



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 8590/1
Permit Holder:	Shire of Kellerberrin
Duration of Permit:	From 28 April 2022 to 28 April 2037

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

Baandee North Road Reserve: PIN 1294752 (North Baandee)

Baandee North Road Reserve: PIN 1294753 (North Baandee)

Baandee North Road Reserve: PIN 1294754 (North Baandee)

Baandee North Road Reserve: PIN 1294755 (North Baandee)

3. Clearing authorised

The permit holder must not clear more than 1.46 hectares of *native vegetation* within the areas cross-hatched yellow in Figure 1 to Figure 6 of Schedule 1.

4. Period during which clearing is authorised

The permit holder must not clear any *native vegetation* after 28 April 2027.

PART II – MANAGEMENT CONDITIONS

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

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

- (a) avoid the clearing of *native vegetation*;
- (b) minimise the amount of *native vegetation* to be cleared; and
- (c) reduce the impact of clearing on any environmental value.

6. Weed and dieback management

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

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

7. Directional clearing

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

8. Fauna management – black cockatoo habitat trees

The permit holder shall not clear the twenty-one *black cockatoo habitat trees* identified red in Figure 1 of Schedule 2.

9. Offset - Lot 19082 on Deposited Plan 403044 (being Crown Reserve R14411)

- (a) Prior to 28 April 2023, the permit holder shall provide to the *CEO* a copy of the executed change in purpose of Lot 19082 on Deposited Plan 403044 (being Crown Reserve R14411) from ‘gravel’ to ‘conservation’ identified red in Figure 2 of Schedule 2.
- (b) In the event that the change in purpose of Lot 19082 on Deposited Plan 403044 (being Crown Reserve R14411) is not achieved in accordance with condition 9(a):
 - (i) the permit holder must submit a new offset proposal for the *CEO*’s approval by 28 April 2023; and
 - (ii) in preparing an offset proposal in accordance with condition 9 (b)(i), the permit holder must comply with the principles in the Government of Western Australia’s *WA Environmental Offsets Policy (September 2011)* and have regard to the *WA Environmental Offsets Guidelines (August 2014)*.

10. Offset – Rehabilitation

The permit holder shall implement the offset proposal submitted to the Department titled: “*Shire of Kellerberrin. Clearing Permit Offset Proposal. CPS 8590/1. December 2021*” and take the following actions for the purpose of *rehabilitation*:

- (a) *rehabilitate* at least 9.01 hectares of *native vegetation* within the areas cross-hatched red within Lot 19082 on Deposited Plan 403044 (being Crown Reserve R14411) in Figure 3 of Schedule 2 of this permit;
- (b) commence *rehabilitation* actions specified under condition 10 of this permit within 12 months of the clearing authorised under condition 3 of this permit;
- (c) attain a *vegetation condition* rating of at least good to very good (*Keighery, 1994*) for at least 9.01 hectares of *native vegetation* within the areas cross-hatched red in Figure 3 of Schedule 2 of this permit;

- (d) undertake *weed* control actions to reduce *weed* densities to facilitate the attainment of the *vegetation condition* rating specified in condition 10(c) of this permit;
- (e) undertake rabbit control actions to facilitate the attainment of the *vegetation condition* rating specified in condition 10(c) of this permit;
- (f) install signage in at least four sites identified in the offset proposal submitted to the Department titled: “*Shire of Kellerberrin. Clearing Permit Offset Proposal. CPS 8590/1. December 2021*” to educate reserve users of the rehabilitation activities and management actions being undertaken;
- (g) remove all historical rubbish from the two sites identified in the offset proposal submitted to the Department titled: “*Shire of Kellerberrin. Clearing Permit Offset Proposal. CPS 8590/1. December 2021*”;
- (h) implement *weed* and *dieback* hygiene protocols by cleaning earth-moving machinery of soil and vegetation prior to entering and leaving the areas cross-hatched red in Figure 3 of Schedule 2 of this permit;
- (i) attain the *vegetation condition* rating specified in condition 10(c) of this permit within three years of the commencement of *rehabilitation* actions;
- (j) within three years of the commencement of rehabilitation actions engage an *environmental specialist* to determine the *vegetation condition (Keighery, 1994)* of the areas cross-hatched red within Figure 3 of Schedule 2 of this permit;
- (k) where the determination made by the *environmental specialist* under condition 10(j) of this permit is that the *vegetation condition (Keighery, 1994)* will not, without further *rehabilitation*, result in the *vegetation condition* specified under condition 10(c) of this permit the permit holder must *rehabilitate* the area by repeating the actions required under conditions 10(a), 10(c), 10(d), 10(e), and 10(h) of this permit;
- (l) Where actions are repeated in accordance with condition 10(k) of this permit, the permit holder shall repeat actions in accordance with condition 10(k) of this permit until the *vegetation condition* rating specified under condition 10(c) is attained;
- (m) Where actions are repeated in accordance with condition 10(k) of this permit, the permit holder shall within two years of repeating actions under condition 10(k) of this permit engage an *environmental specialist* to determine the *vegetation condition (Keighery, 1994)* of the areas cross-hatched red within Figure 3 of Schedule 2 of this permit;
- (n) Where a determination is made by an *environmental specialist* under condition 10(k) or condition 10(m) of this permit that the *vegetation condition* rating specified in condition 10(c) of this permit has been attained that determination shall be submitted for the *CEO*’s consideration; and
- (o) If the *CEO* does not agree with the determinations made by an *environmental specialist* under condition 10(n) of this permit, the *CEO* may require the permit holder to repeat actions under conditions 10(k), 10(l), 10(m) and 10(n) of this permit;

PART III - RECORD KEEPING AND REPORTING

11. Records that must be kept

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

Table 1: Records that must be kept

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

No.	Relevant matter	Specifications
	authorised clearing activities generally	<p>cleared area;</p> <p>(b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings;</p> <p>(c) the date that the area was cleared;</p> <p>(d) the direction that clearing was undertaken;</p> <p>(e) the size of the area cleared (in hectares);</p> <p>(f) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 5 of this permit;</p> <p>(g) actions taken to minimise the risk of the introduction and spread of <i>weeds</i> and <i>dieback</i> in accordance with condition 6 and condition 10(h) of this permit; and</p> <p>(h) actions taken to retain the twenty-one <i>black cockatoo habitat trees</i> in accordance with condition 8 of this permit.</p>
2.	in relation to <i>rehabilitation</i> pursuant to condition 10 of this permit.	<p>(a) a description of the <i>rehabilitation</i> activities undertaken;</p> <p>(b) the size and location of the areas <i>rehabilitated</i> (in hectares);</p> <p>(c) the date that <i>rehabilitation</i> works began;</p> <p>(d) any remediation works undertaken;</p> <p>(e) the date that stipulated vegetation condition ratings are considered to have been attained in accordance with condition 10(c) of this permit;</p> <p>(f) dates and details of <i>weed</i> control actions undertaken in accordance with condition 10(d) and condition 10(k) of this permit;</p> <p>(g) dates and details of rabbit control actions undertaken in accordance with condition 10(e) and condition 10(k) of this permit;</p> <p>(h) dates and locations of signage erected in accordance with condition 10(f) of this permit;</p> <p>(i) dates and locations of rubbish removed in accordance with condition 10(g) of this permit; and</p> <p>(j) determinations made by an <i>environmental specialist</i> in accordance with condition 10(j) and condition 10(m) of this permit.</p>

12. Reporting

- (a) The permit holder must provide to the *CEO* on or before 31 December of each year, a written report containing:
- (i) the records required under condition 11 of this permit; 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 11 of this permit, where these records have not already been provided under condition 12(a) of this permit.

DEFINITIONS

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

Table 2: Definitions

Term	Definition
black cockatoo habitat trees	means trees that have a diameter measured over bark at 130 centimetres from the base of the tree of 50 centimetres or greater (or 30 centimetres or greater for <i>Eucalyptus salmonophloia</i> or <i>Eucalyptus wandoo</i>) that contain hollows suitable for breeding by black cockatoo species.
CEO	Chief Executive Officer of the department or his/her delegates responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> .
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a <i>condition</i> to which this clearing permit is subject under section 51H of the EP Act.
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
dieback	means the effect of <i>Phytophthora</i> species on native vegetation.
environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent and has experience relevant to the type of environmental advice that an environmental specialist is required to provide under this permit, or who is approved by the <i>CEO</i> as a suitable environmental specialist.
EP act	<i>Environmental Protection Act 1986</i> (WA)
fill	means material used to increase the ground level, or to fill a depression.
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
rehabilitate, rehabilitated and rehabilitation	means actively managing an area containing native vegetation in order to improve the ecological function of that area using methods such as natural regeneration, direct seeding and/or planting, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area.
vegetation condition	means the rating given to native vegetation which refers to the impact of disturbance on each of the layers and the ability of the community to regenerate (Keighery, 1994)
Keighery, 1994	Means the publication: Keighery, B.J. (1994) <i>Bushland Plant Survey: A Guide to Plant Community Survey for the Community</i> . Wildflower Society of WA (Inc). Nedlands, Western Australia.
weeds	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 not indigenous to the area concerned.

END OF CONDITIONS

A handwritten signature in black ink, appearing to be 'Mathew Gannaway', written over a horizontal line.

Mathew Gannaway
MANAGER
NATIVE VEGETATION REGULATION

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

4 April 2022

Schedule 1 - The boundary of the areas authorised to be cleared is shown in the maps below (Figure 1 to Figure 6).

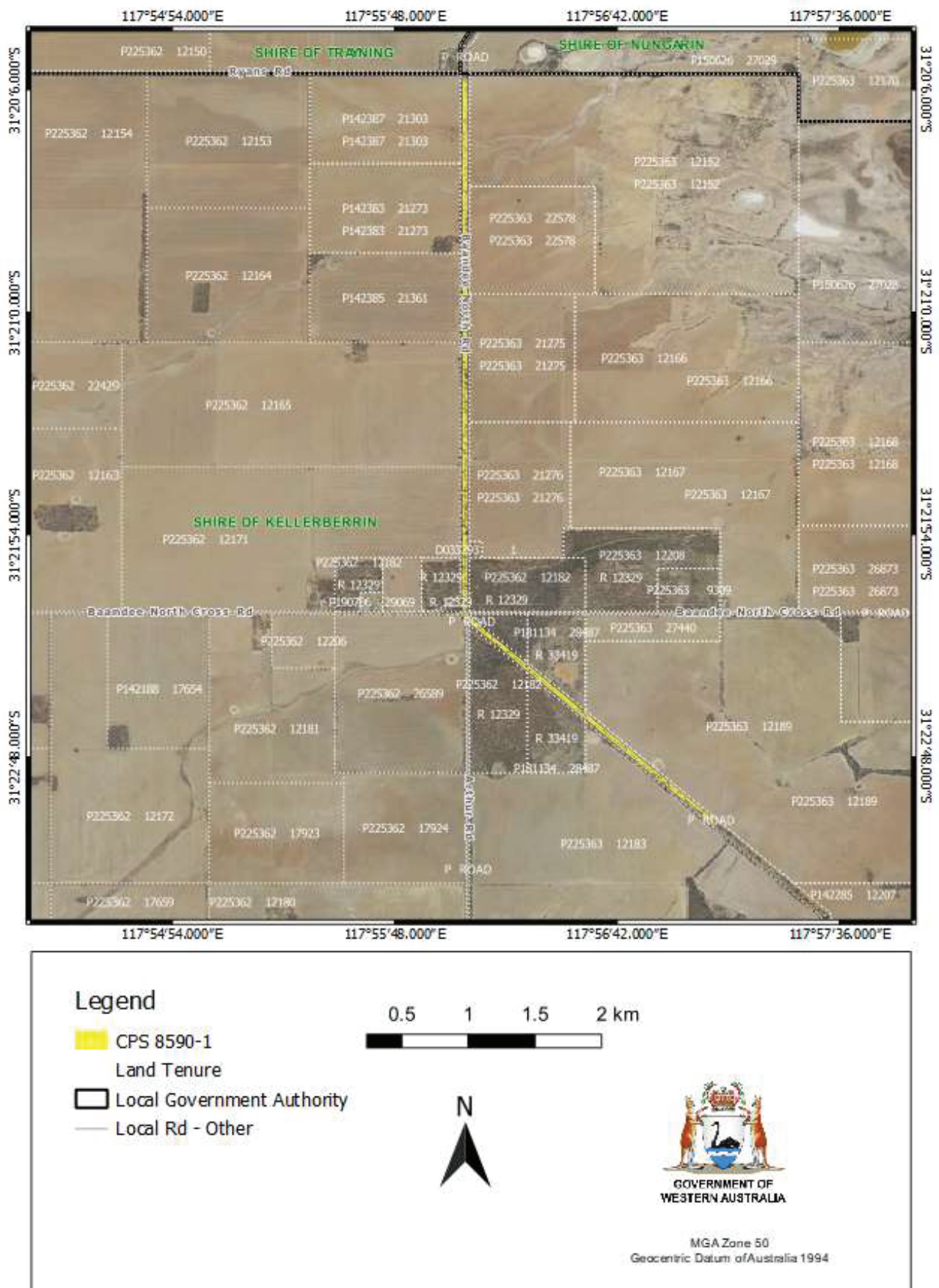


Figure 1: Context map of the area within which clearing may occur

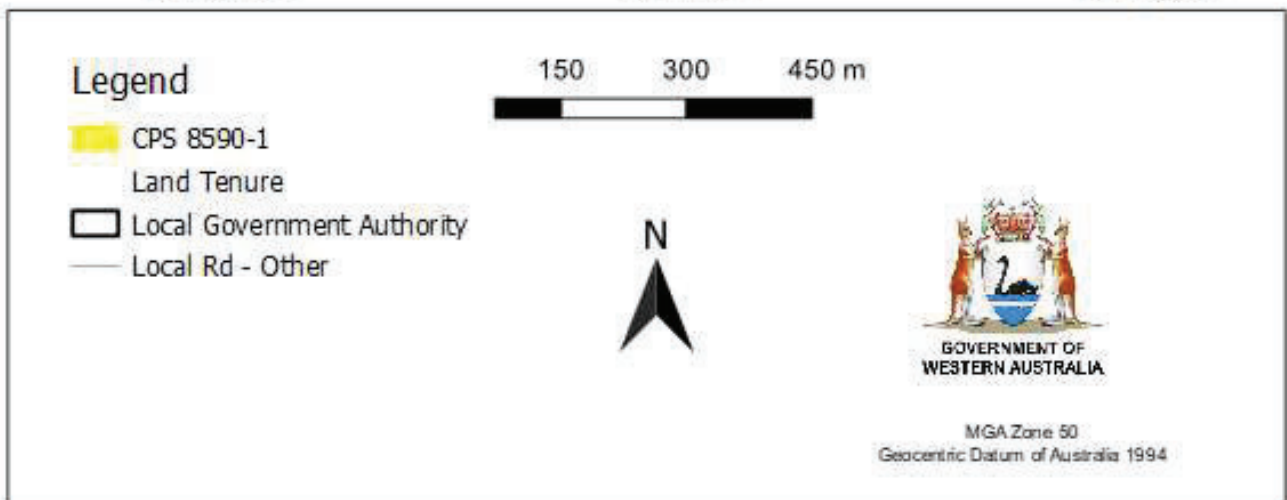


Figure 2: Map of the boundary of the area within which clearing may occur (A)

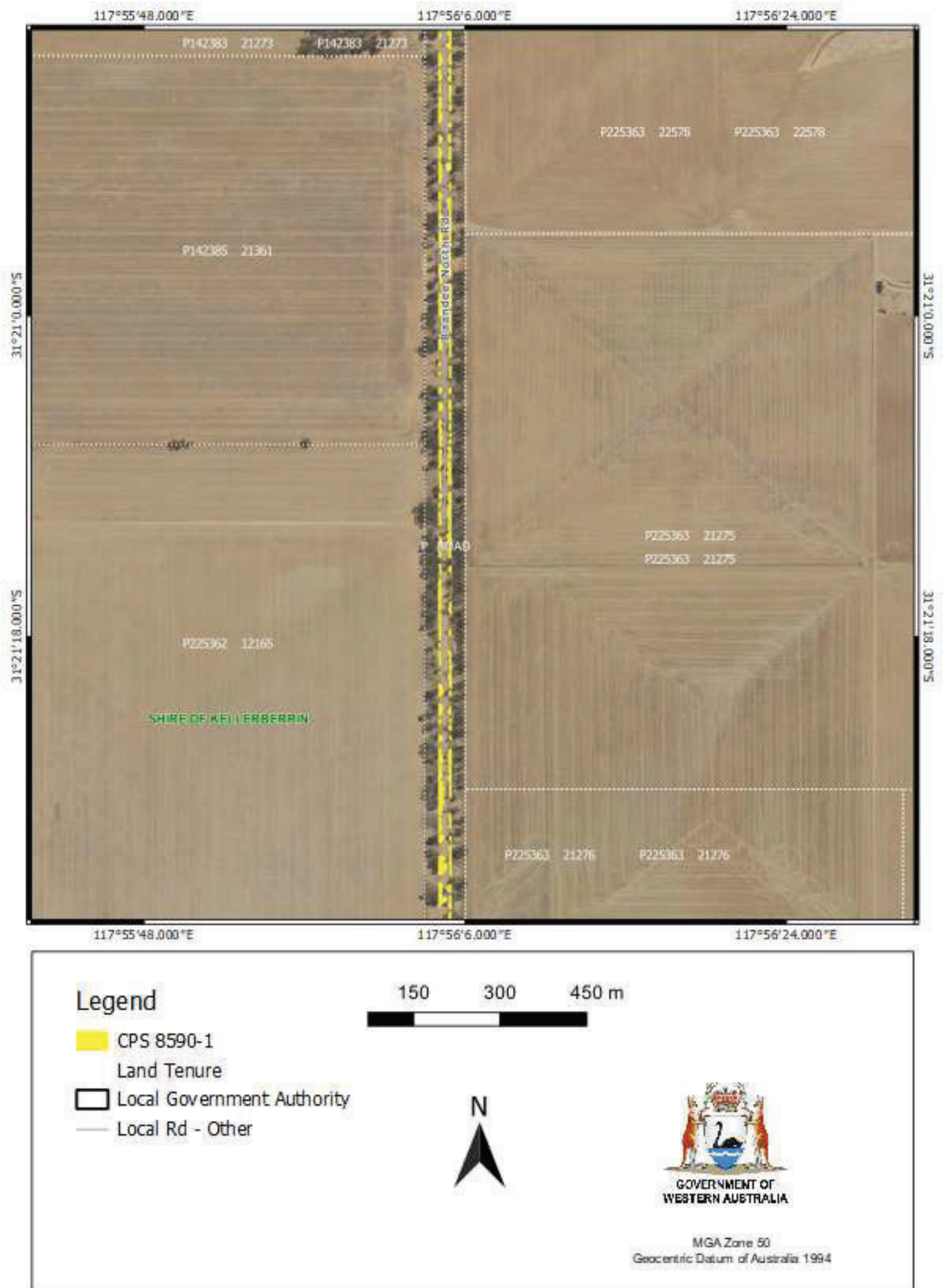


Figure 3: Map of the boundary of the area within which clearing may occur (B)

