 - Abba Flats Phase
Wind erosion	M1: 10-30% of map unit has a high to extreme wind erosion risk	
Water erosion	L1: <3% of map unit has a high to extreme water erosion risk	
Water logging	H2: >70% of map unit has a moderate to very high waterlogging risk	H1: 50-70% of map unit has a moderate to very high waterlogging risk
Water Repellence	M1: 10-30% of map unit has a high water repellence risk	
Sub-surface Acidification	H2: >70% of map unit has a high subsurface acidification risk or is presently acid	
Phosphorous export	M1: 10-30% of map unit has a high to extreme phosphorus export risk	

Risk	213AbABw - Abba wet flats Phase	213AbAB1 - Abba Flats Phase
Salinity	L2: 3-10% of map unit has a moderate to high salinity risk or is presently saline	L1: 30-50% of map unit has a moderate to high salinity risk or is presently saline
Flooding	L1: <3% of the map unit has a moderate to high flood risk	

#### C.4. Flora analysis table

Species name	Conservation status	Number of known records (total)	Distance of closest record to application area (km)	Suitable habitat? [Y/N]	Suitable Soils? [Y/N]	Comment (Associated vegetation/habitat)
<b>Threatened Species</b>						
<i>Banksia nivea</i> subsp. <i>uliginosa</i>	EN	8	7.06	N	N	Eucalyptus dominated woodland or low forest.
<i>Banksia squarrosa</i> subsp. <i>argillacea</i>	T	9	3.79	N	Y	Tall shrubland of banksia, open marri-jarrah forest
<i>Caladenia busselliana</i>	CR	7	2.12	N	Y	Winter-wet swamps
<i>Caladenia excelsa</i>	EN	1	8.98	N	N	Hilltops and slopes
<i>Caladenia procera</i>	CR	11	1.63	Y	N	Marri-jarrah or peppermint woodland
<i>Caladenia viridescens</i>	CR	2	7.75	Y	Y	Marri-peppermint woodlands
<i>Chamelaucium roycei</i>	T	4	2.51	N	N	Wetland and swamp vegetation
<i>Daviesia elongata</i>	T	13	2.01	Y	Y	Marri-jarrah, <i>Banksia</i> woodland
<i>Drakaea micrantha</i>	EN	2	3.89	Y	N	<i>Banksia</i> , <i>Allocasuarina fraseriana</i> woodland or forests
<i>Grevillea brachystylis</i> subsp. <i>grandis</i>	CR	16	2.08	Y	Y	Marri-jarrah woodland
<i>Verticordia densiflora</i> var. <i>pedunculata</i>	EN	2	8.55	Y	N	Low woodland usually dominated by marri-jarrah, melaleuca, over shrubland
<i>Verticordia plumosa</i> var. <i>ananeotes</i>	CR	7	2.55	N	Y	Shrubland with overstorey of marri with melaleuca
<i>Verticordia plumosa</i> var. <i>vassensis</i>	EN	2	8.55	N	N	Inhabits seasonally wet or wetland areas; associated with Melaleuca spp
<b>Priority Species</b>						
<i>Acacia flagelliformis</i>	4	6	2.17	Y	Y	Marri-jarrah banksia woodland
<i>Acacia inops</i>	3	1	8.98	N	N	Dense swampy vegetation
<i>Acacia lateriticola</i> var. Glabrous variant (B.R. Maslin 6765)	3	1	9.28	Y	N	Marri-jarrah woodland
<i>Acacia semitrullata</i>	4	6	1.80	N	Y	Sandplains and swampy areas
<i>Actinotus whicheranus</i>	2	1	7.07	Y	N	Jarrah-marri and banksia woodland
<i>Andersonia ferricola</i>	1	3	7.06	N	N	Tall shrublands
<i>Boronia capitata</i> subsp. <i>gracilis</i>	3	4	2.79	N	Y	Low woodlands of Banksia spp., Melaleuca spp., or Eucalyptus spp., typically in winter wet swamps or hillslopes
<i>Calothamnus lateralis</i> var. <i>crassus</i>	3	3	7.06	N	N	Peaty sand in swamps
<i>Calothamnus quadrifidus</i> subsp. <i>teretifolius</i>	4	13	2.72	Y	Y	Woodland or shrubland of jarrah-marri
<i>Chordifex gracilior</i>	3	2	2.31	N	N	Low eucalyptus woodland
<i>Cyathochaeta teretifolia</i>	3	4	3.77	N	N	Swamp edges with melaleuca
<i>Grevillea brachystylis</i> subsp. <i>brachystylis</i>	3	10	4.11	Y	N	Marri-jarrah Forest
<i>Hakea oldfieldii</i>	3	14	2.29	Y	N	Marri-jarrah woodland
<i>Isopogon formosus</i> subsp. <i>dasylepis</i>	3	4	3.05	N	N	Eucalyptus woodland with banksia

Species name	Conservation status	Number of known records (total)	Distance of closest record to application area (km)	Suitable habitat? [Y/N]	Suitable Soils? [Y/N]	Comment (Associated vegetation/habitat)
<i>Johnsonia inconspicua</i>	3	12	3.21	Y	N	Marri-jarrah open woodland
<i>Lasiopetalum laxiflorum</i>	3	2	1.18	Y	Y	Marri-jarrah open woodland
<i>Lepyrodia heleocharoides</i>	3	4	1.38	N	N	Usually on borders of swamp
<i>Leucopogon</i> sp. Busselton (D. Cooper 243)	2	1	8.60	N	N	Jarrah-marri woodland
<i>Loxocarya magna</i>	3	7	3.00	Y	Y	Marri-melaleuca woodland
<i>Melaleuca incana</i> subsp. Gingilup (N. Gibson & M. Lyons 593)	2	1	8.60	N	N	Swamps – riparian vegetation
<i>Netrostylis</i> sp. Blackwood River (A.R. Annels 3043)	3	1	5.27	N	N	Associated with woodland or tall shrubland over sedges, often found on valley floors or on the edges of swamp/creekline vegetation
<i>Olearia strigosa</i>	3	2	1.90	Y	N	Eucalyptus and Banksia woodland, sandy/loam orange and grey soils
<i>Ornduffia submersa</i>	4	1	7.83	N	N	Open jarrah forest
<i>Pimelea ciliata</i> subsp. <i>longituba</i>	3	1	2.79	N	N	Jarrah or eucalyptus woodland over peppermint
<i>Pultenaea pinifolia</i>	3	3	5.46	N	Y	Swamp or wetland vegetation
<i>Schoenus benthamii</i>	3	1	8.55	N	Y	Swampy vegetation or seasonal wetlands
<i>Schoenus</i> sp. Jindong (R.D. Royce 2485)	1	1	2.79	N	N	Open eucalypt woodland
<i>Stylidium leeuwinense</i>	4	1	2.31	N	N	Winter-wet habitat and depressions
<i>Synaphea decumbens</i>	3	2	7.67	Y	N	Marri-jarrah Forest
<i>Synaphea hians</i>	3	2	3.77	Y	N	Marri-jarrah or melaleuca woodland
<i>Synaphea petiolaris</i> subsp. <i>simplex</i>	3	5	3.85	Y	N	Marri-jarrah and melaleuca woodland
<i>Thysanotus glaucus</i>	4	1	9.34	N	N	Low open woodland dominated by <i>Banksia</i> sp.
<i>Verticordia lehmannii</i>	4	2	3.33	N	Y	Swampy heath vegetation

### C.5. Fauna analysis table

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Actitis hypoleucos</i> (common sandpiper)	MI	N	N	8.18	5	N/A
<i>Arctocephalus tropicalis</i> (subantarctic fur-seal)	VU	N	N	8.97	1	N/A
<i>Bettongia penicillata ogilbyi</i> (woylie, brush-tailed bettong)	CR	N	N	3.53	1	N/A
<i>Calidris acuminata</i> (sharp-tailed sandpiper)	MI	N	N	5.26	20	N/A
<i>Calidris alba</i> (sanderling)	MI	N	N	9.69	1	N/A
<i>Calidris ferruginea</i> (curlew sandpiper)	CR	N	N	8.78	9	N/A
<i>Calidris melanotos</i> (pectoral sandpiper)	MI	N	N	8.81	3	N/A
<i>Calidris ruficollis</i> (red-necked stint)	MI	N	N	8.18	14	N/A



Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Actitis hypoleucos</i> (common sandpiper)	MI	N	N	8.18	5	N/A
<i>Calidris subminuta</i> (long-toed stint)	MI	N	N	8.78	1	N/A
<i>Calidris tenuirostris</i> (great knot)	CR	N	N	9.69	1	N/A
<i>Calyptorhynchus banksii naso</i> (forest red-tailed black cockatoo)	VU	Y	Y	1.21	21	Y
<i>Calyptorhynchus</i> sp. 'white-tailed black cockatoo' (white-tailed black cockatoo)	EN	N	N	1.21	20	Y
<i>Charadrius leschenaultii</i> (greater sand plover, large sand plover)	VU/MI	N	N	7.93	1	N/A
<i>Dasyurus geoffroyi</i> (chuditch, western quoll)	VU	N	N	9.69	1	N/A
<i>Engaewa pseudoreducta</i> (Margaret River burrowing crayfish)	CR	N	N	2.37	10	N/A
<i>Engaewa reducta</i> (Dunsborough burrowing crayfish)	CR	N	N	1.93	47	N/A
<i>Falco peregrinus</i> (Peregrine falcon)	OS	N	N	4.49	2	N/A
<i>Hydromys chrysogaster</i> (water-rat, rakali)	P4	N	N	2.17	14	N/A
<i>Hydroprogne caspia</i> (Caspian Tern)	MI	N	N	7.18	9	N/A
<i>Isoodon fusciventer</i> (quenda, southwestern brown bandicoot)	P4	Y	Y	2.17	23	Y
<i>Neophoca cinerea</i> (Australian sea-lion)	VU	N	N	6.92	1	N/A
<i>Notamacropus irma</i> (western brush wallaby)	P4	Y	Y	6.32	4	Y
<i>Oxyura australis</i> (blue-billed duck)	P4	N	N	8.97	1	N/A
<i>Pachysaga strobila</i> (Vasse pachysaga (Busselton-Donnybrook))	P1	N	N	5.93	1	N/A
<i>Pandion cristatus</i> (Osprey, eastern osprey)	MI	N	N	7.18	10	N/A
<i>Phascogale tapoatafa wambenger</i> (south-western brush-tailed phascogale, wambenger)	CD	Y	Y	2.03	33	Y
<i>Plegadis falcinellus</i> (glossy ibis)	MI	N	N	8.76	5	N/A
<i>Pluvialis fulva</i> (Pacific golden plover)	MI	N	N	8.97	3	N/A
<i>Pseudocheirus occidentalis</i> (western ringtail possum, ngwayir)	CR	Y	Y	1.83	1207	Y
<i>Thalasseus bergii</i> (crested tern)	MI	N	N	6.94	6	N/A
<i>Tringa glareola</i> (wood sandpiper)	MI	N	N	8.76	19	N/A
<i>Tringa nebularia</i> (common greenshank, greenshank)	MI	N	N	8.18	15	N/A
<i>Tringa stagnatilis</i> (marsh sandpiper, little greenshank)	MI	N	N	8.76	1	N/A
<i>Westralunio carteri</i> (Carter's freshwater mussel)	VU	N	N	1.96	6	N/A
<i>Zanda baudinii</i> (Baudin's cockatoo)	EN	Y	Y	2.18	24	Y
<i>Zanda latirostris</i> (Carnaby's cockatoo)	EN	Y	Y	3.14	9	Y

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Actitis hypoleucos</i> (common sandpiper)	MI	N	N	8.18	5	N/A

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

## Appendix D. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
<b>Environmental value: biological values</b>		
<p><u>Principle (a):</u> “Native vegetation should not be cleared if it comprises a high level of biodiversity.”</p> <p><u>Assessment:</u></p> <p>The trees proposed to be cleared occur near records of priority flora, contains habitat for fauna and occurs within an area that functions as an ecological linkage.</p>	May be at variance	Yes <i>Refer to Section 3.2.1.</i>
<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></p> <p>The area proposed to be cleared contains habitat for black cockatoo and western ringtail possums, as well as habitat utilised by south-western brush-tailed phascogales.</p>	At variance	Yes <i>Refer to Section 3.2.2. above.</i>
<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></p> <p>No threatened flora was recorded within the application area. A survey of the application area also found no individuals of threatened flora species.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1.</i>
<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></p> <p>The area proposed to be cleared does not contain species that represent a threatened ecological community.</p>	Not at variance	No
<b>Environmental value: significant remnant vegetation and conservation areas</b>		
<p><u>Principle (e):</u> “Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</p> <p><u>Assessment:</u></p> <p>The extent of the mapped vegetation type and the native vegetation in the local area is not consistent with the national objectives and targets for biodiversity conservation in Australia. Application area contains suitable habitat for threatened fauna and occurs adjacent to records of priority flora. Native vegetation is considered to be a significant remnant.</p>	At variance	Yes <i>Refer to Section 3.2.3. above.</i>

Assessment against the clearing principles	Variance level	Is further consideration required?
<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></p> <p>Given the distance to the nearest conservation area and the lack of topographical connectivity from the application area to conservation areas, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas.</p>	Not at variance	No
<b>Environmental value: land and water resources</b>		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u></p> <p>Given no water courses or wetlands are recorded within the application area, the proposed clearing is unlikely to impact an environment associated with a watercourse or wetland.</p>	Not at variance	No
<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></p> <p>Two soil types were mapped within the application area. Noting the extent and location of the application area, and the vegetation remaining within the road reserve, the proposed clearing is not likely to have an appreciable impact on 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></p> <p>Given no rivers, creeks or wetlands are recorded within the application area, the proposed clearing is unlikely to impact surface or ground water quality.</p>	Not likely to be at variance	No
<p><u>Principle (j):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</i></p> <p><u>Assessment:</u></p> <p>The mapped soil type within the application area has low risk of flooding. This low occurrence is aligned with the waterway which runs parallel, with the closest measurement approximately 360 metres to the west of the application area, with no waterways or waterbodies intersecting the application area.</p> <p>As a result of the distance between the application area and any floodplain boundaries of neighbouring watercourses and the size of the clearing, it is considered that the proposed clearing is unlikely to contribute to increased incidence or intensity of flooding.</p>	Not likely to be at variance	No