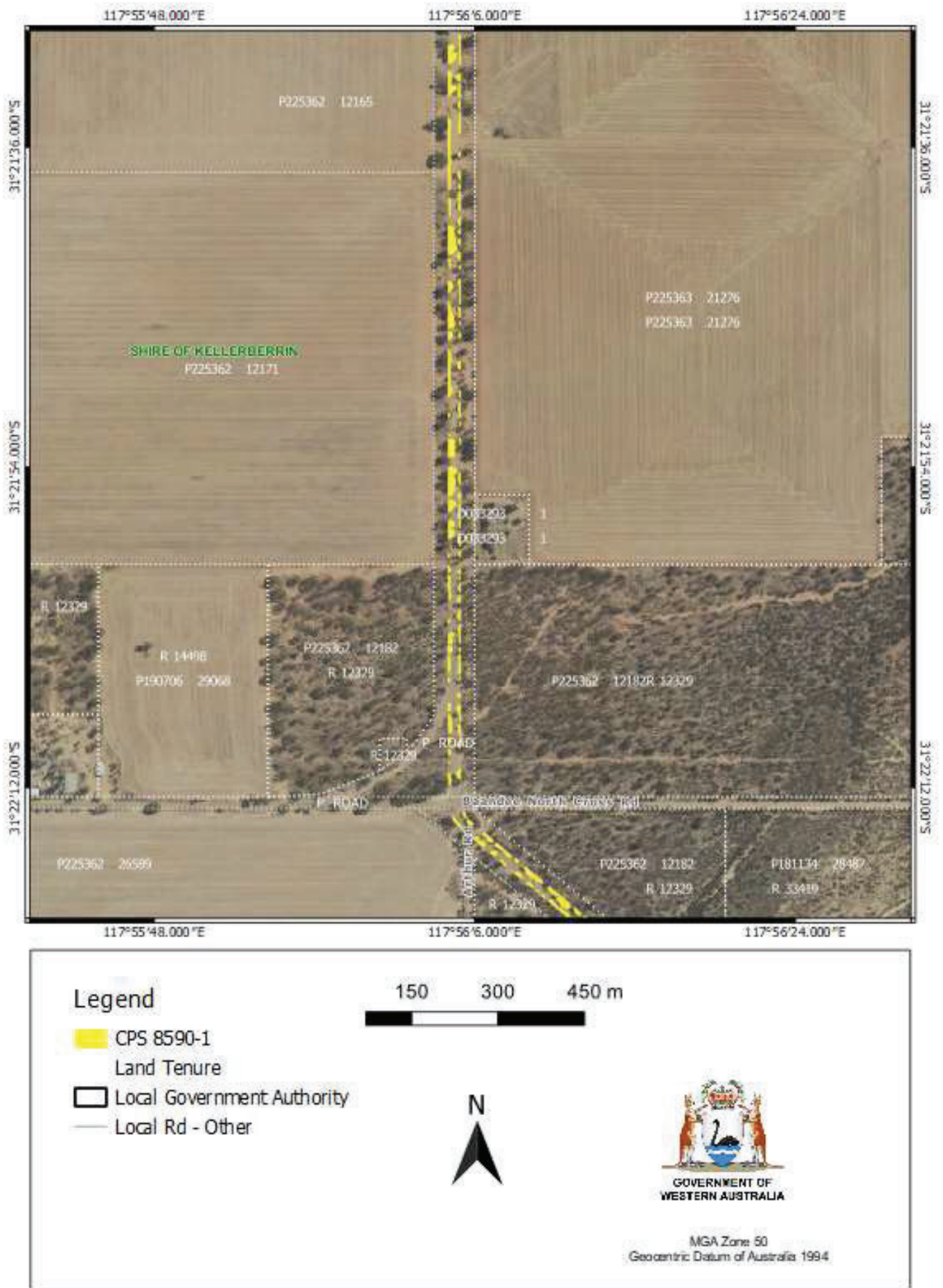


Figure 4: Map of the boundary of the area within which clearing may occur (C)

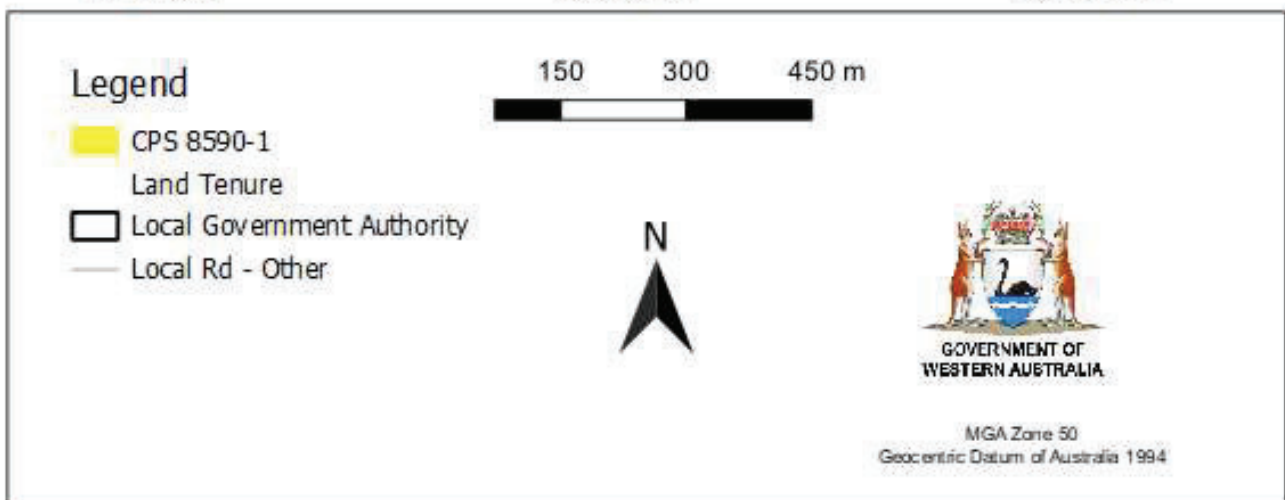


Figure 5: Map of the boundary of the area within which clearing may occur (D)

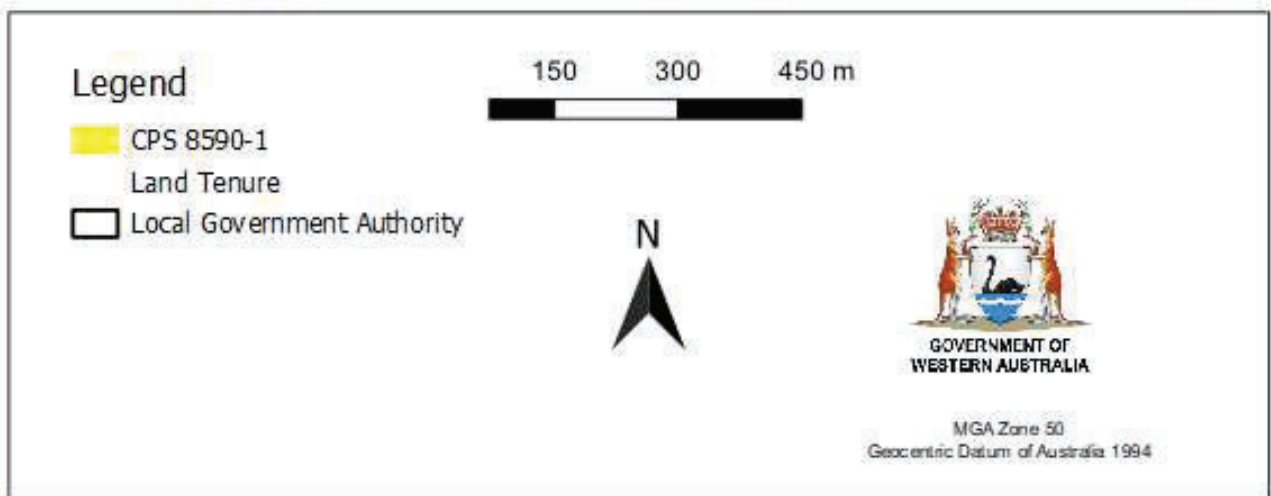


Figure 6: Map of the boundary of the area within which clearing may occur (E)

Schedule 2 – Areas where permit conditions apply (Figure 1).

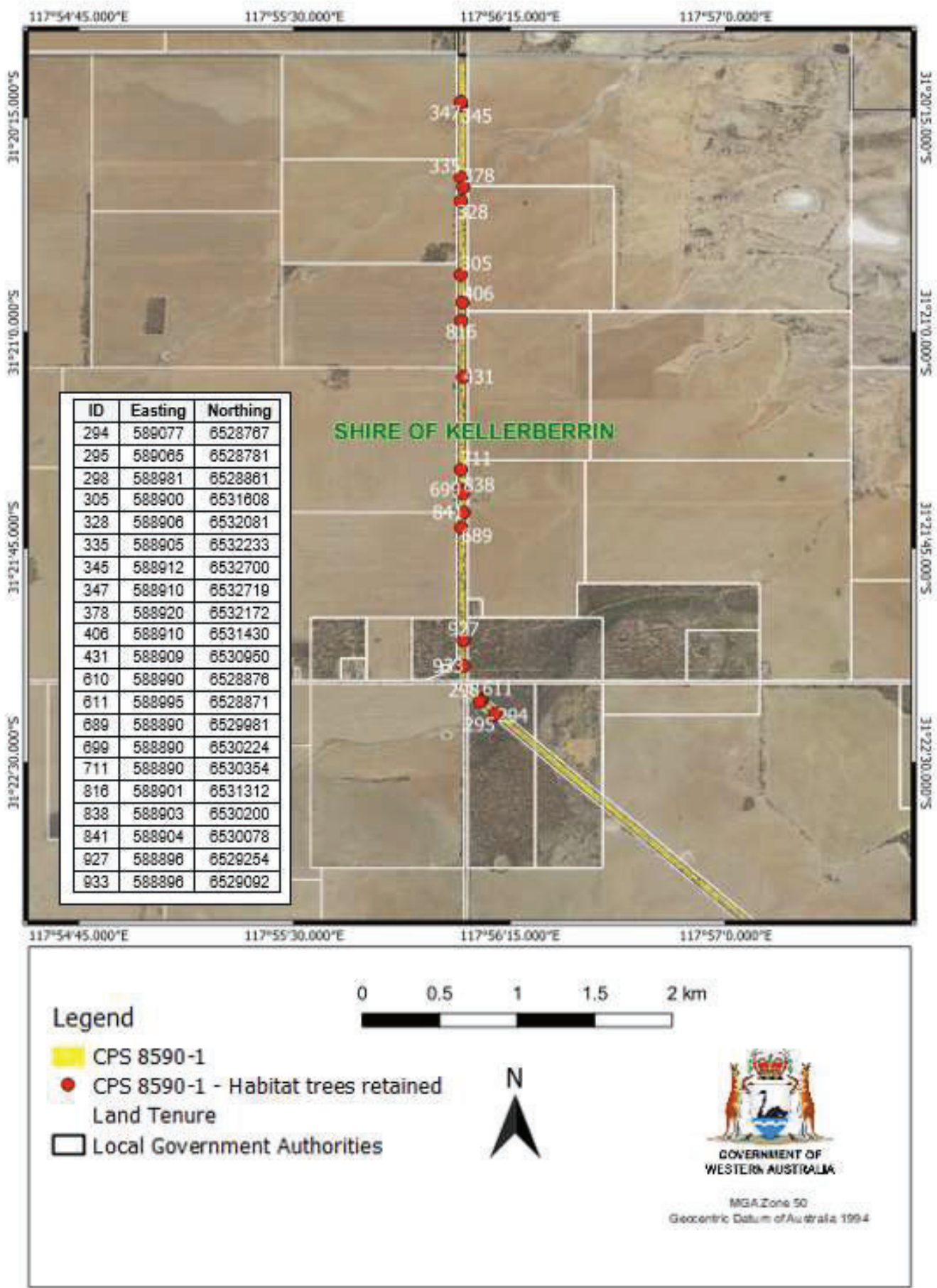


Figure 1: Map of the habitat trees to be retained

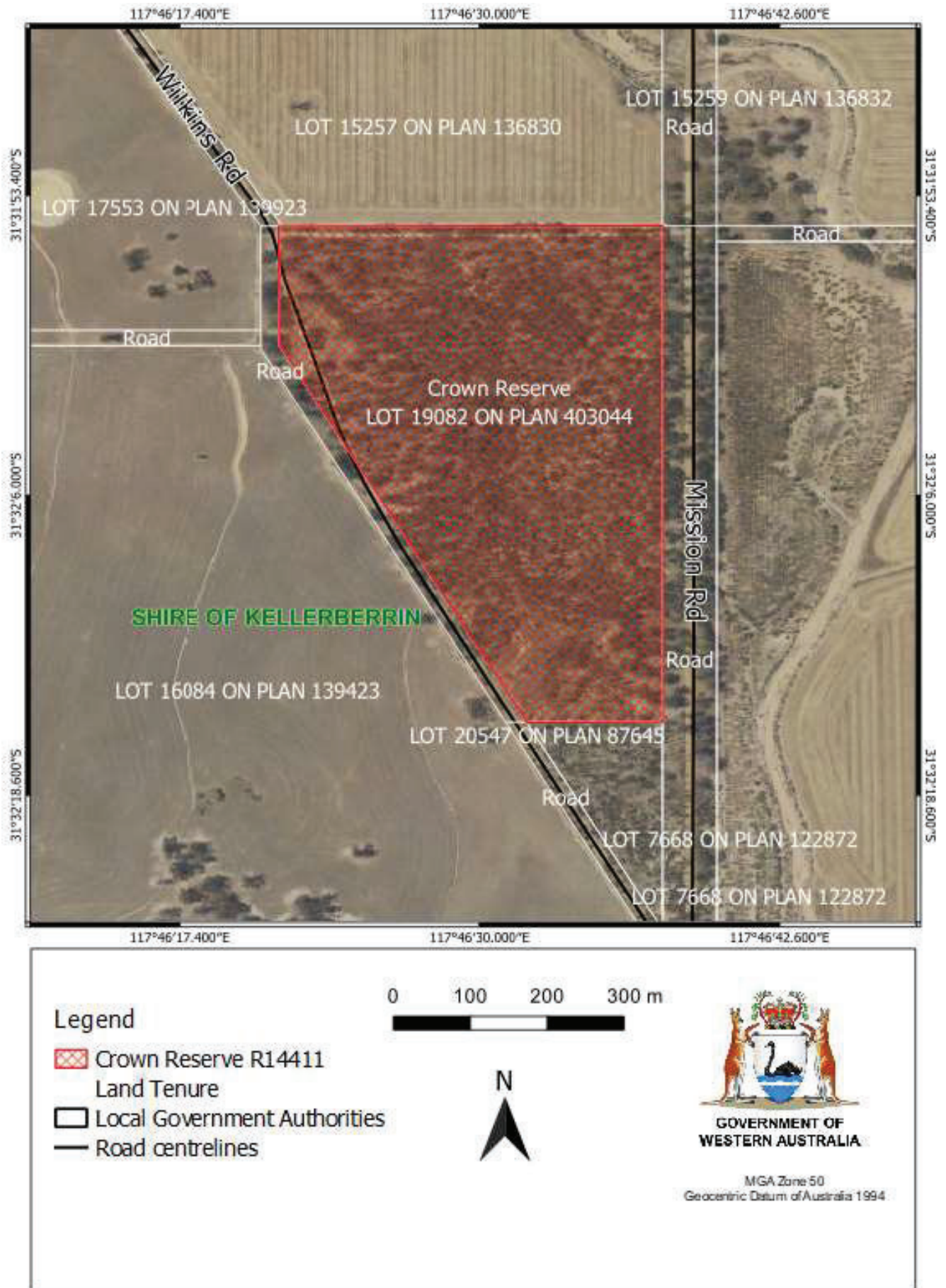


Figure 2: Map of Lot 19082 on Deposited Plan 403044 (being Crown Reserve R14411)



Clearing Permit Decision Report

1. Application details and outcome

1.1. Permit application details

Permit number:	CPS 8590/1
Permit type:	Purpose Permit
Applicant name:	Shire of Kellerberrin
Application received:	28 June 2019
Application area:	1.46 hectares (revised) of native vegetation
Purpose of clearing:	Road construction and upgrades
Method of clearing:	Mechanical removal
Property:	Baandee North Road Reserve (PINs 1294752, 1294753, 1294754 and 1294755), North Baandee
Location (LGA area/s):	Shire of Kellerberrin
Localities (suburb/s):	North Baandee

1.2. Description of clearing activities

The Shire of Kellerberrin proposes to widen a 6.4 kilometre section of the Baandee North Road. This will improve road safety on the Baandee North Road, which currently experiences heavy traffic from road trains originating from surrounding Shires accessing the Great Northern Highway. The current constructed road width is approximately 14 metres, and to abide by design standards this width needs to be increased to 17 metres to accommodate an eight metre bitumen seal. This will entail approximately two metres of native vegetation clearing on each side of Baandee North Road.

During the assessment the area of clearing required has been reduced from 2.8 hectares down to 1.46 hectares. A purpose permit has been applied for to enable enough flexibility to enable both the road widening and the installation of associated table drains (See Section 1.5, Figure 1).

1.3. Decision on application and key considerations

Decision:	Granted
Decision date:	04 April 2022
Decision area:	1.46 hectares of native vegetation on both sides of Baandee North Road 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 public comment for 21 days and one submission was received (Appendix C).

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix D), relevant datasets (Appendix L2), the findings of vegetation and flora surveys, a fauna survey and trapdoor spider survey (Appendix B), the clearing principles set out in Schedule 5 of the EP Act (Appendix E), proposed avoidance and minimisation measures provided by the applicant (Section 3.1), relevant planning instruments, and any other matters considered relevant to the assessment (Section 3.3). The Delegated Officer also took into consideration the purpose of the clearing to upgrade a road of regional significance to improve public safety.

The assessment identified that the proposed clearing will result in the loss of native vegetation that represents a significant remnant of native vegetation in an area that has been extensively cleared, including an area of native vegetation representing the Eucalypt Woodlands of the Western Australian Wheatbelt Threatened Ecological Community (TEC). Proposed clearing may also result in the introduction and spread of dieback and weeds into

adjacent vegetation managed for conservation purposes and impact breeding hollows potentially utilised by black cockatoos.

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

- avoid, minimise to reduce the impacts and extent of clearing;
- provide an offset to counterbalance the significant residual impacts to 1.46 hectares of native vegetation representing a significant remnant of native vegetation in an area that has been extensively cleared including 1.10 hectares of native vegetation representing the Eucalypt Woodlands of the Western Australian Wheatbelt TEC. An offset to conserve 9.01 hectares of Eucalypt Woodland in at least good to very good condition within Crown Reserve R14411 is considered appropriate to address the residual impact;
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback into adjacent areas of native vegetation;
- implement slow directional clearing to allow fauna to move into adjacent vegetation ahead of the clearing activity; and
- retain all potential Carnaby's Cockatoo breeding habitat trees within the application area.