## Appendix E. Vegetation condition rating scale

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

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

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

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

## Appendix F. Biological survey information excerpts and photographs of the vegetation

Table 1: Clear zone distances from edge of through travelled way on straights ([Main Roads, 2011](#))

Batter slopes are described as x:1, being (Horizontal):(Vertical)

Design speed (km/h)	Design ADT <sup>(4)</sup>	Clear zone width (m)						
		Fill batter			Cut batter			
		6:1 to flat	4:1 to < 6:1	Steeper than 4:1 <sup>(2)</sup>	6:1 to flat	4:1 to < 6:1	4:1 to 3:1	Steeper than 3:1 <sup>(3)</sup>
≤ 60	< 750	3.0	3.0	<sup>(2)</sup>	3.0	3.0	3.0	<sup>(3)</sup>
	750 – 1500	3.5	4.5	<sup>(2)</sup>	3.5	3.5	3.5	<sup>(3)</sup>
	1501 – 6000	4.5	5.0	<sup>(2)</sup>	4.5	4.5	4.5	<sup>(3)</sup>
	> 6000	5.0	5.5	<sup>(2)</sup>	5.0	5.0	5.0	<sup>(3)</sup>
70 – 80	< 750	3.5	4.5	<sup>(2)</sup>	3.5	3.0	3.0	<sup>(3)</sup>
	750 – 1500	5.0	6.0	<sup>(2)</sup>	5.0	4.5	3.5	<sup>(3)</sup>
	1501 – 6000	5.5	8.0	<sup>(2)</sup>	5.5	5.0	4.5	<sup>(3)</sup>
	> 6000	6.5	8.5	<sup>(2)</sup>	6.5	6.0	5.0	<sup>(3)</sup>
90	< 750	4.5	5.5	<sup>(2)</sup>	3.5	3.5	3.0	<sup>(3)</sup>
	750 – 1500	5.5	7.5	<sup>(2)</sup>	5.5	5.0	3.5	<sup>(3)</sup>
	1501 – 6000	6.5	9.0	<sup>(2)</sup>	6.5	5.5	5.0	<sup>(3)</sup>
	> 6000	7.5	10.0 <sup>(1)</sup>	<sup>(2)</sup>	7.5	6.5	5.5	<sup>(3)</sup>
100	< 750	5.5	7.5	<sup>(2)</sup>	5.0	4.5	3.5	<sup>(3)</sup>
	750 – 1500	7.5	10.0 <sup>(1)</sup>	<sup>(2)</sup>	6.5	5.5	4.5	<sup>(3)</sup>
	1501 – 6000	9.0	12.0 <sup>(1)</sup>	<sup>(2)</sup>	8.0	6.5	5.5	<sup>(3)</sup>
	> 6000	10.0 <sup>(1)</sup>	13.5 <sup>(1)</sup>	<sup>(2)</sup>	8.5	8.0	6.5	<sup>(3)</sup>
110	< 750	6.0	8.0	<sup>(2)</sup>	5.0	5.0	3.5	<sup>(3)</sup>
	750 – 1500	8.0	11.0 <sup>(1)</sup>	<sup>(2)</sup>	6.5	6.0	5.0	<sup>(3)</sup>
	1501 – 6000	10.0 <sup>(1)</sup>	13.0 <sup>(1)</sup>	<sup>(2)</sup>	8.5	7.5	6.0	<sup>(3)</sup>
	> 6000	10.5 <sup>(1)</sup>	14.0 <sup>(1)</sup>	<sup>(2)</sup>	9.0	9.0	7.5	<sup>(3)</sup>

1. Where a site specific investigation indicates a high probability of continuing crashes, or such occurrences are indicated by crash history, the designer may provide clear zone distances greater than the clear zone shown in Table 4.1. A jurisdiction may limit clear zones to 9 m for practicality and to provide a consistent roadway template if previous experience with similar projects or designs indicates satisfactory performance.

2. For fill batters steeper than 4:1 the batter width shall be treated as non-recoverable and not be considered as part of the clear zone. If a clear zone is to be provided then:

- Providing that the embankment is not considered hazardous (refer to Sections 4.3.3 – 4.3.4) then the clear zone can be provided by the recoverable area at the top and bottom of the embankment. If this summation is equal to or greater than the required clear zone for the appropriate slopes of these areas then the clear zone is satisfied.
- If the embankment is hazardous, then unless the embankment is offset a distance equal to the clear zone for the appropriate slope from the edge of the travelled way to the embankment it is within the clear zone.

3. No clear zone widths are provided for cut batters steeper than 3:1. Therefore unless an appropriate clear zone is provided prior to the cut batter it shall be treated as being within the clear zone. The cut batter and any objects contained on it shall be assessed in accordance with Section 4.5.5.

4. The design ADT in the table is the average daily traffic volume in both directions and in all lanes, other than for divided roads where it is the total traffic in all lanes in one direction. In selecting the traffic to be used for the assessment of the clear zone a 20 year timeframe and allowance for growth over this period shall be considered.

5. Where the road is curved the values in Table 4.1 should be adjusted by the curve correction factors in Table 4.2.

Source: Adapted from AASHTO (2006).

MAIN ROADS Western Australia

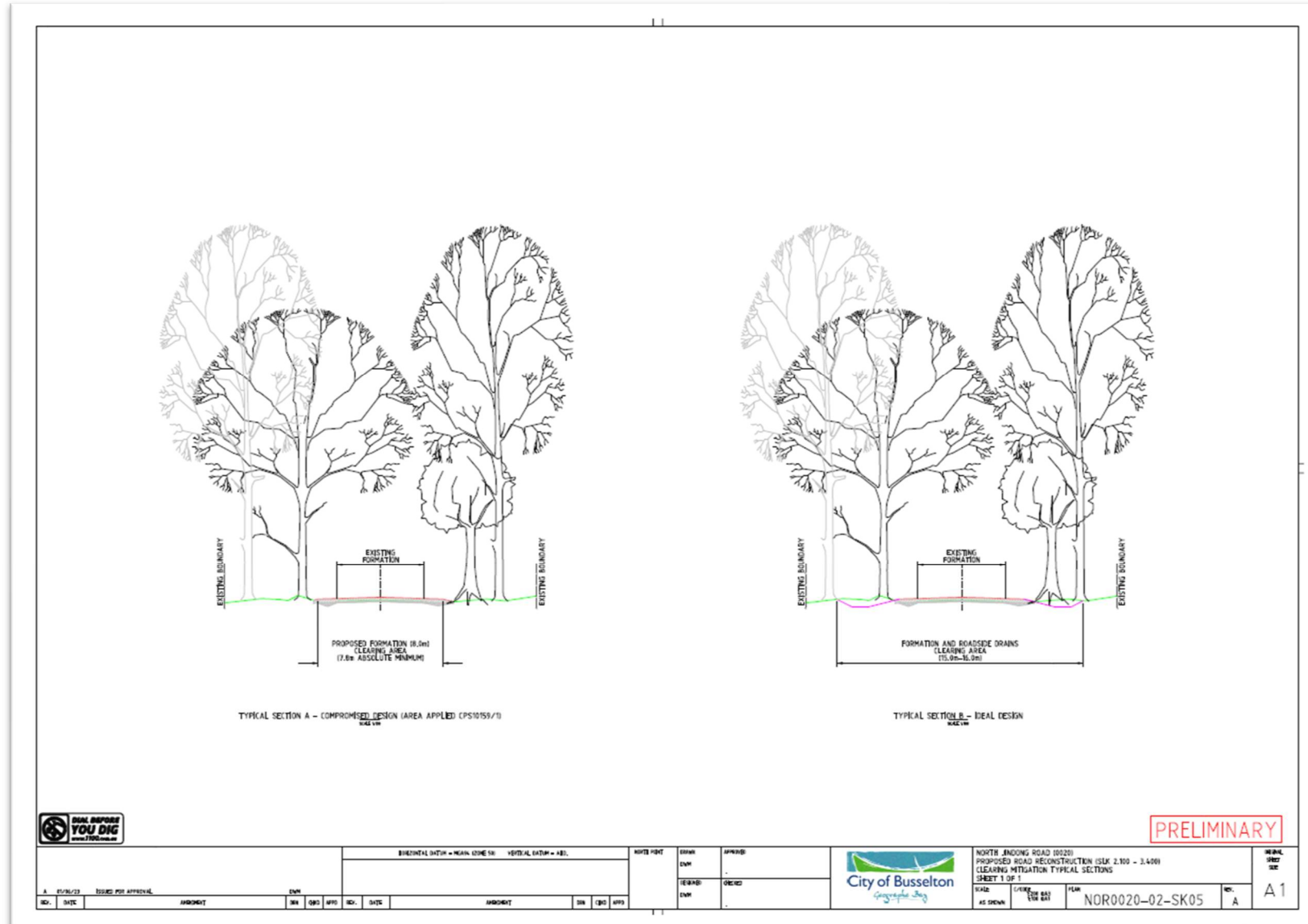


Figure 11: The City of Busselton's compromised road design to minimise the clearing of vegetation (City of Busselton, 2023b)









Figure 13: Trees remaining in/on the compacted shoulder within 3.9 metre of the centreline of the road post clearing under clearing permit CPS 9795/1 (City of Busselton, 2023b).