1.5. Site maps

The areas cross-hatched yellow below indicate the areas within which 1.46 hectares of native vegetation is authorised to be cleared under the granted clearing permit (See Appendix A for finer scale Maps A to E).

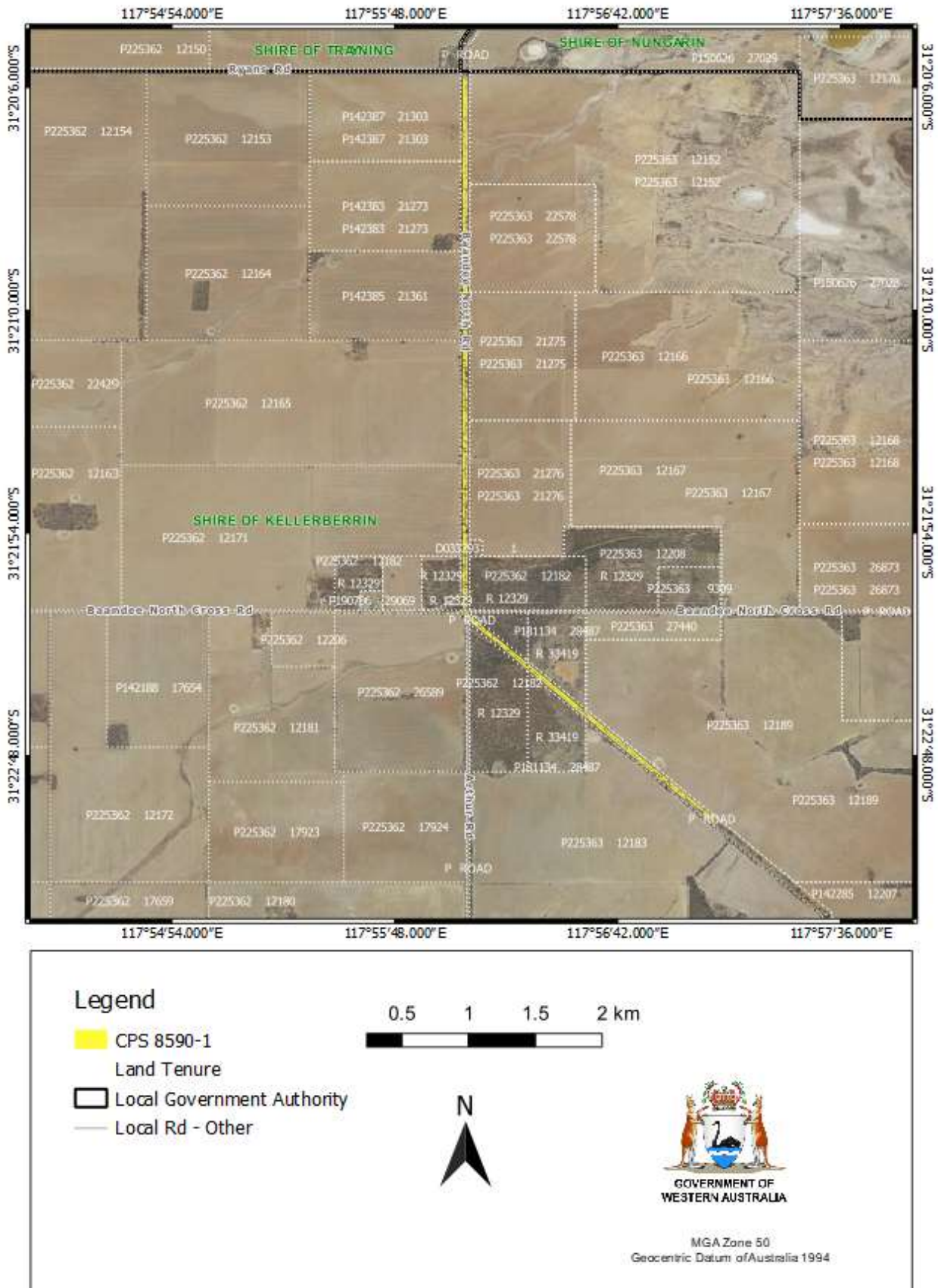


Figure 1: Map of the application area CPS 8590/1

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 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; and
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment includes:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)
- *Soil and Land Conservation Act 1945* (WA)

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)
- *Environmental Offsets Guidelines* (August 2014)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA 2016)

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

The Baandee North Road is one of the Shire of Kellerberrin's Roads of Regional Significance (or 2030 Road), which are secondary sealed roads that link Regional towns and areas to the Main Roads Western Australia controlled road network, and other 2030 roads (Main Roads 2015). This road network is essentially the heavy freight network throughout the state of WA. The Baandee North Road is the main sealed arterial road linking the Baandee North agricultural area to the Great Eastern Highway for a considerable distance. The Shire proposes to widen Baandee North Road for safety purposes consistent with the Wheatbelt North Regional Road (WN RRG) standard, and the CPS 8590/1 application area considered here represents Stage 3 of that process. Stages one and two were considered under CPS 6581/2 and CPS 8253/2.

The existing road pavement is in very poor condition and has a deficient seal width of 3.7 metres and carriageway width of 7.5 metres on average. To abide by design standards this width needs to be widened to accommodate an eight metre bitumen seal. The initial area applied for and proposed to be cleared by the applicant consisted of 2.8 hectares (Shire of Kellerberrin 2019).

During the planning process, consideration was given to relocating Baandee North Road onto adjacent cleared freehold land. Adjacent landholders were not supportive, and questioned why the existing 60 metre road corridor that is managed by the Shire and dedicated to the task could not be utilised. The Shire would also be required to pay for excising and purchasing the land, constructing the new road alignment sub-grade, constructing new culverts and intersections, pay to relocate water services and fence the new alignment. The Shire does not have the financial capacity to absorb these additional costs (Shire of Kellerberrin 2019).

The Shire's preferred width of clearing as assessed by the Shire engineer is 19 metres (Appendix J: Figure 1), however, this width has been reduced to a minimum of 17 metres (Appendix J: Figure 2). To ensure the structural integrity of the road pavement no less than 17 metres can be considered. Approximately 2.8 hectares of native vegetation clearing would be required to include the roadworks and associated table drains associated with the 17 metre minimum. The preferred 19 metre width would allow uncomplicated table drain maintenance. The 17 metre width allows table drains to be constructed to the minimum specification only, with an additional cost to the Shire to maintain these drains, due to the lack of clearance to allow graders onto the back cut. This entails approximately two metres of native vegetation clearing on each side of the Baandee North Road, with a purpose permit applied for that includes wider areas to enable enough flexibility to enable both the road widening operation as well as the installation of associated table drains. The Baandee North Road reserve is at least 60 metres in width and over 21 metres of native vegetation will be retained on either side of the road.

Results of a vegetation survey (Santaleuca 2019a) were used to inform further avoidance strategies by the Shire. In consultation with the Shire engineer trees and vegetation located within the proposed 17 metre clearing envelope that could be avoided were identified and marked in the field (Appendix H). This enabled proposed clearing to be reduced from 2.8 hectares down to 1.71 hectares with further refinements to 1.46 hectares (Copeland 2021). Results of a habitat tree assessment (Bamford 2020a) were used to avoid potential black cockatoo breeding hollows (Santaleuca 2020) (Appendix I). All 21 trees located within the application area assessed as potential Carnaby's Cockatoo (*Calyptorhynchus latirostris*) breeding habitat will be retained (Santaleuca 2020; Shire of Kellerberrin (2020) (Appendix I).

All soil and vegetation which is within the clearing area will be removed to a designated spoil area within an abandoned gravel pit on the corner of Baandee North Road and Baandee Crossroads Road (Santaleuca 2020), rather than within the remaining road reserve to avoid any additional disturbance including to the Threatened Shield-backed Trapdoor Spider (*Idiosoma nigrum*) which occurs within the road reserve.

Avoidance strategies have been applied to all vegetation that could accommodate an engineering alternative. This applied to trees near the edge of the proposed clearing area, and isolated enough that diverting the drain around them would be unlikely to compromise the integrity of the road construction. The Shire will modify the drainage design to take account of revised circumstances and use existing drainage infrastructure such as spoon drains and culverts with appropriate modifications, so as to achieve the best drainage outcomes (Santaleuca 2020). Engineering drawings have been provided (Appendix J), and a purpose permit has been applied for that includes a wider area of 2.8 hectares to enable enough flexibility to accommodate both the road widening operation as well as the installation of associated table drains.

After consideration of avoidance and mitigation measures, it was determined that an offset is required to counterbalance the significant residual impacts to 1.10 hectares of native vegetation that is representative of 'Eucalypt Woodlands of the Western Australian Wheatbelt' Threatened Ecological Community and an additional 0.36 hectares of native vegetation that is a significant remnant within an extensively cleared landscape.

In accordance with the Government of Western Australia's *Environmental Offsets Policy* and *Environmental Offsets Guidelines*, these significant residual impacts have been addressed through the conditioning of environmental offset requirements on the permit. The nature and suitability of the offset provided are summarised in Section 4 and Appendix K).

3.2. Assessment of environmental impacts

In assessing the application in accordance with section 51O of the EP Act, the Delegated Officer has examined the application and site characteristics (Appendix D) and considered whether the clearing poses a risk to environmental values and whether these can be managed to be environmentally acceptable. An assessment against the Clearing Principles is contained in Appendix E.

The assessment identified that the clearing may pose a risk to the environmental values of significant vegetation and flora, fauna habitat, significant remnant vegetation, conservation areas, watercourses and land resources, and that these required further consideration. 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 (significant vegetation and flora) – Clearing Principles (a) and (d).

Assessment: Three distinct vegetation types have been identified over the application area by Santaleuca (2019a); eucalypt woodlands on flat red clay soils, mallee on white sandy soils over clay, and Acacia / Allocasuarina woodland on white to yellow sands over gravel (Appendix G1).

The Eucalypt Woodlands of the Western Australian Wheatbelt (Eucalypt Woodlands) is listed as a Priority 3 Priority Ecological Community (PEC) by the Department of Biodiversity, Conservation and Attractions (DBCA) and a Critically Endangered (CR) TEC under the EPBC Act. Approximately 1,005 hectares of Eucalypt woodlands has been mapped within the local area of a ten kilometre radius of the application area, including over portions of the northern component of the application area (Figure 4).

Santaleuca (2019a) identified 1.10 hectares of native vegetation in the northern 75 per cent of the application area representing the Eucalypt Woodlands TEC. Overstorey eucalypts consist predominantly of *Eucalyptus salmonophloia* (Salmon Gum), *Eucalyptus salubris* (Gimlet), *Eucalyptus loxophleba* (York Gum), and *Eucalyptus longicornis* (Red Morrel). The average canopy cover of the Eucalypt woodland is 50 per cent. The majority of trees are mature with a sparse mid storey (under 10 per cent cover) and sparse ground cover (approximately 20 per cent

cover). Although weeds are present vegetation condition has been assessed as very good (Keighery 1994) (Santaleuca 2019a).

The two remaining vegetation types identified by Santaleuca (2019a) do not represent the Eucalypt Woodlands TEC. Mallee vegetation type was assessed by Santaleuca (2019a) to be in very good condition with the Acacia / Allocasuarina woodland in very good to excellent condition (Keighery 1994). The road reserve has vegetation rated as high value as determined by the Roadside Conservation Committee (RCD 2010) applying the Roadside Conservation Values as assessed in 2008, with the right hand side rated at 9 (High) and the left hand side rated at 8 to 9 (Medium - High).

Seven Priority flora taxa have been recorded within ten kilometres of the application area, with the Priority 3 (P3) *Baeckea exserta* recorded in 2008 and 2009 within the Baandee North Road Reserve in the vicinity of the application area, and *Eucalyptus leptophylla* var. *floribunda* (P1) (now known as *Eucalyptus efflorescens* D.Nicolle & M.E.French) recorded approximately 166 metres north of the application area in 2007 within the road reserve (Appendix D2) (Figure 2). Santaleuca (2019a) undertook a desktop study of the area and generated a list of significant flora taxa known from the area, and a flora and vegetation survey was undertaken over the application area and immediate surrounds during September 2019. A vegetation condition survey was also undertaken over the adjacent Crown Reserve R33419 during October 2019 (Santaleuca 2019c).

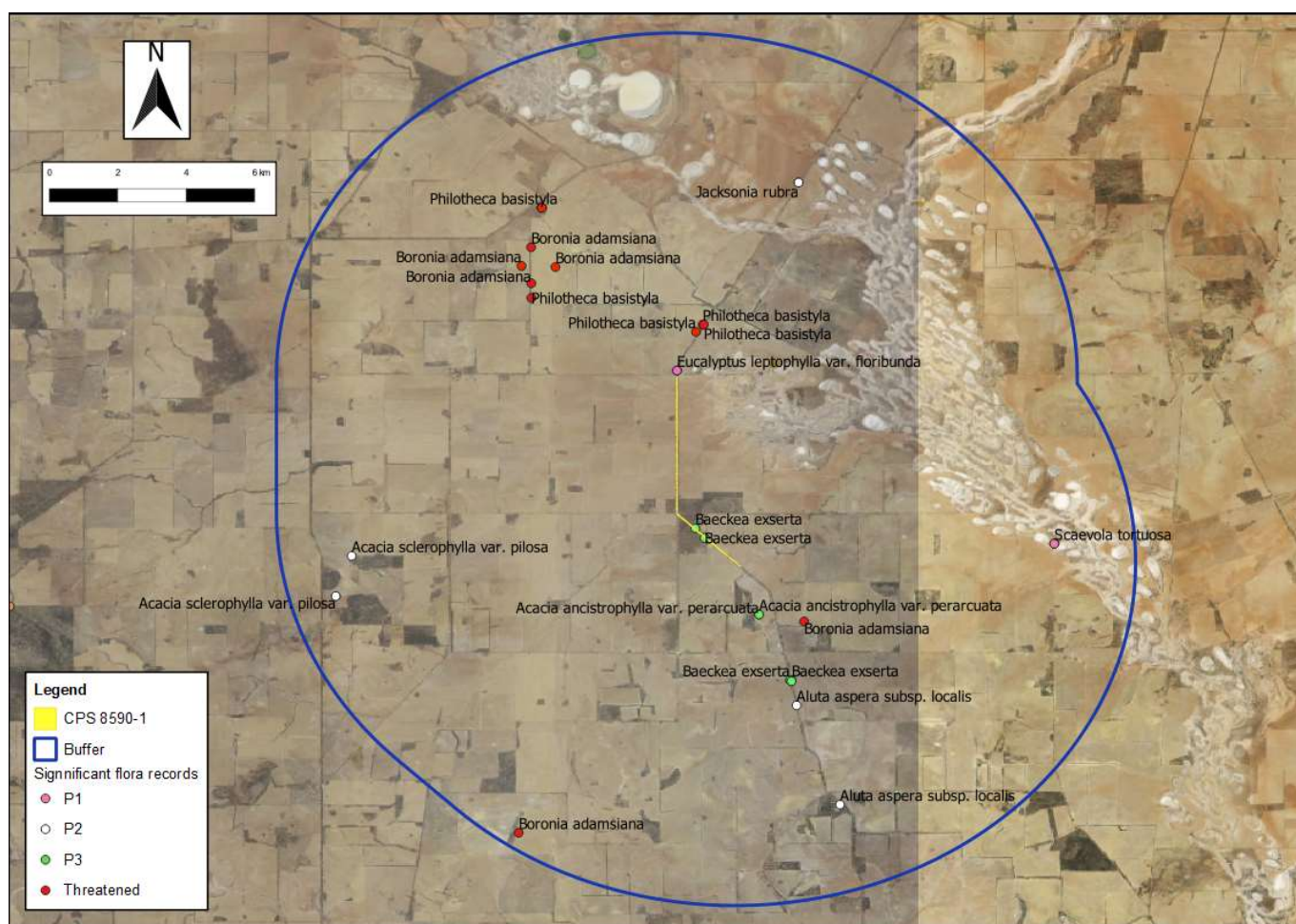


Figure 2: Records of conservation significant flora taxa recorded from the local area (10 kilometre buffer)

The flora and vegetation survey undertaken by Santaleuca (2019a) did not identify any flora taxa of conservation significance over the application area or surrounds. *Aluta aspera* var. *localis*. (P2) has been recorded approximately 4.3 kilometres to the south of the application area and was recorded within the road reserve during an assessment for clearing permit CPS 8253/1 approximately seven kilometres south of the application area. A broader survey by Santaleuca (2019b) recorded approximately 9,660 plants on mostly private land at 1471 Baandee North Road adjacent to the road reserve as well as within the road reserve itself. *Aluta aspera* var. *localis* favours loamy yellow sand and quickly disappears as the soils tend to hard gravel or white sandy clays (Santaleuca 2019b). In consideration of the separation distances, soil types and results of the Santaleuca (2019a) survey over the application area it is unlikely that this species occurs.

The survey over the application area of Santaleuca (2019a) was undertaken in September 2019. The 12 months preceding the survey had been drier than average with the result of fewer annual species present than would be otherwise expected (Santaleuca 2019a). The nine flora of significance identified with the potential to occur over the application area (Appendix D2) are not annuals, and would have been visible at the time of survey with all within, or very close to, their typical spring flowering period during the survey. In consideration of the flora of significance known from the local area and the results of local surveys, it is unlikely that flora of conservation significance are present within the application area.

Conclusion: Based on the above assessment, the application area includes 1.10 hectares of native vegetation representing the Eucalypt Woodlands TEC. The application area is unlikely to include, or be necessary for, the continued existence of conservation significant flora taxa and no adverse impacts to the conservation status or distribution of any conservation significant flora taxa are likely to result from the proposed clearing. Noting that the vegetation under application is contiguous with adjacent native vegetation within the Baandee North Road Reserve and forms part of a larger remnant associated with the North Baandee Nature Reserve (R12329), the proposed clearing may result in the spread of weeds and dieback (*Phytophthora* sp.) into adjacent areas of native vegetation. Weed and dieback management practices would assist in minimising this risk.

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

- avoid, minimise to reduce the impacts and extent of clearing;
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback; and
- provide an offset to counterbalance the significant residual impacts to 1.10 hectares of native vegetation representing the Eucalypt Woodlands TEC (Section 4).

3.2.2. Environmental value: biological values (significant fauna habitat) – Clearing Principle (b)

Assessment

Utilising available databases one Threatened fauna species has been recorded within 10 kilometres of the application area (Appendix D2). That is, a historical record of the Vulnerable (VU) Malleefowl (*Leipoa ocellata*), recorded from within 200 metres of the application area in 1960. Bamford (2020a) undertook a significant fauna assessment over approximately 20 hectares that included the application area and surrounding areas, followed-up by an invertebrate survey (Bamford 2020b) focussing on mygalomorph trapdoor spiders.