SLK2303R

Dead Redgum

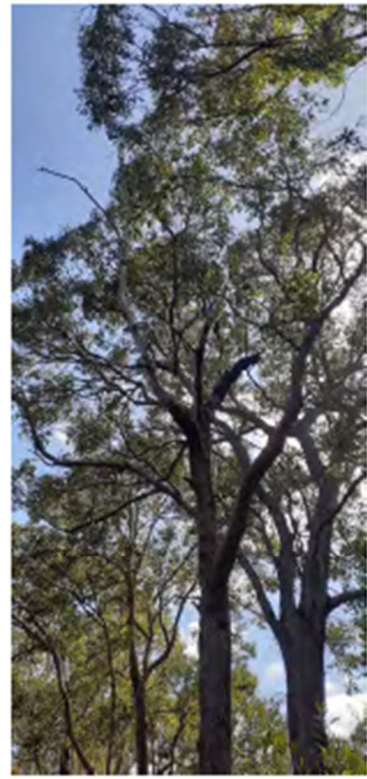
0.3m DBH

Coodinates

E 333086.245

N 6266074.265

Linked with report



SLK2578L

Redgum

(Sight line issue)

0.3m DBH

Coodinates

E 333168.987

N 6266340.324

Not linked with report

Not Significant



Figure 14: Trees along North Jindong Road reserve, proposed to be cleared (City of Busselton, 2023a).



SLK2610L

Redgum

(Sight line issue)

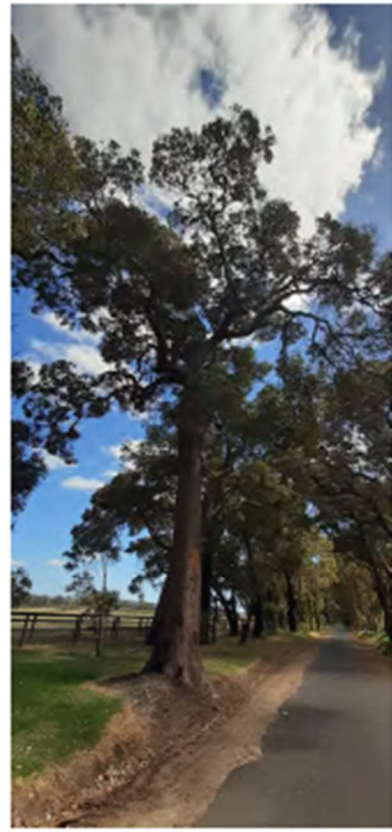
1.5m DBH

Coodinates

E 333179.949

N 6266369.274m

Linked with report



SLK2696L

Redgum

0.7m DBH

Coodinates

E 333207.396

N 6266451.025

Linked with report

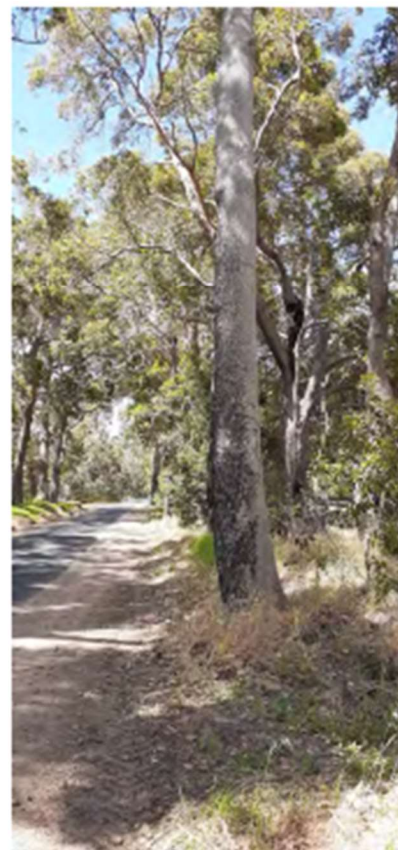


Figure 15: Trees along North Jindong Road reserve, proposed to be cleared (City of Busselton, 2023a).



SLK2760L

Redgum

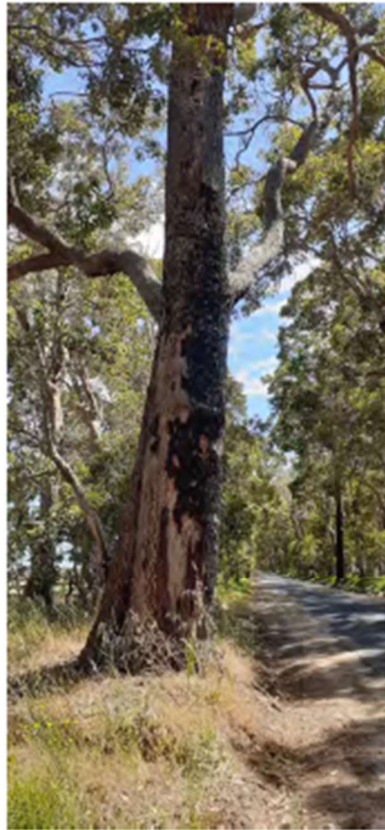
1.2m DBH

Coodinates

E 333228.441

N 6266512.111

Linked with report



SLK2906R

Redgum

0.9m DBH

Coodinates

E 333283.750m

N 6266646.875

Linked with report



Figure 16: Trees along North Jindong Road reserve, proposed to be cleared (City of Busselton, 2022a).



SLK2938L

Redgum

0.4m DBH

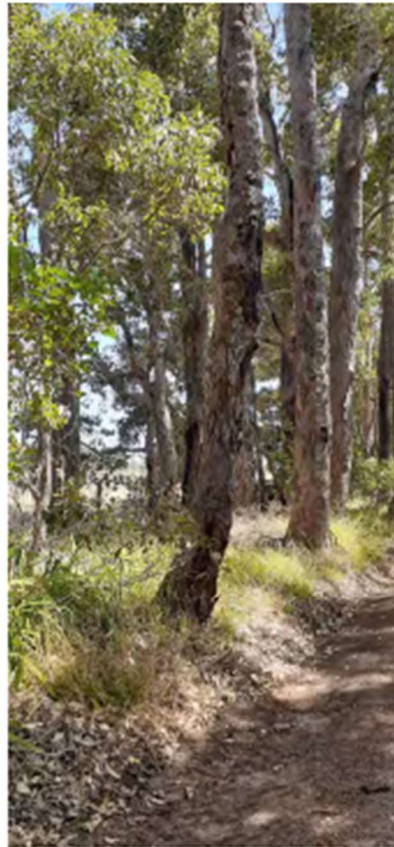
Coodinates

E 333286.478

N 6266679.918

Not linked with report

Not Significant



SLK2984R & SLK2987R

Redgums

0.3m and 0.5m DBH

Coodinates

E 333308.972

N 6266721.763

E 333310.126

N 6266724.856

Linked with report

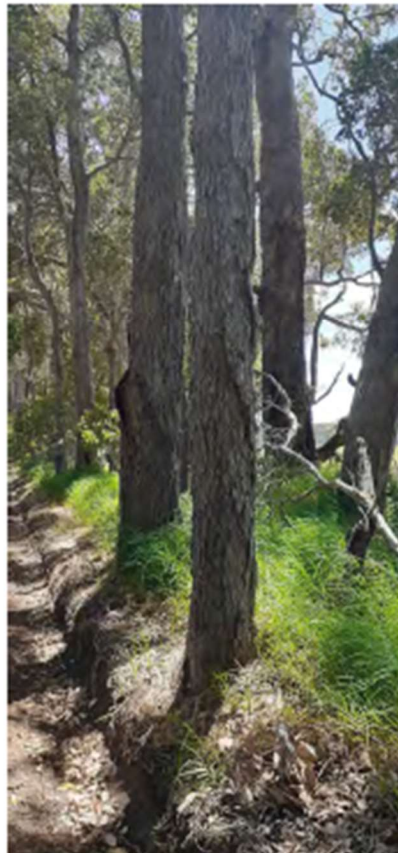


Figure 17: Trees along North Jindong Road reserve, proposed to be cleared (City of Busselton, 2023a).



SLK3112R

Redgum

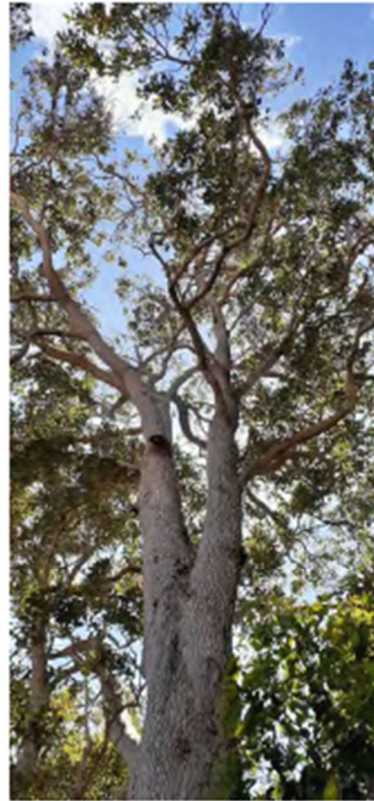
0.7m DBH

Coodinates

E 333349.462

N 6266838.031

Linked with report



SLK3409R

Redgum

0.7m DBH

Coodinates

E 333448.590

N 6267122.317

Linked with report



Figure 18: Trees along North Jindong Road reserve, proposed to be cleared (City of Busselton, 2023a).