Malleefowl

No evidence of Malleefowl activity (such as mounds or tracks) was found in the area surveyed by Bamford (2020a) including the application area, the Baandee North Road Reserve or in those parts surveyed within the adjacent North Baandee Nature Reserve (R12329). Bamford (2020a) considered that although suitable habitat is present, particularly in the adjacent nature reserve, the species is likely no longer likely to be present due to the lack of evidence of the species, the small area of native vegetation, and the extent of habitat loss in the region.

Carnaby's Cockatoo

The application area (and local area within 10 kilometres of the application area) is outside the current distribution of any Threatened black cockatoo species. The closest black cockatoo distribution to the application area is the Endangered (EN) Carnaby's Cockatoo (*Calyptorhynchus latirostris*) which terminates approximately 16 kilometres to the south of the application area.

Carnaby's Cockatoo was formerly a winter/spring breeding visitor across much of the wheatbelt bioregion. It may formerly have bred in the general Kellerberrin area, at the eastern limit of its range but has declined and disappeared from the eastern components of its range (Johnstone and Storr 1998; Saunders and Ingram 1995 cited in Bamford 2020a). No Carnaby's Cockatoo records, roost sites or breeding sites are located within 12 kilometres of the application area. Bamford (2020a) consider that there is little likelihood of Carnaby's Cockatoo still being present in the region, and the native vegetation of the application area is unlikely to provide foraging habitat to support any Carnaby's Cockatoo roosts or breeding sites.

A conservative approach was undertaken whereby eucalypts within the application area were assessed by Bamford (2020a) as to their potential to provide breeding hollows for Carnaby's Cockatoo. Bamford (2020a) assessed 503 eucalypts at a minimum of 20 metres either side of the existing road (that is, both inside and outside of the application area) for their potential as breeding habitat for Carnaby's Cockatoo. Of the 503 trees, 89 had a rank of 3, meaning they had apparently suitable hollows for Carnaby's Cockatoo with no sign of nesting activity (Appendix G3 - Table 1). Similarly, no nesting activity had been found during spring visits to the site by Santaleuca (2019a). All trees within the application area deemed to be potential Carnaby's Cockatoo breeding habitat (commensurate with Score 3 and 4 on the Bamford scoring methodology) will be retained (Santaleuca 2020) (Section 3.1) (Appendix I).

Shield-backed Trapdoor Spider

In the Wheatbelt region of Western Australia, the Threatened (Vulnerable) Shield-backed Trapdoor Spider (*Idiosoma nigrum*) typically inhabits clay soils with populations associated with eucalypt woodlands and acacia shrublands (DoEE 2019). *Idiosoma nigrum* has been recorded by Bamford (2020b), within the Baandee North Road Reserve including within the proposed clearing area, as well as the adjacent North Baandee Nature Reserve (R12329).

In addition to the Shield-backed Trapdoor Spider, small numbers of other mygalomorph species were recorded by Bamford (2020b), including a species of *Gaius* (which is not of conservation significance), and possibly a second species of *Idiosoma*, most likely *Idiosoma mcnamarai* or *Idiosoma kopejtkaorum*. *Idiosoma mcnamarai* is a Priority 1 species while *Idiosoma kopejtkaorum* is Endangered. The specimen has been lodged with the Western Australian Museum for identification (WAM T152555).

Trapdoor spiders were recorded from 29 locations that included 22 formal sites and seven opportunistic locations sampled by Bamford (2020b) (Figure 3) (Appendix G4 – Figure 1). *Idiosoma nigrum* was recorded from 24 locations including 18 formal sites and 6 opportunistic locations. *Gaius* sp was recorded from eight locations that included seven formal sites and one opportunistic location.



Figure 3: Locations of *Idiosoma nigrum* records of Bamford (2020b)

Vegetation and Substrate Associations (VSAs) identified by Bamford (2020b) associated with Wheatbelt Woodlands recorded higher densities of spiders. The adjacent North Baandee Nature Reserve supports a substantial *Idiosoma nigrum* population (Bamford 2020b). Approximately 90 hectares of VSAs representing Wheatbelt Woodland occurs in the reserve, with 101 hectares representing other vegetation types. Overall mean densities recorded for *Idiosoma nigrum* in Wheatbelt Woodland VSAs were 550 spiders per hectare, with densities of 68.8 spiders per hectare elsewhere, suggesting a population in adjacent reserves of 56,449 (Bamford 2020b). While this is a broad estimate, the data and interpretation by Bamford (2020b) suggests a substantial population in the North Baandee Nature Reserve. An additional at least 26 hectares of native vegetation will be retained within the road reserve, outside of the 1.46 hectare application area within which Bamford (2020b) estimates an additional 12,100 spiders may occur. While the Bamford (2020b) calculations make many assumptions, the calculated impact represents approximately 1.5 per cent of the local spider population, with the proportional impact likely to be less than this. The application area has been reduced since the calculated impact of Bamford (2020b). Two of 18 sites that *Idiosoma nigrum* were recorded by Bamford (2020b) are located within the application area (T01 with 4 burrows and T06 with 2 burrows), with an additional four sites within ten metres of the application area.

All soil and vegetation which is within the application area will be removed to a designated spoil area within an abandoned gravel pit on the corner of Baandee North Road and Baandee Crossroads Road (Santaleuca 2020), rather than within the remaining road reserve to avoid any additional disturbance including to *Idiosoma nigrum*.

Conclusion

Based on the above assessment it is unlikely that the proposed clearing will impact the Threatened Malleefowl. No records of Carnaby's Cockatoo have been made within ten kilometres of the application area, nor any night roosts or breeding sites, and the species may no longer be resident. All trees with the potential to provide breeding hollows have been retained, and it is unlikely that the proposed clearing will impact Carnaby's Cockatoo.

In consideration of the scale and nature of the proposed clearing, impacts to the Shield-backed Trapdoor Spider (*Idiosoma nigrum*) are likely to be minimal, impacting less than 1.5 per cent of the local population. The native vegetation under application is contiguous with adjacent native vegetation within the Baandee North Road Reserve, the North Baandee Nature Reserve (R12329) and Crown Reserve R33419 used as an environmental offset site. Proposed clearing may result in the spread of weeds and dieback (*Phytophthora* sp.) into adjacent habitats. Weed and dieback management practices would assist in minimising this risk.

For the reasons set out above, it is considered that the impacts of the proposed clearing on fauna of conservation significance and adjacent habitats can be managed by retaining potential Carnaby's Cockatoo breeding habitat trees within the application area (Appendix I), implementing slow and directional clearing to allow any fauna present at the time of clearing to move into adjacent vegetation and minimise any fauna mortality, and taking steps to minimise the risk of the introduction and spread of dieback and weeds into adjacent habitats.

Conditions

To address the above impacts, the following conditions will be added to the permit:

- Retain identified potential Carnaby's Cockatoo breeding habitat trees;
- Implement slow and directional clearing; and
- Implement of dieback and weed management strategies.

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 clearance of ecological communities with an extent below 30 per cent of that present pre the year 1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia 2001).

The Avon Wheatbelt bioregion of Thackway and Cresswell (1995) is extensively cleared, retaining less than 19 per cent of its original extent (Government of Western Australia 2019) (Appendix D3).

Two regional vegetation associations of Shepherd *et al.* (2001) have been mapped over the application area. The northern portion of the application area is mapped as:

- Vegetation Association 1049: Wheatbelt; York Gum (*Eucalyptus loxophleba*), Salmon Gum (*Eucalyptus salmonophloia*). Goldfields; Gimlet (*Eucalyptus salubris*), Redwood (*Eucalyptus transcontinentalis*), Giant Mallee (*Eucalyptus oleosa*), Riverine; River Gum (*Eucalyptus camaldulensis*).

The southern portion of the application area is mapped as:

- Vegetation Association 955: Mosaic: shrublands; scrub-heath (South-East Avon) / shrublands; *Allocasuarina campestris* thicket.

Vegetation mapping and descriptions of Santaleuca (2019a) and Bamford (2020b) align broadly with these regional vegetation association descriptions. The woodland of vegetation association 1049 retains less than seven per cent of its original extent (56,618 hectares) (Appendix D3), and the scrub-heath / thicket of vegetation association 955 retains less than eleven per cent of its original extent (15,282 hectares) (Appendix D3). The extent remaining reduces further when viewed in the context of area remaining within the Avon Wheatbelt bioregion.

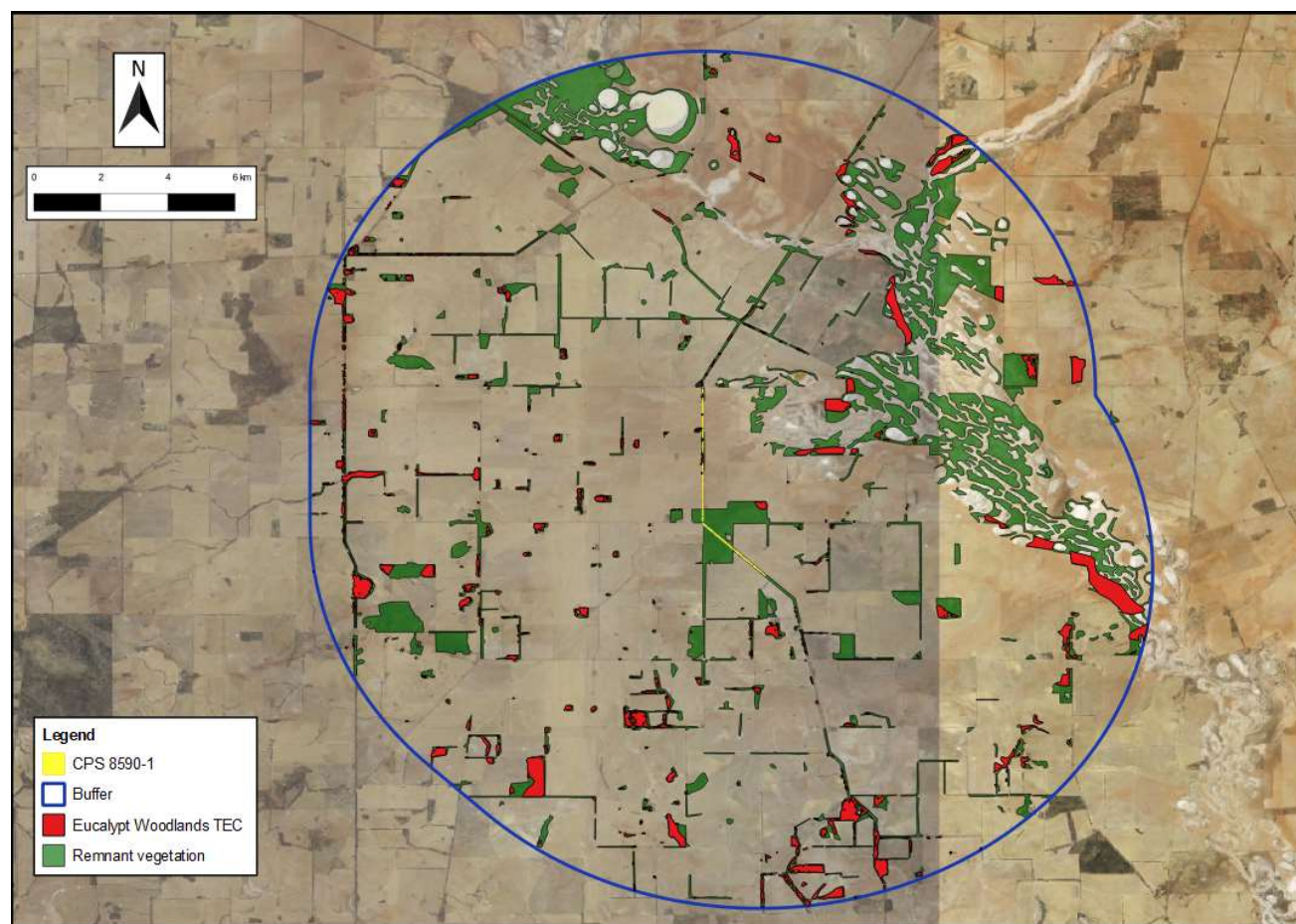


Figure 4: Remnant vegetation and Eucalypt Woodlands mapped within the local area (10 kilometre buffer)

Remnant vegetation remaining within ten kilometres of the application area has been mapped (Figure 4). Less than 3,280 hectares of remnant vegetation remains representing 10.43 per cent of its original extent (Appendix D3), (Figure 4). Of the remnant vegetation remaining in the local area approximately 48 per cent is salt affected (Appendix D3). Approximately 1,005 hectares (or 30.6 per cent of the remnant vegetation remaining) has been mapped as the Eucalypt Woodlands of the Western Australian Wheatbelt (Figure 4) (Section 3.2.1).

Conclusion

Based on the above assessment, the native vegetation proposed to be cleared is considered significant as a remnant of native vegetation in an area that has been extensively cleared. Noting that the vegetation under application is contiguous with adjacent native vegetation within the Baandee North Road Reserve and forms part of a larger remnant associated with the North Baandee Nature Reserve (R12329) and Crown Reserve R33419, the proposed clearing may result in the spread of weeds and dieback into adjacent areas of significant remnant vegetation. Weed and dieback management practices would assist in minimising this risk.

Conditions:

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

- avoid, minimise to reduce the impacts and extent of clearing;
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback; and
- provide an offset to counterbalance the significant residual impacts to 1.46 hectares of native vegetation representing a significant remnant of native vegetation in an area that has been extensively cleared (Section 4).

3.2.4. Environmental value: Nearby conservation areas – Clearing Principle (h)

Assessment

In the central portion of the application area the North Baandee Nature Reserve (R12329) is located immediately adjacent, and on both sides of the Baandee North Road Reserve (Figure 5). The North Baandee Nature Reserve consists of six land parcels vested in Western Australian Conservation and Parks Commission with the purpose of the Conservation of Flora and Fauna and managed by the DBCA.

Immediately to the east of the North Baandee Nature Reserve is Crown Reserve R33419. Crown Reserve R33419 is an environmental offset site whereby the reserve purpose will be transferred from 'gravel' to 'conservation'. Crown Reserve R33419 is located on both sides of the Baandee North Road Reserve (Figure 5).

The proposed clearing is located within the Baandee North Road Reserve, which connects the North Baandee Nature Reserve and Crown Reserve R 33419 to other remnant patches of native vegetation. This remnant vegetation corridor therefore potentially serves as an ecological linkage promoting species diversity and recruitment within the local area.

The Baandee North Road Reserve is at least 60 metres in width in the location of the proposed clearing. A nominal width of up to 17 metres of clearing is required, with over 21 metres of native vegetation remaining on each side of the road acting as a buffer to adjacent or nearby conservation areas, and although the ecological corridor will be reduced connectivity along the road reserve length will not be severed. With the implementation of standard weed and dieback management strategies and effective drainage controls impacts to the North Baandee Nature Reserve (R12329) or Crown Reserve R33419 are not likely, and proposed clearing is unlikely to have a significant impact on the environmental values of any adjacent or nearby conservation area.

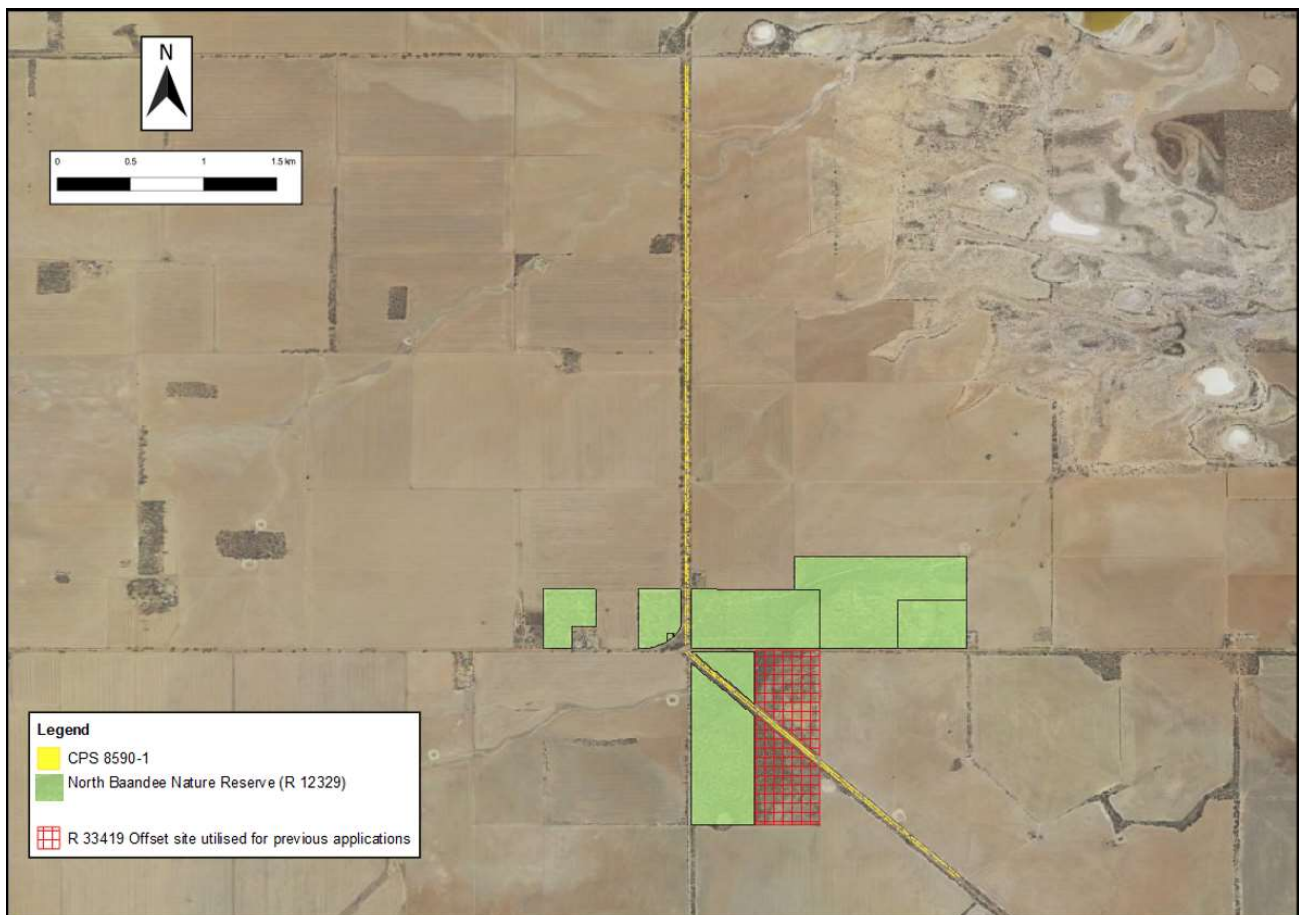


Figure 5: Conservation areas surrounding the application area

Conclusion

Based on the above assessment and noting that the vegetation under application is contiguous with larger remnants associated with the North Baandee Nature Reserve (R12329) and Crown Reserve R33419 the proposed clearing may result in the spread of weeds and dieback into adjacent areas managed for conservation. Weed and dieback management practices would assist in minimising this risk.