SLK3448L

Redgum

0.45m DBH

Coodinates

E 333453.354

N 6267161.787

Linked with report



SLK4313L

Redgum

0.5m DBH

Coodinates

E 333584.102

N 6268002.120

Linked with report

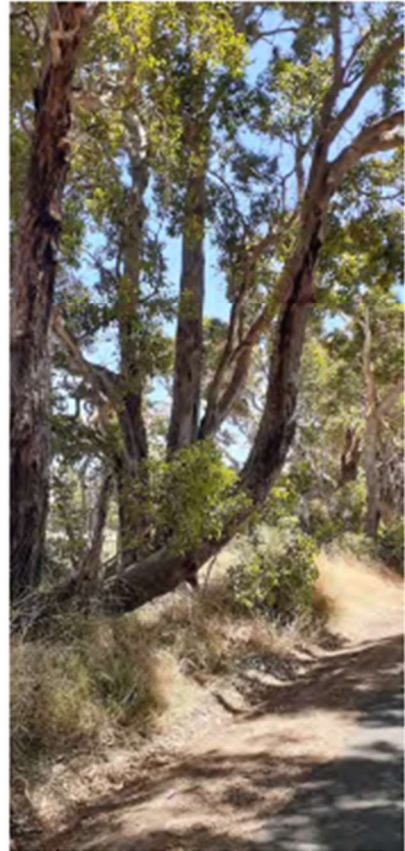


Figure 19: Trees along North Jindong Road reserve, proposed to be cleared (City of Busselton, 2023a).



SLK4382R

Redgum

0.3m DBH

Coodinates

E 333592.398

N 6268071.683

Not linked with report

Not Significant



SLK2590R and SLK2592R

(Hairpin Road intersection)

Redgums

0.15m and 0.2m DBH

Coodinates

E 333187.818

N 6266346.185

E 333190.094

N 6266347.484

Not linked with report

Not Significant



Figure 20: Trees along North Jindong Road reserve, proposed to be cleared (City of Busselton, 2023a).

Curve SLK3836-3882

SLK3836L

Redgum

0.25m DBH

Coodinates

E 333577.453

N 6267529.323

Not linked with report

Not Significant



SLK3847L

Jarraah (inc small Redgums)

1.0m DBH

Coodinates

E 333578.963

N 6267540.560

Linked with report



Figure 21: Trees along North Jindong Road reserve, proposed to be cleared (City of Busselton, 2023a).



SLK3860L

Redgums (inc small Redgums)

1.2m and 0.4m DBH

Coodinates

E 333582.304

N 6267552.635

E 333582.953

N 6267553.380

Linked with report



SLK3875L

Redgum (two together) (inc small Redgums and 4x grass trees)

0.6(x2)m DBH

Coodinates

E 333586.654

N 6267566.256

Linked with report



Figure 22: Trees along North Jindong Road reserve, proposed to be cleared (City of Busselton, 2023a).



SLK3882L

Redgum (inc small Redgums)

0.4m DBH

Coordinates

E 333587.622

N 6267570.429

Not linked with report

Not Significant



Figure 23: Trees along North Jindong Road reserve, proposed to be cleared (City of Busselton, 2023a).

## Appendix G. Sources of information

### G.1. GIS databases

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

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- 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
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas

- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems

Restricted GIS Databases used:

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

## G.2. References

- City of Busselton (2023a) *Clearing permit application and supporting CPS 10159/1*, received 20 April 2023 (DWER Ref: DWERDT768222).
- City of Busselton (2023b) *CPS 10159/1 – response to RFI*, received 6 June 2023 (DWER Ref: DWERDT788528).
- City of Busselton (2023c) *CPS 10159/1 – additional information provided*, received 26 July 2023 (DWER Ref: DWERDT812166).
- Commonwealth of Australia (2001) *National Objectives and Targets for Biodiversity Conservation 2001-2005*, Canberra.
- Department of Agriculture, Water and the Environment (DAWE) (2022) *Referral guideline for three WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black cockatoo*, Department of Agriculture, Water and the Environment, Canberra, February.
- Department of Biodiversity, Conservation and Attractions (DBCA) (2022) *Species and Communities Branch TEC/flora advice for clearing permit application CPS 9795/1*, received 7 November 2022. Department of Biodiversity, Conservation and Attractions, Western Australia (DWER Ref: DWERDT668386).
- Department of Environment and Conservation (DEC) (2012) *Red-tailed Phascogale Phascogale calura (Gould, 1844) – Fauna Profiles*. Perth. Available from [https://www.dpaw.wa.gov.au/images/documents/conservation-management/pests-diseases/red-tailed-phascogale\\_2012.pdf](https://www.dpaw.wa.gov.au/images/documents/conservation-management/pests-diseases/red-tailed-phascogale_2012.pdf).
- Department of Environment Regulation (DER) (2013). *A guide to the assessment of applications to clear native vegetation*. Perth. Available from [https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Guidelines/Guide2\\_assessment\\_native\\_veg.pdf](https://www.der.wa.gov.au/images/documents/your-environment/native-vegetation/Guidelines/Guide2_assessment_native_veg.pdf).
- Department of Parks and Wildlife (DPAW) (2017) *Western Ringtail Possum (Pseudocheirus occidentalis) Recovery Plan*. Wildlife Management Program No. 58. Available from: <http://www.environment.gov.au/biodiversity/threatened/publications/recovery/western-ringtail-possum-recovery-plan>.
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