Conditions

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

- avoid, minimise to reduce the impacts and extent of clearing; and
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback.

3.2.5. Environmental value: Environment associated with a watercourse – Clearing Principle (f)

Assessment

The application area is located within the Avon River System (UFI 24), a Surface Water Area proclaimed under the *Rights in Water and Irrigation Act 1914* (RIWI Act). Groundwater is mapped at 14,000 to 35,000 TDS /mg/L (that is, highly saline).

Flats surrounding a Basin as a component of the Wheatbelt Wetland suite are located within 500 metres of the application area to the east, and two minor non-perennial watercourses bisect the application area (Figure 6) within the vegetation type described as eucalypt woodlands on flat red clay soils (Santaleuca 2019a). The proposed clearing, therefore, may result in the loss of vegetation growing in association with a watercourse. Drainage of these watercourses is controlled over the road reserve, and no riparian vegetation was recorded by the flora and vegetation survey of Santaleuca (2019a) (Appendix G1).

The proposed clearing of the roadside may cause some short term water quality issues in terms of localised surface water sedimentation during works. Implementation of standard designs to Australian standards (Appendix J) and staged road construction methodologies including strategies for drainage control and water erosion will minimise potential impacts.

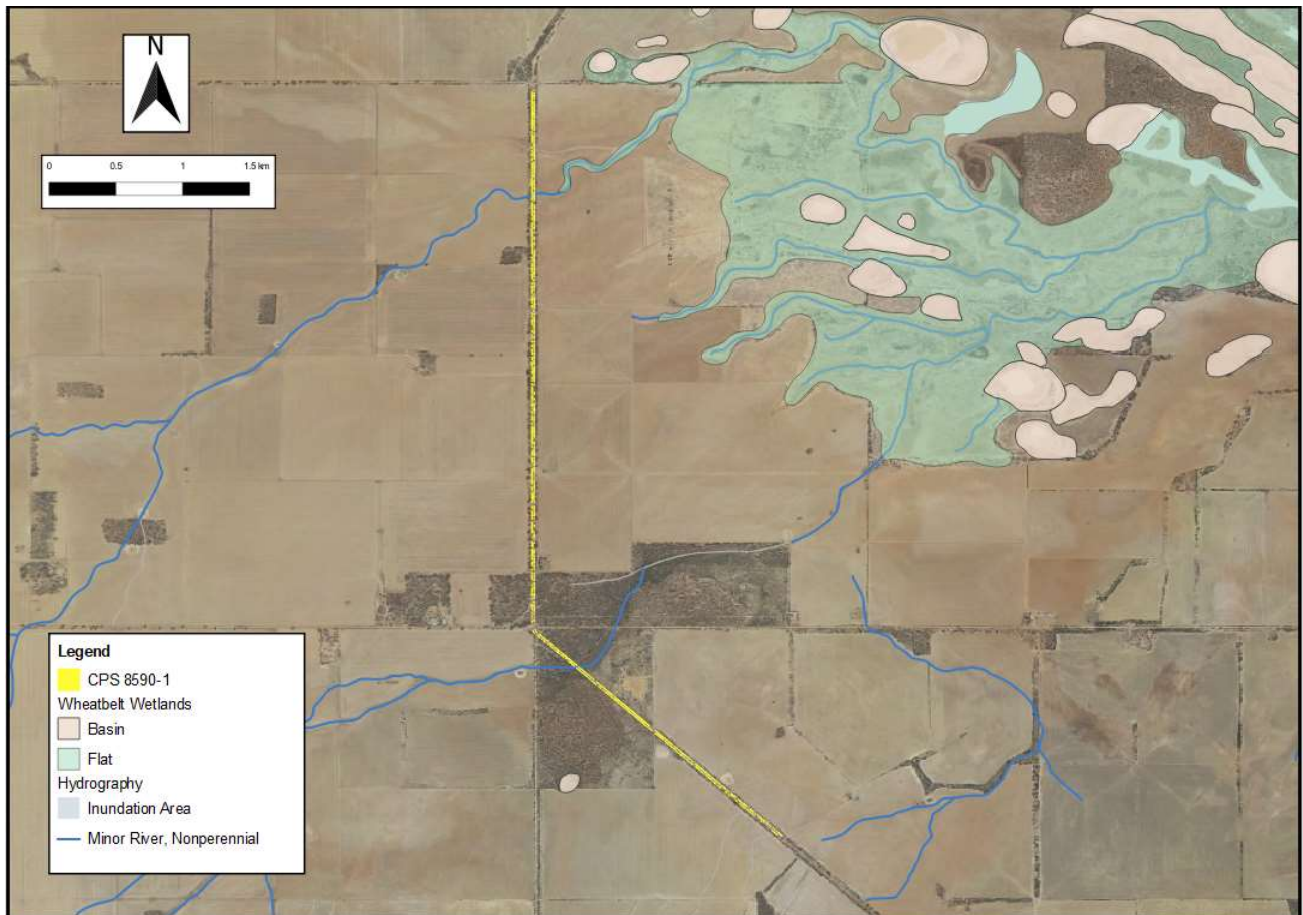


Figure 6: Hydrography surrounding the application area

Conclusion

Based on the above assessment any impacts to surrounding drainage systems and associated vegetation can be managed through appropriate design. With the implementation of standard and effective drainage controls impacts to watercourses are unlikely.

Conditions

No specific watercourse management conditions required.

3.2.6. Environmental value: Land resources – Clearing Principle (g)

Assessment

The climate of the application area is semi-arid, with dry and warm Mediterranean climate (Beacham 2001) and mean annual rainfall for Kellerberrin of 328 millimetres (BOM 2022). Two Land systems of Schoknecht *et al.* (2004) have been mapped over the application area. The majority of the application (approximately 78 per cent) consists of the Kellerberrin, Merredin Subsystem (258KbME) of broad, flat valleys containing heavy, red and grey soils. A smaller area in the south (approximately 22 per cent) consists of the Tandegin, Ulva Subsystem (258TaUL) of yellow sandplain and gravel plains (Appendix D1).

The mapped sandy soils of the Tandegin, Ulva Subsystem are prone to wind erosion and sub-surface acidification, and the mapped soils of the Kellerberrin, Merredin Subsystem are prone to water-logging and phosphorus export (Appendix D1).

Phosphorus export is rated at a high risk, however, an increase in nutrient output will not be a consequence of the proposed clearing and final land use. Similarly sub-surface acidification is primarily driven by the leaching of nutrients not from topsoil and will not likely be influenced by the proposed clearing and final land use.

The potential for wind erosion over the Tandegin, Ulva Subsystem and water-logging over the Kellerberrin, Merredin Subsystem can be managed by implementing standard and staged road construction methodologies including strategies for drainage controls and wind and water erosion. Soils will not be excavated at depth, and any impacts to surrounding landscapes, soils, or drainage systems can also be managed through appropriate design (Appendix J).

The local area has undergone extensive clearing to support historical agricultural developments with approximately 10.43 per cent of the local area's original native vegetation extent remaining. The majority of the vegetation corridor associated with the Baandee North Road reserve will remain intact at the completion of the proposed clearing. In addition, the establishment of road infrastructure within the cleared areas would be anticipated to stabilise the cleared ground, preventing land degradation impacts from arising and causing adverse impacts to the ecological values of the application areas surrounds.

Conclusion

Noting the relatively minor extent of proposed clearing along an existing road, and the standard and staged road construction methodologies proposed to be implemented, the proposed clearing is not likely to cause appreciable land degradation.

Conditions

No specific land degradation management conditions required.

3.3. Relevant planning instruments and other matters

The application was advertised on the DWER website for a 21 day public comment period. One public submission was received in relation to this application. Consideration of the comments received in the submission is summarised in Appendix C.

Baandee North Road is a major heavy vehicle transport route for grain from Baandee to the Doodlakine Cooperative Bulk Handling (CBH) Receival Facilities and onto the main east-west standard gauge rail line (Main Roads 2015). The road provides access for local residents to the Doodlakine Public Passenger Service on the Prospector and Avon Link trains, enhances access to Kellerberrin itself and its associated industries and businesses and facilitates that utilise Great Eastern Highway (Main Roads 2015). The Baandee North Road is also a major access route to Nungarin and further north for local and visitor traffic to access the Great Eastern Highway and comprises a transport route for agricultural commodities including fertiliser, grain, livestock, gypsum and lime (Main Roads 2015). The road's development would increase the economic efficiency of a major direct heavy vehicle transport route serving towns and farmers north of Kellerberrin and increase the efficiency of grain rail transport from Doodlakine on the main east - west line (Main Roads 2015). The development strategy proposed incorporates the reconstruction and widening of the roads shoulders with sectional works required to improve safety standards along the entire route to support its use by heavy vehicle traffic and local and visiting traffic (Main Roads 2015). The Baandee North Road upgrade is a Local Government project, upgrading a Local Government controlled road on a Local Government Road Reserve funded by Western Australian State Government and Federal Government grants (Shire of Kellerberrin 2020). Local government approvals under the *Planning and Development Act 2005*, or any other Act, are not required and clearing is consistent with the Shire of Kellerberrin Town Planning Scheme No. 4.

Two watercourses bisect the road reserve and proposed clearing is located within the Avon River System Surface Water Area proclaimed under the RIWI Act. There may be a requirement to obtain a licence to take water or a permit to interfere with the bed and banks of a water course, and the applicant is encouraged to contact the DWER's Swan Avon Region office to discuss water management options.

The Shire has referred the project to the Federal Government under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Shire of Kellerberrin 2020). The Shire was advised that the proposed action is not a controlled action (DAWE 2020b).

The application area is located within the boundaries of the South West Settlement (WAD6085/1998) Native Title determination, and the Ballardong People Indigenous Land Use Agreement (ILUA) (WI2017/012). No Aboriginal Heritage Places have been identified from within ten kilometres of the application area. It is the applicant's responsibility to ensure compliance with any obligations under the *Aboriginal Heritage Act 1972*.

4. Suitability of offset

Avoidance and mitigation

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 (Section 3.1)

Assessment of impact

An assessment of the impacts of the revised 1.46 hectares of clearing identified that significant residual impact remains, summarised as:

- 1.10 hectares of native vegetation that is representative of the Eucalypt Woodlands TEC; and an additional
- 0.36 hectares of native vegetation that is a significant remnant within an extensively cleared landscape (significant remnant).

Offset background

The Shire has a banked offset that was submitted and approved by DWER under clearing permit CPS 8253/2 immediately south of the current application, including within a reserve (R33419) immediately adjacent to the current application. Utilising the survey information of Santaleuca Consulting (2019c) this reserve was considered suitable to be used to offset native vegetation that is a significant remnant within an extensively cleared landscape. However, no banked offset areas remain within this reserve that are representative of, or capable of being rehabilitated to, the 'Eucalypt Woodlands of the Western Australian Wheatbelt'.

The Shire subsequently undertook a detailed analysis of all reserves within the Shire of Kellerberrin, assessing their suitability for use as potential offset sites for CPS 8590/1 (Shire of Kellerberrin 2021a) that included separate vegetation condition reports for reserves R40211 and R14411 (Shire of Kellerberrin 2021b) that have 'Gravel' as their current purpose.

After an analysis of information provided to DWER it was concluded that reserve R40211 provides opportunities to offset a significant remnant but not the Eucalypt Woodlands TEC. Reserve R14411 provides opportunities to offset both a significant remnant as well as the Eucalypt Woodlands TEC.

In regard to offsetting the Eucalypt Woodlands TEC, 'like for like' is always the preferred outcome with respect to the vegetation community being impacted. That is, Salmon Gum (*Eucalyptus salmonophloia*) and Gimlet (*Eucalyptus salubris*) in this instance. If the particular vegetation community impacted is not available a justification is required as to the reasons for the unavailability of the preferred community. The report submitted '*Analysis of Reserves within the Shire of Kellerberrin*' (Shire of Kellerberrin 2021a) provides evidence as to the reasons for the unavailability of the preferred TEC community.

Offset

The Shire has submitted an offset proposal that centres on Crown Reserve R14411 (Lot 19082 on Deposited Plan 403044) (Shire of Kellerberrin 2021d). For R14411 to be considered a viable option, a change of purpose is required from 'gravel' to 'conservation'. Due to the Eucalypt Woodlands TEC at the impact site having a condition rating of very good (value 6), and the majority of the Eucalypt Woodlands TEC within R 14411 (88 per cent) being in less than very good condition (Figure 7), rehabilitation work within R 14411 is required to meet the minimum threshold. Based on the survey of R14411 (Shire of Kellerberrin 2021b) the improved condition could be achieved without the requirement for infill planting. The Shire offset proposal for R14411 considers of a change of purpose from 'gravel' to 'conservation' and management and rehabilitation work within the reserve (Shire of Kellerberrin 2021d).

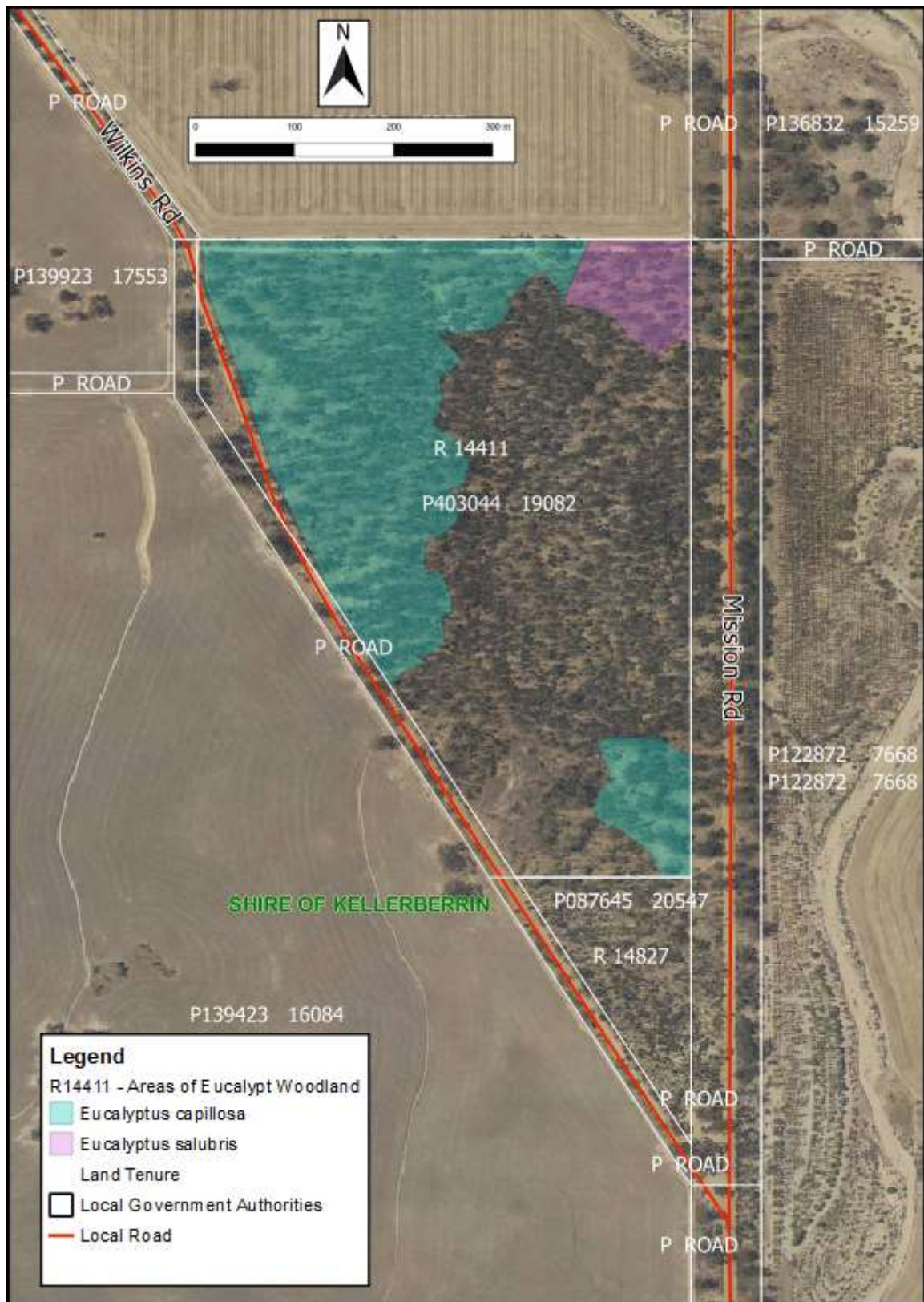


Figure 7: Eucalypt Woodlands of the proposed offset site (R14411)

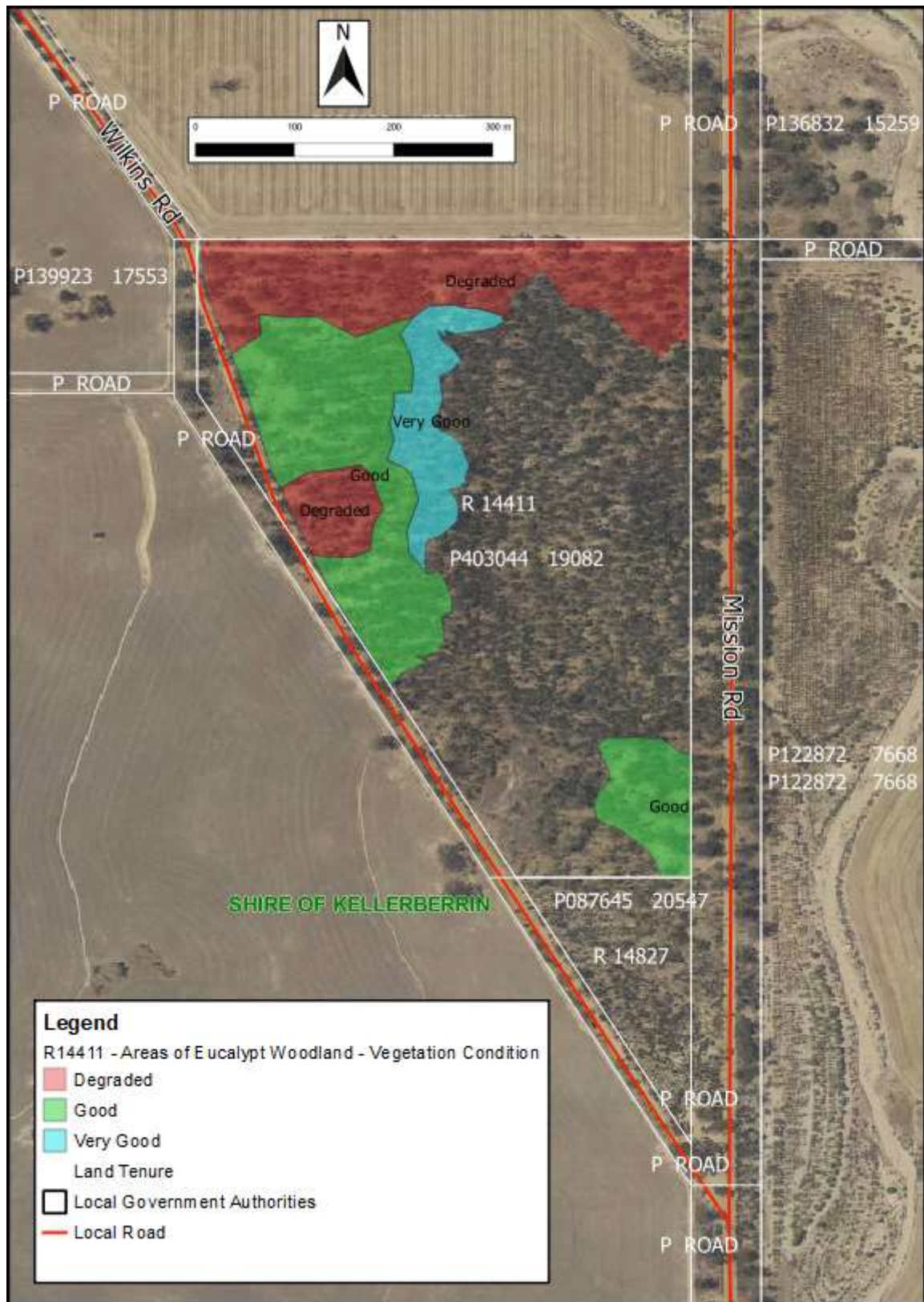


Figure 8. Vegetation condition of Eucalypt Woodland communities within R14411

The nominal area of the reserve R14411 is 20.6 hectares of which approximately 19.8 hectares is remnant vegetation (Shire of Kellerberrin 2021c). Of the remnant vegetation, 9.01 hectares is proposed as an offset for CPS 8590/1 as this area qualifies as the Eucalypt Woodlands TEC, consisting of 8.09 hectares of *Eucalyptus capillosa* eucalypt woodland, and 0.92 hectares of *Eucalyptus salubris* eucalypt woodland (Figure 8). The Shire intends to bank the remaining approximately 10.79 hectares as an offset to be used against future clearing permits.

A summary of the management and rehabilitation work proposed in the offset proposal of the Shire of Kellerberrin (2021d) is provided below. Fencing was considered as an action to reduce access to the reserve based on the evidence of historic dumping and illegal firewood harvesting. However, at this site, there are constraints and limitations to fencing. Of note:

- There is an existing fence-line on the northern boundary where the reserve abuts agricultural land.
- Fencing along the eastern and southern edges would require clearing through existing bushland for approximately 820 metres resulting in the loss of 0.33 hectares of native vegetation.
- The possibility of fencing only the western boundary was considered (requiring less clearing), however, the offset area consists of intact native vegetation across two adjacent reserves (R14411 and R14827 immediately to the south).
- The Shire does not have management orders for the adjacent R14827 (Figure 9) and it has not been included as a potential offset site due to both its small size (two hectares) and its current listed purpose as a 'School Site'.
- In summary, any fencing along the western edge would not be able to extend the entire length of the intact native vegetation, and reserve R14411 would therefore remain unfenced along the southern end (Figure 9).

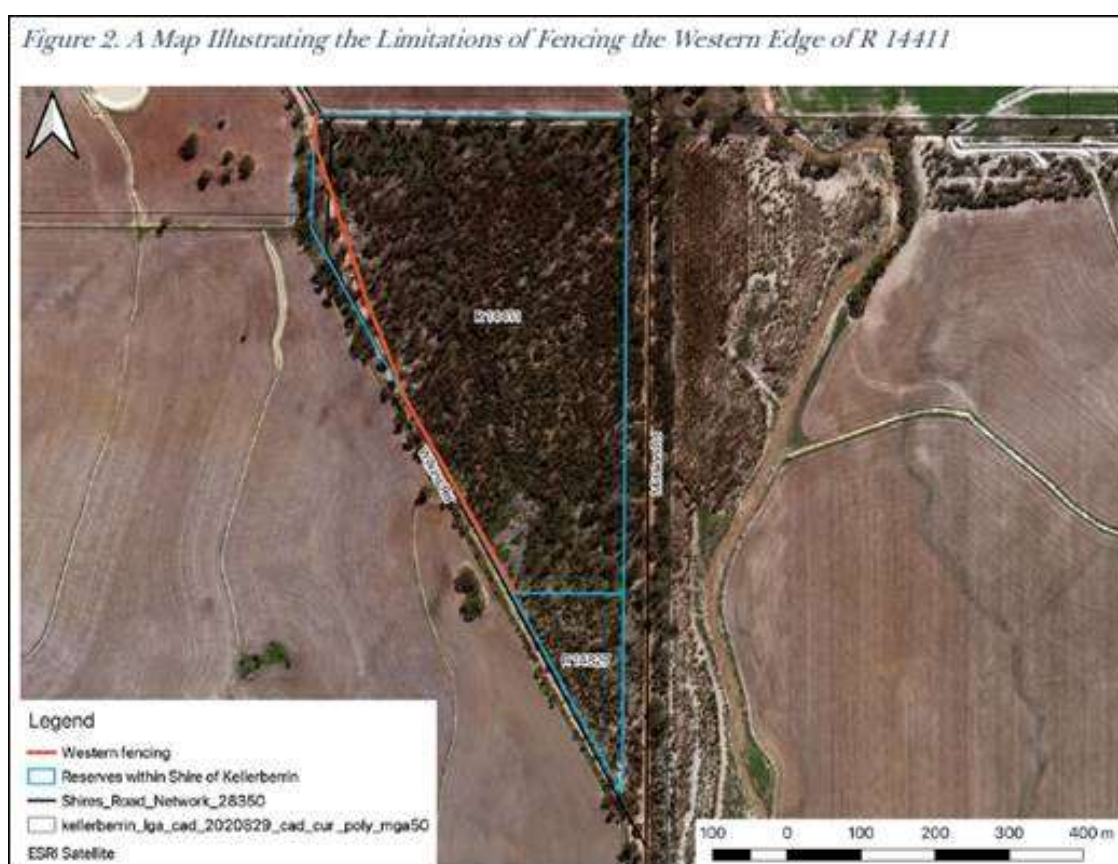


Figure 9. Limitation of fencing (Shire of Kellerberrin 2021d).

Signage

Given the constraints to restricting access through fencing the Shire has proposed the use of signage. 1080 baiting for rabbits is also being proposed and prior to this occurring warning signs will be required. Permanent signage, that includes the required 1080 poison warning, is likely to act as a deterrent to unauthorised entry. The Shire proposes to install four signs.

Weed control

Approximately 3.93 hectares of the 9.01 hectare offset site is degraded (43.7 per cent), approximately 4.0 hectares is in good condition (44.5 per cent), and approximately 1.06 hectares is in very good condition (11.8 per cent). Several species of weeds occur around the northern and western edges where the reserve is closest to agricultural land. The proposal is to conduct weed control undertaken each winter for three years to increase vegetation condition to at least good to very good.

Rabbit control

Clear evidence of rabbits was recorded in the proposed offset site. Rabbits impact recruitment of native vegetation and provide a vector for weeds to enter and establish in the reserve. The Shire propose to bait for rabbits each summer for three years. All baiting activities will be conducted by appropriately accredited and experienced staff and all required permits will be in place.

Removal of historic rubbish.

Two sites of historic dumping were recorded during the assessment of the proposed offset site. The rubbish type, extent and locations are provided in the offset proposal. The Shire proposes to sensitively remove accumulated rubbish at these two sites.

Reserve R14411 – Change of purpose.

The Shire have received advice from the Department of Planning, Lands, and Heritage (DPLH) that due to the proposed change to a conservation purpose, and management by the Shire, Reserve R14411 will be removed from consideration for inclusion in the Noongar Land Estate (informed by the South West Settlement team), and an application for the relevant change of purpose and management orders can be made. Evidence from the Shire has been submitted indicating an application to the DPLH from the Shire on 4 November 2021 for the relevant change of purpose from 'gravel' to 'conservation', and the relevant vesting and management orders (Shire of Kellerberrin 2021d).

Assessment of proposed offset

In assessing whether the proposed offset is adequately proportionate to the significance of the environmental values being impacted, a calculation using the EPBC Act Offsets calculator was undertaken. The EPBC Act calculator was used as the offset discussions had already substantially progressed prior to the state metric being finalised. Calculations are based on both 1) acquisition and long-term security, and 2) rehabilitation or management to maintain or elevate the current vegetation condition.

The calculator averages the condition values within R14411. The calculated outputs are provided (Tab 1 - Land Acquisition – Rehabilitation) and the assumptions used to derive the calculated outputs (Tab 2 – Justification). The calculation assumes an averaged start condition of the Eucalypt Woodlands TEC within R14411 of good (value 4) with an increase in condition to good to very good (value 5) over three years. This is assumed to be facilitated by weed control, rabbit control and placement of signage to deter access. If the stipulated condition is not attained over three years additional actions will be required to be implemented by the Shire to attain the condition threshold.

Inputs to the offset calculations provided are based on a 'risk of loss' without the offset of 30 per cent. This is based upon vegetation in gravel reserves within the Wheatbelt Region being subject to continuing clearing and land degradation pressures. The calculation assumes a change of purpose from 'gravel' to 'conservation' to reduce the 'risk of loss' to 10 per cent with the offset.

The output of the offset calculation shows that the changing of reserve purpose, with an increased condition within the 9.01 hectares of Eucalypt Woodlands TEC within the reserve, would achieve 100 percent of the offset required. Offset calculations indicate that the 9.01 area would also offset the residual impact to the significant remnant component. This is consistent with the WA Environmental Offsets Policy September 2011 and Guidelines (2014). The offset justification is provided in Appendix K. The remaining approximately 10.79 hectares within R14411 is intended to be utilised by the Shire as a 'banked offset' for future use.

Consistent with the WA Environmental Offset Policy (2011) and WA Environmental Offsets Guidelines (2014), and pursuant to section 51I(2)(b) of the EP Act, in order to mitigate the significant residual environment impacts described, the applicant has provided an offset that involves the transfer of the purpose of Crown Reserve R14411 from 'gravel' to 'conservation', with the rehabilitation of 9.01 hectares to at least good to very good condition (Keighery 1994).

Appendix A –Application Area (Maps A to E)

CPS 8590-1 - Overall



Legend

- CPS 8590-1
- Land Tenure
- Local Government Authority
- Local Rd - Other

0.5 1 1.5 2 km

N

GOVERNMENT OF WESTERN AUSTRALIA

MGA Zone 50
Geocentric Datum of Australia 1994

CPS 8590-1 - Map A



Legend

- CPS 8590-1
- Land Tenure
- Local Government Authority
- Local Rd - Other

150 300 450 m

N

GOVERNMENT OF
WESTERN AUSTRALIA

MGA Zone 50
Geocentric Datum of Australia 1994

CPS 8590-1 - Map B



Legend

- CPS 8590-1
- Land Tenure
- Local Government Authority
- Local Rd - Other

150 300 450 m

N

**GOVERNMENT OF
WESTERN AUSTRALIA**

MGA Zone 50
Geocentric Datum of Australia 1994

CPS 8590-1 - Map C



Legend

- CPS 8590-1
- Land Tenure
- Local Government Authority
- Local Rd - Other

150 300 450 m

N

GOVERNMENT OF
WESTERN AUSTRALIA

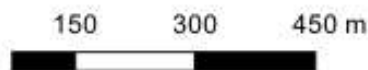
MGA Zone 50
Geocentric Datum of Australia 1994

CPS 8590-1 - Map D



Legend

- CPS 8590-1
- Land Tenure
- Local Government Authority
- Local Rd - Other



GOVERNMENT OF
WESTERN AUSTRALIA

MGA Zone 50
Geocentric Datum of Australia 1994

CPS 8590-1 - Map E



Legend

- CPS 8590-1
- Land Tenure
- Local Government Authority

150 300 450 m

N

GOVERNMENT OF
WESTERN AUSTRALIA

MGA Zone 50
Geocentric Datum of Australia 1994

Appendix B – Information provided by applicant

Description	Reference
Supporting Information for clearing permit application CPS 8590/1 including a justification and description of clearing activities, avoidance and minimisation actions, and representative photographs of the application area.	Shire of Kellerberrin (2019)
Vegetation Survey: Baandee North Rd, SLK 23 – SLK 28.68. RE: CPS 8590/1. Stephen Fry (Principal Botanist) and Dylan Copeland (NRM Consultant). 12 September 2019. PO Box 278, Narembeen, WA, 6369. IBSA-2021-0184.	Santaleuca (2019a)
Population survey: <i>Aluta aspersa</i> var. <i>localis</i> . Priority 2 species. 1471 Baandee North Road. Stephen Fry (Principal Botanist) and Dylan Copeland (NRM Consultant). PO Box 278, Narembeen, WA, 6369. 9th to 11th July 2019.	Santaleuca (2019b)
Vegetation Condition Report. Kellerberrin Shire Reserve R33419 RE: CPS 8253/1. Stephen Fry (Principal Botanist) and Dylan Copeland (NRM Consultant). PO Box 278, Narembeen, WA, 6369. 9th October 2019.	Santaleuca (2019c)
Significant Fauna Assessment for Kellerberrin Shire Road Upgrade Baandee North Road SLK 23 – SLK 29.5. Prepared for the Shire of Kellerberrin P. Smith, S. Smith, M. Bamford and J. Bamford. Bamford Consulting Ecologist. 23 Plover Way Kingsley, WA 6026. 31st July 2020. IBSA-2021-0100.	Bamford (2020a)
Targeted survey for the Shield-backed Trapdoor Spider <i>Idiosoma nigrum</i> . Proposed Upgrade Baandee North Road. Prepared for the Shire of Kellerberrin by P. Smith, S. Smith, and M. Bamford. Bamford Consulting Ecologists 23 Plover Way Kingsley, WA 6026. 24 September 2020. IBSA-2021-0101.	Bamford (2020b)
Change in road construction methodology to avoid significant trees. Baandee North Road, SLK 23 – SLK 29. Steve Fry. PO Box 278, Narembeen, WA, 6369. 15 December 2020.	Santaleuca (2020)
Baandee North Road 23–29 Clearing and Avoidance Areas. Excel spreadsheet that itemises vegetation avoided). Provision of habitat tree avoidance and revised clearing area.	Copeland (2020; 2021)
Analysis of Reserves within the Shire of Kellerberrin. Assessing the suitability of reserves for use as potential offsets for CPS 8590/1. Undertaken by Mr Dylan Copeland, NRM Consultant, for the Shire of Kellerberrin. September 2021.	Shire of Kellerberrin (2021a)
Vegetation Condition Report of Durokoppin Gravel Extraction Reserve R40211. Undertaken by Steve Fry and Michelle Fry of Santaleuca Consulting.	Shire of Kellerberrin (2021b)
Reconnaissance Survey of R 14411- An Assessment of Vegetation Units and Condition. Undertaken by Mr Dylan Copeland, NRM Consultant, for the Shire of Kellerberrin. September 2021.	Shire of Kellerberrin (2021c)
Clearing Permit Offset Proposal CPS 8590/1. Prepared by Dylan Copeland NRM Consultant for the Shire of Kellerberrin. December 2021.	Shire of Kellerberrin (2021d)
EPBC Act references	
EPBC Act Referral information submitted to the Department of Agriculture, Water and the Environment (DAWE). Baandee North Road Upgrade SLK 23 to SLK 29. 13-03-2020. EPBC Act Referral: 2020/8638.	Shire of Kellerberrin (2020)
Department of Agriculture, Water and the Environment (DAWE) decision on EPBC Act Referral: 2020/8638: Baandee North Road Upgrade SLK 23 to SLK 29. 22 December 2020. Not a controlled action and proposed action does not require further assessment and approval under the EPBC Act before it can proceed.	DAWE (2020b)

Appendix C – Details of public submissions

Summary of comments	Consideration of comment
A range of alternative options were presented that have not been considered. All potential engineering and planning solutions to reduce or eliminate clearing should be considered and all alternatives need to be more fully explored.	Alternatives were considered by the Shire and provided to DWER (Shire of Kellerberrin 2019; Shire of Kellerberrin 2020) and summarised in Section 3.1. Engineering drawings in respect to preferred options and a compromised option are presented in Appendix J. Minimisation strategies were provided as Santaleuca (2020), Copeland (2020) and Copeland (2021) and summarised in Section 3.1.
Cumulative impact should be assessed, particularly in regard to Clearing Permit CPS 8253/1 also along Baandee North Road.	The impact of Clearing Permit CPS 8253/1 and other clearing within the local area has been considered in the assessment by utilising up-to-date calculations of potential impacts to remnant vegetation, significant ecological communities, Priority flora and fauna habitat and assessment of other clearing permits along Baandee North Road.
Flora, vegetation, and fauna surveys are required.	Relevant flora, vegetation, and fauna surveys and condition reports have been provided (Bamford 2020a; Bamford 2020b; Santaleuca 2019a; Santaleuca 2019b; and Santaleuca 2019c) (Appendix B)
The surrounding area has not been extensively surveyed	Flora, vegetation, vertebrate fauna and invertebrate fauna surveys considered the Baandee North Road outside of the application area as well as adjacent areas of remnant vegetation within the North Baandee Nature Reserve (R 12329) (Bamford 2020a; Bamford 2020b; Santaleuca 2019a)
Clearing proposed is located within a highly cleared landscape, and clearing along Wheatbelt roads is not insignificant.	The assessment of the significance of the native vegetation under application as a remnant of native vegetation in an area that has been extensively cleared has been considered in Appendix E and Section 3.2.3.
Threatened plant species may occur including: <i>Boronia adamsiana</i> and <i>Philothea basistyla</i> .	Two Threatened flora taxa have been recorded within ten kilometres of the application area; <i>Boronia adamsiana</i> and <i>Philothea basistyla</i> (Appendix D2). A flora survey undertaken by Santaleuca (2019a) during Spring 2019 did not identify any flora taxa of conservation significance over the application area or surrounds (Appendix E) (Section 3.2.1).
Priority plant species are known to occur in the area and may be present including <i>Eucalyptus leptophylla</i> var. <i>floribunda</i> (P1), and <i>Acacia ancistrophylla</i> var. <i>perarcuata</i> (P3)	Seven Priority flora taxa have been recorded within ten kilometres of the application area including <i>Eucalyptus leptophylla</i> var. <i>floribunda</i> (more recently known as <i>Eucalyptus efflorescens</i> D.Nicolle & M.E.French) (P1) and <i>Acacia ancistrophylla</i> var. <i>perarcuata</i> (P3). A flora survey undertaken by Santaleuca (2019a) during Spring 2019 did not identify any flora taxa of conservation significance over the application area or surrounds (Section 3.2.1).
The Threatened Malleefowl (<i>Leipoa ocellate</i>), occurs in the area.	Impacts to significant fauna and fauna habitat, including the Malleefowl, are considered in Section 3.2.2. No evidence of the Malleefowl was recorded by Bamford (2020a) within the application area.
The Eucalypt Woodlands of the Western Australian Wheatbelt Threatened Ecological Community (TEC) is present, and an EPBC Act accredited assessment process is required.	The assessment of the significance of the native vegetation under application as representative of the Eucalypt Woodlands of the Western Australian Wheatbelt TEC has been considered in Appendix E and Section 3.2.1. The Shire referred the proposal to the Commonwealth under the EPBC Act and it was determined to not be a controlled action. Action that are deemed not a controlled action are not able to be assessed under an accredited assessment.

The Shire of Kellerberrin should prepare a fauna mortality estimate.

Implementing slow and directional clearing to allow any fauna present at the time of clearing to move into adjacent vegetation is likely to minimise fauna mortality. Proposed clearing is unlikely to significantly increase fauna mortality and a fauna mortality estimate has not been provided by the applicant.

Appendix D – 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 E.

1. Site summary

Site characteristic	Details
Local context	The application area is situated within the Avon Wheatbelt bioregion (AVW) of Thackway and Cresswell (1995), and the Merredin subregion (AVW01). The proposed clearing area comprises 1.46 hectares on both sides of Baandee North Road, North Baandee, approximately 38 kilometres north of the town of Kellerberin, WA. Spatial data indicates that the local area (ten kilometre radius of the proposed clearing area) retains approximately 12.3 per cent of the original native vegetation cover.
Ecological linkage	No Environmentally Sensitive Areas (ESAs) have been mapped over the application area. The road reserve has vegetation rated as high value as determined by the Roadside Conservation Committee (RCD 2010) applying the Roadside Conservation Values as assessed in 2008, with the right hand side rated at 9 (High) and the left hand side rated at 8 to 9 (Medium - High). That is, no weeds identified and <i>'a wide range of native trees, shrubs and ground covers present; continuous cover of native vegetation; presence of habitat features such as tree hollows and/or food sources like seeds, fruits or nectar; few weeds/less aggressive weeds'</i> .
Conservation areas	The North Baandee Nature Reserve (R12329) is located immediately adjacent, on both sides of the Baandee North Road, in the central portion of the application area. The North Baandee Nature Reserve consists of six land parcels vested in Western Australian Conservation and Parks Commission with the purpose of the Conservation of Flora and Fauna. The Baandee North Road also bisects a reserve (R33419) used as an offset site for clearing permit CPS 8253/2 and clearing permit CPS 8838/1, with a vesting change from 'gravel' to 'conservation'. The Walcancobbing Nature Reserve (R35413) is located approximately 8.7 kilometres to the north of the application area.
Regional vegetation description. (Shepherd <i>et al.</i> 2001)	The application area is mapped as occurring within the following mapped vegetation associations (Shepherd <i>et al.</i> 2001): The northern portion of the application area is mapped as: <ul style="list-style-type: none"> Vegetation Association 1049: Wheatbelt; York Gum (<i>Eucalyptus loxophleba</i>), Salmon Gum (<i>Eucalyptus salmonophloia</i>). Goldfields; Gimlet (<i>Eucalyptus salubris</i>), Redwood (<i>Eucalyptus transcontinentalis</i>), Giant Mallee (<i>Eucalyptus oleosa</i>), Riverine; River Gum (<i>Eucalyptus camaldulensis</i>). The southern portion of the application area is mapped as: <ul style="list-style-type: none"> Vegetation Association 955: Mosaic: shrublands; scrub-heath (South-East Avon) / shrublands; <i>Allocasuarina campestris</i> thicket.

Site characteristic	Details																																																	
Vegetation description	<p>The flora and vegetation survey of Santaleuca (2019) identified three distinct vegetation types over the application area (Appendix G1):</p> <ul style="list-style-type: none"> • Eucalypt Woodlands on flat red clay soils, with minimum second storey species and a healthy mix of understorey species. • Mallee vegetation on white sandy soils over clay. A mix of mallee Eucalypt species with very good secondary storey and understorey species present. • Acacia / Allocasuarina woodland over a diverse understorey on white to yellow sands over gravel. 																																																	
Vegetation condition (Keighery 1994)	<p>Santaleuca (2019) assessed the vegetation as:</p> <table border="1"> <tr> <td>Eucalypt Woodlands</td> <td>Very Good</td> </tr> <tr> <td>Mallee</td> <td>Very Good</td> </tr> <tr> <td>Acacia / Allocasuarina</td> <td>Very Good to Excellent</td> </tr> </table>	Eucalypt Woodlands	Very Good	Mallee	Very Good	Acacia / Allocasuarina	Very Good to Excellent																																											
Eucalypt Woodlands	Very Good																																																	
Mallee	Very Good																																																	
Acacia / Allocasuarina	Very Good to Excellent																																																	
Climate	<p>Avon Wheatbelt IBRA region (AW1 Ancient drainage subregion). Climate is semi-arid (dry) warm Mediterranean (Beacham 2001). The mean annual rainfall for the local area is 328 millimetres (BOM 2022).</p>																																																	
Land systems and soils (Schoknecht, et al. 2004)	<p>The application area is mapped as occurring within the following mapped land systems (DPIRD 2017).</p> <table border="1"> <tr> <td>258KbME</td> <td>Kellerberrin, Merredin Subsystem</td> <td>Broad, flat valleys of the eastern wheatbelt containing heavy, red and grey soils.</td> </tr> <tr> <td>258TaUL</td> <td>Tandegin, Ulva Subsystem</td> <td>Yellow sandplain and gravel plain of the Eastern wheatbelt. This unit contains small areas of pale sand.</td> </tr> </table>	258KbME	Kellerberrin, Merredin Subsystem	Broad, flat valleys of the eastern wheatbelt containing heavy, red and grey soils.	258TaUL	Tandegin, Ulva Subsystem	Yellow sandplain and gravel plain of the Eastern wheatbelt. This unit contains small areas of pale sand.																																											
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Land degradation risk (DPIRD 2017)	<p>Land degradation risk ratings are provided in the table below.</p> <table border="1"> <thead> <tr> <th rowspan="2">Aspect</th> <th colspan="2">Kellerberrin, Merredin Subsystem</th> <th colspan="2">Tandegin, Ulva Subsystem</th> </tr> <tr> <th colspan="2">Hazard Rating</th> <th colspan="2">Hazard Rating</th> </tr> </thead> <tbody> <tr> <td>Wind Erosion</td> <td>L1</td> <td>-Low</td> <td>H1</td> <td>-High</td> </tr> <tr> <td>Water Erosion</td> <td>L1</td> <td>-Low</td> <td>L1</td> <td>-Low</td> </tr> <tr> <td>Water-logging</td> <td>H2</td> <td>+High</td> <td>L1</td> <td>-Low</td> </tr> <tr> <td>Water repellance</td> <td>L1</td> <td>-Low</td> <td>M1</td> <td>-Medium</td> </tr> <tr> <td>Phosphorus export</td> <td>H2</td> <td>+High</td> <td>L2</td> <td>+Low</td> </tr> <tr> <td>Subsurface acidification</td> <td>L2</td> <td>+Low</td> <td>H2</td> <td>+High</td> </tr> <tr> <td>Salinity</td> <td>M2</td> <td>+Medium</td> <td>L1</td> <td>-Low</td> </tr> <tr> <td>Flooding</td> <td>L1</td> <td>-Low</td> <td>L1</td> <td>-Low</td> </tr> </tbody> </table> <p>Acid sulphate soil risk has not been mapped over the application area.</p>	Aspect	Kellerberrin, Merredin Subsystem		Tandegin, Ulva Subsystem		Hazard Rating		Hazard Rating		Wind Erosion	L1	-Low	H1	-High	Water Erosion	L1	-Low	L1	-Low	Water-logging	H2	+High	L1	-Low	Water repellance	L1	-Low	M1	-Medium	Phosphorus export	H2	+High	L2	+Low	Subsurface acidification	L2	+Low	H2	+High	Salinity	M2	+Medium	L1	-Low	Flooding	L1	-Low	L1	-Low
Aspect	Kellerberrin, Merredin Subsystem		Tandegin, Ulva Subsystem																																															
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Subsurface acidification	L2	+Low	H2	+High																																														
Salinity	M2	+Medium	L1	-Low																																														
Flooding	L1	-Low	L1	-Low																																														
Waterbodies	<p>Flats surrounding a Basin as a component of the Wheatbelt Wetland suite is located within 500 metres of the application area to the east. Two minor drainage lines intersect the application area (minor river – non-perennial).</p>																																																	
Hydrogeography	<p>The application area <u>IS</u> located within the:</p>																																																	

Site characteristic	Details
	<ul style="list-style-type: none"> Avon River System (UFI 24), a Surface Water Area proclaimed under the RIWI Act <p>The application area is <u>NOT</u> located within any:</p> <ul style="list-style-type: none"> Rivers proclaimed under the RIWI Act Groundwater areas or irrigation districts proclaimed under the RIWI Act; CAWS Act Clearing Control Catchments; and any Public Drinking Water Source Areas. <p>Groundwater is mapped at 14,000 to 35,000 TDS /mg/L. (That is, highly saline).</p>

2. Ecosystem, flora, and fauna analysis

With consideration for the site characteristics set out above, relevant datasets (Appendix L2), and survey results (Appendix B) an analysis of relevant ecosystem, flora, and fauna factors are presented below.

2a) Ecological Communities

The Eucalypt woodlands of the Western Australian Wheatbelt is listed as a Priority 3 PEC by the DBCA and a Critically Endangered TEC under the EPBC Act.

The Eucalypt woodlands of the Western Australian Wheatbelt ecological community has been mapped regionally over portions of the northern section of the application area (Figure 4).

2b) Conservation significant flora recorded within ten kilometres of the application area

Two Threatened flora taxa and seven Priority flora taxa have been recorded within ten kilometres of the application area; Two P1; three P2; and two P3.

Threatened taxon	Status	Count	Closest record (m)	Annual?	Flowering period	Are surveys adequate to identify?
<i>Philotheca basistyla</i>	CR	9	1,376	No	Aug to Oct	Yes
<i>Boronia adamsiana</i>	VU	6	2,256	No	Jul to Oct	Yes

Priority listed Taxon	Status	Count	Closest record (m)	Annual?	Flowering period	Are surveys adequate to identify?
<i>Eucalyptus leptophylla</i> var. <i>floribunda</i> - more recently known as <i>Eucalyptus efflorescens</i> D.Nicolle & M.E.French	P1	1	166	No	Nov to Mar	Yes
<i>Scaevola tortuosa</i>	P1	1	7,864	No	Aug to Oct	Yes
<i>Acacia sclerophylla</i> var. <i>pilosa</i>	P2	3	8,216	No	Aug to Oct	Yes
<i>Aluta aspera</i> subsp. <i>localis</i>	P2	2	4,283	No	Oct to Nov	Yes
<i>Jacksonia rubra</i>	P2	2	6,410	No	Oct	Yes
<i>Acacia ancistrophylla</i> var. <i>perarcuata</i>	P3	2	1,474	No	Aug to Sep	Yes
<i>Baeckea exserta</i>	P3	6	7	No	Aug to Nov	Yes

2c) Conservation significant fauna recorded within ten kilometres of the application area

The Malleefowl (*Leipoa ocellata*) has been recorded within 200 metres of the application area.

Species	Status	Count	Closest record (m)
Malleefowl <i>Leipoa ocellata</i>	VU	1	185

2d) Potential black cockatoo habitat trees (Bamford 2020a)

Santaleuca (2020)					
Potential habitat trees (>300 mm DBH)	Proposed clearing	Proposed Avoidance	Proposed Retention	In adjacent road reserve	Total
No hollows	30	42		320	392
With potential hollows (Rank 3 and 4)		20	*21	70	111
TOTALS	30	62	*21	390	503

* Appendix I

2d) *Idiosoma nigrum* (Shield-backed Trapdoor Spider) locations (Bamford 2020b)

<i>Idiosoma nigrum</i> locations	No. sites	Percentage (%)	Sites
Recorded	18		
Within application area	2	11%	T01, T06,
Within 10m of application area	4	22%	T09, T03, T16, T23

3. Vegetation extent

3a) Regional vegetation mapping

Factor		Pre-European Extent (ha)	Current Extent (ha)	Remaining (%)	Current extent in DBCA-managed lands	
					(ha)	(%)
AVW	Avon Wheatbelt	9,517,110	1,761,187	18.51	174,981	9.94
Assn. 1049 (Total)	Woodland	833,385	56,618	6.79	3,376	5.96
Assn. 1049 (in AVW)		833,385	56,618	6.79	3,376	5.96
Assn. 955 (Total)	Scrub-heath / Thicket	139,324	15,282	10.97	1,809	11.84
Assn. 955 (in AVW)		120,565	12,901	10.70	1,098	8.51

3b) Remnant vegetation within ten kilometres of the application area

Remnant Vegetation	Hectares	Remaining %
Total Area (10 km radius)	31,440	100
Remnant vegetation remaining	3,278	10.43

Of the 3,278 hectares of remnant vegetation remaining:

- 1,573 hectares is classified as salt-affected
- 1,705 hectares that is not salt-affected,
- 1,005 hectares has been mapped as the Eucalypt woodlands of the Western Australian Wheatbelt

Appendix E – 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> Three distinct vegetation types have been identified over the application area (Santaleuca 2019a) one of which represents the Eucalypt woodlands of the Western Australian Wheatbelt listed as a Priority 3 PEC by the DBCA and a Critically Endangered TEC under the EPBC Act. Two Threatened flora taxa and seven Priority flora taxa have been recorded within ten kilometres of the application area with the P3 <i>Baeckea exserta</i> recorded within the Baandee North Road Reserve in the vicinity of the application area. The Threatened (Vulnerable) Shield-backed Trapdoor Spider (<i>Idiosoma nigrum</i>) has been recorded within the road reserve including within the proposed clearing area.</p>	May be at variance	Yes See Section 3.2.1
<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> The Threatened Malleefowl (<i>Leipoa ocellata</i>) has been recorded within 200 metres of the application area and eucalypts that potentially provide hollows for the Threatened Caranaby’s Cockatoo (<i>Calyptorhynchus latirostris</i>) are present. The Threatened (Vulnerable) Shield-backed Trapdoor Spider (<i>Idiosoma nigrum</i>) has been recorded within the road reserve including within the proposed clearing area.</p>	May be at variance	Yes See Section 3.2.2
<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> Two Threatened flora taxa have been recorded within ten kilometres of the application area; the Vulnerable (VU) <i>Boronia adamsiana</i>, and the Critically Endangered (CR) <i>Philothea basistyla</i>, the closest of which is 1.3 kilometres distant. The flora and vegetation survey undertaken by Santaleuca (2019a) did not identify any Threatened flora species within the surveyed area. The survey was undertaken in September 2019. <i>Boronia adamsiana</i> and <i>Philothea basistyla</i> are not annuals and would have been visible, and in their flowering period, during the time of the survey. The application area is unlikely to include, or be necessary for, the continued existence of Threatened flora.</p>	Not likely to be at variance	No
<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> No TECs endorsed by the Western Australian Minister for Environment or listed under the BC Act have been mapped within ten kilometres of the application area. Vegetation over the application area does not align with any TECs endorsed by the Western Australian Minister for Environment. An area representing the Eucalypt woodlands of the Western Australian Wheatbelt TEC listed as Critically Endangered under the EPBC Act occurs within the application area. The application area is likely to comprise a part of, or be necessary for, the maintenance of, a Threatened Ecological Community.</p>	At variance	Yes See Section 3.2.1
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> 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 the year 1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia 2001). The two vegetation associations mapped over the application area retain under 11 percent of the original extent for Association 955 (Scrub-heath / Thicket), and under seven per cent of the original extent for Association 1049 (Woodland). Less than 11 percent of native vegetation is retained in the local area.</p>	At variance	Yes See 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> In the central portion of the application area the North Baandee Nature Reserve (R12329) is located immediately adjacent, and on both sides of the Baandee North Road Reserve.</p>	Not likely to be at variance	Yes See Section 3.2.4
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> Two watercourses bisect the application area, however, drainage of these watercourses is controlled over the road reserve and no riparian vegetation was recorded by the flora and vegetation survey of Santaleuca (2019a). With the implementation of standard and effective drainage controls impacts to watercourses are unlikely.</p>	Not likely to be at variance	Yes See Section 3.2.5
<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> The mapped sandy soils of the Tandegin, Ulva Subsystem (258TaUL) are prone to wind erosion, and the mapped soils of the Kellerberrin, Merredin Subsystem (258KbME) are prone to Water-logging and Phosphorus export (DPIRD 2017). Standard and staged road construction methodologies will be implemented including strategies for drainage controls and wind and water erosion. Soils will not be excavated at depth, and any impacts to surrounding landscapes, soils, or drainage systems can also be managed through appropriate design (Appendix J). Noting the minor extent of proposed clearing along an existing road, the proposed clearing is not likely to cause appreciable land degradation.</p>	Not likely to be at variance	Yes See Section 3.2.6
<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> The application area is located within the Avon River System (UFI 24), a Surface Water Area proclaimed under the RIWI Act. Groundwater is mapped at 14,000 to 35,000 TDS /mg/L. (That is, highly saline). Flats surrounding a Basin as a component of the Wheatbelt Wetland suite is located within 500 metres of the application area to the east. Two minor drainage lines intersect the application area (minor river – non-perennial). The proposed clearing of the roadside may cause some short term water</p>	Not likely to be at variance	Yes See Section 3.2.5

Assessment against the Clearing Principles	Variance level	Is further consideration required?
<p>quality issues in terms of localised surface water sedimentation during works. Standard and staged road construction methodologies will be implemented including strategies for drainage control and water erosion. Soils will not be excavated and any impacts to groundwater and surrounding drainage systems can be managed through appropriate design.</p>		
<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> The mapped soils of the Tandegin, Ulva Subsystem (258TaUL) and the Kellerberrin, Merredin Subsystem (258KbME) are rated low for flooding risk (DPIRD 2017). No FPM floodplain areas (DWER-020) have been mapped within ten kilometres of the application area and is located outside of any recognised floodplain areas. The hydrology of the area is altered due to existing roadside infrastructure. Surface flow may occur over short distances for short periods during, and immediately after, very intense rainfall. Standard road construction methodologies will be implemented including strategies for drainage controls and water erosion and any potential for flooding can be managed through appropriate drainage design (Appendix J). Given the small scale and linear nature of the proposed clearing, and the standard construction methodologies employed, proposed clearing is unlikely to cause, or exacerbate, the incidence or intensity of flooding.</p>	Not at variance	No

Appendix F – 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 G –Biological survey excerpts

1. Vegetation types and flora species recorded (Santaleuca 2019a)



Figure 1: Vegetation types of the application area (Santaleuca 2019a data)

Eucalyptus woodland

Acacia	hemiteles	tan wattle
Acacia	acuminata	jam
Acacia	erinacea	Prickly wattle
Acacia	merallii	
Atriplex	vesicaria	Bladder saltbush
Atriplex	semibaccata	creeping saltbush
Enchylaena	tomentosa	ruby saltbush
Dodonaea	adenophora	Hop bush
Eucalyptus	loxophleba ssp lissophloia	oil mallee
Eucalyptus	salubris	gimlet
Eucalyptus	salmomophloia	salmon gum
Eucalyptus	kochii ssp plennisima	oil mallee
Eucalyptus	longicornis	red morrel
Eucalyptus	capillosa	white gum (tree form)
Eremophila	Oppositifolia ssp angustifolia	Purple eremophila
Maireana	brevifolia	bluebush
Maireana	georgii	
Melaleuca	pauperiflora	boree
Olearia	muellerii	goldfields daisy
Ptilotus	exaltatus	Purple mulla mulla
Rhagodia	preissii	
Scaevola	spinescens	maroon bush
Sclaeolaena	sp	
Senna	artemisioides	

Acacia – Allocasuarina

GENUS	SPECIES	COMMON NAME
Acacia	coolgardiensis	
Acacia	acuminata (narrow phyllode)	jam
Acacia	neurophylla	wodjil
Allocasuarina	acutivalvis	black sheoak
Allocasuarina	campestris	tammar
Amphipogon	caricinus	Greybeard grass
Austrostipa	elegantissima	grass
Baeckea	Sp koonadgin	
Dianella	revoluta	flax
Dodoneaea	adenophora	Hop bush
Drosera	macrantha	sundew
Ericomyrtus	serplifolius	
Eremophila	Sp (herbarium)	
Grevillea	hookeriana	black toothbrush
Grevillea	paradoxa	vanilla bush
Hakea	scoparia	
Lawrencella	rosea	pink everlasting
Lepidospermum	sp	sedge
Leptospermum	erubescens	Tee tree
Melaleuca	hamata	brushwood
Melaleuca	cordata	Purple pom poms
Persoonia	quinquenervis	
Petrophile	brevifolia	Yellow
Thryptomene	Sp (herbarium)	
Thysanotus	patersonii	Climbing lilly
Santalum	acuminatum	quandong
Santalum	spicatum	sandalwood
Verticordia	crysantha	Yellow
Waitzia	acuminata	orange waitzia

Mallee		
GENUS	SPECIES	COMMON NAME
Acacia	hemetiles	tan wattle
Acacia	erinaceae	Prickly wattle
Amphipogon	caracinus	greybeard grass
Atriplex	vesicaria	bladder saltbush
Atriplex	semibaccatta	creeping saltbush
Austrostipa	elegantissima	
Enchylaena	tomentosa	ruby saltbush
Eremophila	lonanthe	purple
Eremophila	decipiens	
Eremophila	oppositifolia ssp angustifolia	
Eucalyptus	horistes	oil mallee
Eucalyptus	subangusta ssp subangusta	
Eucalyptus	erythronema	red flowering gum
Eucalyptus	tenera	yellow flowering gum
Eucalyptus	moderata	lemon flowering gum
Eucalyptus	capillosa	Mallee white gum
Exocarpus	aphylla	leafless ballart
Grevillea	paniculata	vanilla bush
Lepidosperma	brunonianum	sedge
Maireana	brevifolia	Bkuebush
Melaleuca	pauperiflora	
Olearia	muellerii	goldfields daisy
Olearia	eremicola	Mauve daisy
Santalum	acuminatum	quandong
Hemigenia	cilliata	
Waitzia	acuminata	

2. Conclusions of the vegetation and flora survey of Santaleuca (2019a)

Executive Summary:

This report is the third and final Vegetation Survey on Baandee North Road, in the Shire of Kellerberrin, in response to a Clearing Permit Application (CPS8590/1), by the Shire of Kellerberrin. This report covers the final section of the road from SLK 23 to SLK 28.68. GPS co-ordinates are from; 31° 23.066's, 117° 57.093'e on the southern end to 31° 20.040's, 117° 56.056'e, to the northern end of the survey area. The survey clearly identified 3 different vegetation types, which are separately detailed below.

SLK 23 to SLK 24.07 is generally a mildly sloping mallee ecosystem growing on white sandy soils over clay. A mix of mallee Eucalypt species with very good secondary storey and understorey species present. The road reserve remnant extends approximately 20 metres either side of the constructed road. Vegetation health is described as Very Good to Excellent. This section is marked yellow in the map below.

SLK 24.07 to SLK 24.52 is a short belt of break of slope systems, with an Acacia, Allocasuarina overstorey, and diverse secondary storey. Understorey is healthy with some agricultural weeds present. General health of the section is described as Very Good to Excellent. Most of this section occurs within an oddly shaped remnant of 190 hectares covering land either side of the road for 1.5 km. There is also a cross roads within this remnant area, Baandee Nth Rd intersecting with Baandee North Cross Rd and Arthur Rd, on the north west corner of the remnant. Soils are white to yellow sand over gravel. This section is marked as red in the map below.

SLK 24.52 to SLK 28.68 becomes Eucalypt woodlands on flat red clay soils, with minimum second storey species and a healthy mix of understorey species. General health of the remnant is very good but only the first 900 metres is within the remnant. The rest is roadside verge and extends approximately 20 metres either side of the constructed road. The area within the remnant has slightly more second storey species within it, but more weeds. This is explained by the fact that a thin strip of Eucalyptus loxophleba ssp lissophloia, a mallee, with associated Acacia acuminata buffers the change of soils from sandy to clay and coincides with a drainage line running through the remnant.

Particular emphasis was placed on the Threatened Environmental Community of Wheatbelt Woodlands (TEC) which is marked as green in the map below. This section is definitely identifiable as a TEC and will therefore be required to be referred to the Federal Department of Environment, before any further progress can be made via Department of Biodiversity, Conservation and Attractions.

It is approximately the final 4 km of the section until the Shire border. The patch is approximately 20 metres wide either side of the road and is about 16 hectares. I would estimate approximately 1-1.5 hectares will be cleared, depending on engineering avoidance strategies.

It comprises Salmon, Gimlet and Morrel, with a sparse but healthy understorey of Chenopods, Boree and Acacia. Its' condition rating is Very Good.

CONCLUSION:

This section of Baandee North Road was surveyed as three distinct vegetation associations. Uniformly 20 metres wide either side of the road, the remnant vegetation was found to be in very good condition or better, throughout.

The third and longest vegetation type, from SLK 24.52 to 28.68 was determined to be Wheatbelt Woodland for the purposes of Federal Legislation protecting it as a Threatened Ecological Community. As such it will need to be referred to the Federal Department of Environment and Energy, for them to determine whether the road works proposed are a controlled action under that legislation.

A list of Priority and Declared Rare flora was generated from the Naturemap database, administered by the Department of Biodiversity, Conservation and Attractions and the WA Museum. This is the standard database to enquire about protected native flora species. The reproduced table earlier in this document lists the species to be especially aware of when surveying. None of the species listed were found in this survey.

END

3. Conclusions of the significant fauna assessment of Bamford (2020a)

Fauna Assessment Baandee Road North

CONCLUSIONS

The Baandee North Road supports remnant native vegetation along its length and one fauna species of conservation significance has been confirmed to be present: the Shield-backed Trapdoor Spider. This species is also present in the nearby Nature Reserve. Other species of conservation significance returned from databases are not expected to be present regularly either along the road reserve or in the nature reserve, due largely to the extent of regional habitat loss and fragmentation.

A more comprehensive survey of the North Baandee Nature Reserve is recommended and should target the Shield-backed Trapdoor Spider and the Malleefowl. If the spider is abundant in the reserve this will represent a significant and outlying population as the species is declining in many other reserves to the west, and information on its abundance in the reserve will provide some context for the impact of the proposed road widening on spiders along the road. Although the Malleefowl is considered unlikely to be present in the reserve due to the reserve's small size and isolation, if the birds are present then there may be a risk of roadkill for which some management measures could be taken. There seems little likelihood of Carnaby's Black-Cockatoo still being present in the region, but any sightings should be reported to BirdLife Australia in Perth.

Appendix 1. Species listed under the EPBC Act as mNES and returned from the Protected Matters Search Tool for the general region of the Baandee North Road project area as 'species or species habitat may be present'.

This list does not include species listed solely as Marine under the EPBC Act, as these are not mNES and the Marine listing applies only in Commonwealth waters.

Species	Listing under EPBC Act	Likely status in Baandee North Road area and discussion
Curlew Sandpiper <i>Calidris ferruginea</i>	Critically Endangered	Vagrant and unlikely to be present except for occasional small numbers overflying the project area. A wetland species so no suitable habitat in project area.
Carnaby's Black-Cockatoo <i>Calyptrorhynchus latirostris</i>	Endangered	Vagrant and unlikely to be present except for occasional small numbers of birds making temporary visits to the area. The North Baandee site lies in the extreme north-east of the species' range is (Johnson and Storr) and that range has contracted in recent years due to over-clearing for agriculture. The site does contain potential nesting habitat but due to clearing it lacks foraging habitat to sustain breeding birds. Surveys of the project area, including in spring 2019 (breeding season) have failed to detect the species.
Malleefowl <i>Leiopoa ocellata</i>	Vulnerable	Probably locally extinct . Suitable habitat for the Malleefowl is present in the Baandee North Reserve but the species was not detected and is likely to have died out due to the small size and isolation of the reserve. There is a slight possibility of vagrant birds visiting the area.
Night Parrot <i>Pezoporus occidentalis</i>	Endangered	Probably locally extinct . The few recent records of this species are all well to the north; northern Murchison, Pilbara and Great Sandy Desert, western Queensland and northern South Australia. Furthermore, the project area does not provide the sort of habitat with which the specie is usually associated (DBCA 2017). The project area is also outside the high and medium priority regions for survey for the species identified in this guidance.
Australian Painted-snipe <i>Rostratula australis</i>	Endangered	Vagrant and unlikely to be present except for occasional birds making temporary visits to nearby wetlands; no suitable habitat in project area.
Chuditch <i>Dasyurus geoffroyii</i>	Vulnerable	Probably locally extinct . There are records on the species from near Mukinbudin and Ghooli in the 1990s and 2000s but there is no evidence of extant populations in the highly fragmented landscape of the eastern Wheatbelt.
Fork tailed Swift	Migratory	A highly mobile and largely aerial species that may be an occasional visitor throughout the greater South-West region in summer. This is a non-breeding visitor to Australia and has low reliance on small patches of terrestrial environments.
Grey Wagtail	Migratory	A vagrant in Australia and particularly in southern Australia; highly unlikely to ever occur in the project area and often associates with wetland margins which are absent.
Common Sandpiper <i>Actitis hypoleucos</i>	Migratory	Vagrant and unlikely to be present except for occasional small numbers overflying the project area. A wetland species so no suitable habitat in project area.
Sharp tailed Sandpiper <i>Calidris acuminata</i>	Migratory	Vagrant and unlikely to be present except for occasional small numbers overflying the project area. A wetland species so no suitable habitat in project area.
Pectoral Sandpiper <i>Calidris melanotos</i>	migratory	Vagrant and unlikely to be present except for occasional small numbers overflying the project area. A wetland species so no suitable habitat in project area.
Shield-backed Trapdoor Spider <i>Idiosoma nigrum</i>	Vulnerable	Resident . Nearest known populations prior to current surveys are XXkm to the west.

Table 1. Ranking system for the assessment of potential nest trees for Black-Cockatoos.

Rank	Description of tree and hollows/activity
1	Active nest observed; adult (or immature) bird seen entering or emerging from hollow. Can also be used for a known nest tree active in the previous 12 months (although this should be noted in the description).
2	Hollow of suitable size and angle (i.e. near-vertical) visible with chew marks around entrance.
3	Potentially suitable hollow visible but no chew marks present; or potentially suitable hollow suspected to be present (as suggested by structure of tree, such as large, vertical trunk broken off at a height of >8m).
4	Tree with large hollows or broken branches that might contain large hollows but hollows or potential hollows are not vertical or near-vertical; thus a tree with or likely to have hollows of sufficient size but not to have hollows of the angle preferred by Black-Cockatoos.
5	Tree lacking large hollows or broken branches that might have large hollows; a tree with more or less intact branches and a spreading crown.

4. Conclusions of the Shield-backed Trapdoor Spider survey of Bamford (2020b)

Shield-backed Trapdoor Spider Assessment Baandee Road North



Figure 1. Locations of spider transects along the Road Reserve and in the Nature Reserve.

RESULTS and DISCUSSION

Raw data from the transects are presented in Appendix 2 (Road Reserve) and Appendix 3 (Nature Reserve), with results summarised in Table 1 (Road Reserve) and Table 2 (Nature Reserve).

Further summaries, examining impact and non-impact areas along the Road Reserve, and in the Nature Reserve, and comparing spider densities by VSA, are provided in Table 3 and Table 4. The locations of a few spiders found opportunistically outside transects are given in Appendix 4. In addition to the Shield-backed Trapdoor Spider, small numbers of other species were found, including a species of *Gaius*, which is not of conservation significance, and possibly a second species of *Idiosoma*, most likely *Idiosoma mcnamarai* or *Idiosoma kopeitkaorum*. *I. mcnamarai* is a Priority 1 species, and therefore is not listed under legislation, while *I. kopeitkaorum* is a Schedule 2 (Endangered) species under the WA Biodiversity Conservation Act (2016). A specimen of this second possible *Idiosoma* has been lodged with the WA Museum for identification. It was collected within the area proposed for clearing along the road (Transect 6) with two spiders within half a metre of each other.

Shield-backed Trapdoor Spiders were found throughout at highly variable densities, as is typical for the genus *Idiosoma*. This variability is a result of the distribution of the spiders being highly clumped around successful breeding females, with spiders often occurring in matriarchal clusters that can exceed 30 animals in a square metre (Bamford *et al.* 2013). Because such clusters appear to occur at random, encountering a cluster in a transect gives a very high density estimate, and therefore multiple transect replicates are required to provide a realistic density value. Larger samples would probably be required for robust statistical analyses to be conducted, but some general trends appear to exist (but recognising that the discovery of one more or less matriarchal cluster could affect results greatly).

Spiders were present in the Road Reserve both within and outside the area of proposed impact, and were also present in the Nature Reserve. The density was lower in the impact area of the Road Reserve than in either the non-impact area or in the Nature Reserve (Table 3). This could be due to levels of existing disturbance with spiders possibly affected by dust, vibration and road maintenance close to the existing road.

There were clear differences in the density of spiders in different VSAs, broadly forming two groups. VSAs 1, 2 and 3 had high spider densities, with the very high density in VSA 3 (Rough barked Mallee) probably partly an artefact of a small sample size and one of the transects including a large matriarchal cluster. Despite this, there is a degree of consistency in the densities calculated for VSAs 1, 2 and 3, while VSAs 4 and 5 clearly had lower but similar spider densities. VSAs 1, 2 and 3 are all part of the Wheatbelt Woodlands Threatened Ecological Community.

Spider populations can be roughly estimated based upon these calculated densities and where areas of each VSA are known. Within the Road Reserve, the application for clearing affects 1.84ha of VSAs 1, 2 and 3 combined. This has an overall mean density of 550 spiders/ha (taking account of all 21 transects in these VSAs), with a possible impact on 1,012 spiders. However, the density may be lower close to the road with a mean density in the impacted part of the Road Reserve in these VSAs (9 transects) within the proposed clearing area of just 87 spiders/ha, meaning that only 160 spiders could be impacted.

The application for clearing also affects 0.42 ha of VSAs 4 and 5 (Tammar on sand over gravel and Smooth barked mallee on pale clay) which have an overall mean density of 68.8 spiders/ha (16 transects) and 117 spiders/ha (6 transects in impact area). This represents as few as 29 or as many as 49 additional spiders. The number of impacted spiders is a minimum of 189 and a maximum of 1061.

In comparison with the number of spiders that could be impacted, there are spiders in the reserve outside the area proposed for clearing, and the Baandee Nature Reserve supports a substantial population. The botanical survey of the Nature Reserve (R 12329) and the adjoining gravel extraction reserve (R33419) shows 90ha of VSAs 1, 2 and 3 combined (the Wheatbelt Woodland Threatened Ecological Community (TEC), and 101ha of other vegetation types, consisting mostly of VSAs 4 and 5. With an overall mean density in VSAs 1, 2 and 3 of 550 spiders/ha, and in VSAs 4 and 5 of 68.8 spiders/ha, this suggests a spider population in the Nature Reserve and adjoining reserve of 56,449. While this value is clearly an estimate, it does suggest a substantial population in the reserve. There is a further 22ha area within the road reserve but outside the 1.84 ha over which the application for clearing applies. This consists mostly of VSAs 1, 2 and 3 and therefore a density of 550 spiders/ha can be assumed, giving an additional 12,100 spiders.

While the calculations above make many assumptions, the calculated impact of up to about 1,000 spiders represents about 1.5% of the local spider population, with the proportional impact likely to be less than this.

Table 1. Summary of spider data in Road Reserve.

VSA	Outside or within disturbance area	Transect Number	Number of <i>I.nigrum</i> burrows	Mean burrows per transect	Mean burrows per hectare
VSA 1. Salmon gum/Gimlet	Outside	T4	9	5.67	566.67
		T16	5		
		T18	3		
	Within	T15	0	0.00	0.00
		T17	0		
		T25	0		
VSA 2. <i>Eucalyptus laxophleba</i> ssp. <i>lissophloia</i>	Outside	T2	5	3.67	366.67
		T14	1		
		T28	5		
	Within	T1	4	2.33	233.33
		T3	3		
		T13	0		
VSA 3. Rough barked Mallee	Outside	T20	53	17.67	1766.67
		T22	0		
		T24	0		
	Within	T19	0	0.33	33.33
		T21	0		
		T23	1		
VSA 4. Tammar on sand over gravel	Outside	T7	0	0.67	66.67
		T8	2		
		T32	0		
	Within	T5	0	0.67	66.67
		T6	2		
		T31	0		
VSA 5. Smooth mallee on pale clay	Outside	T10	2	0.67	66.67
		T12	0		
		T30	0		
	Within	T9	5	1.67	166.67
		T11	0		
		T29	0		

Table 2. Summary of spider data in Nature Reserve.

VSA	Transect Number	Number of <i>I.nigrum</i> burrows	Mean burrows per transect	Mean burrows per hectare
VSA 1. Salmon Gum/ Gimlet	T26	0	4	400.00
	T27	8		
VSA 2. <i>Eucalyptus loxopleba ssp lissophloia</i>	T33	24	12	1200.00
	T34	0		
VSA 4. Tammar on Sand over gravel	T35	0	0	0.00
	T36	0		
VSA 5. Smooth barked Mallee on pale clay	T37	0	0	0.00
	T38	0		

Table 3. comparison of spider densities between road and nature reserve.

Area	N transects	Mean density/ha
Road reserve within impact	15	100
Road reserve outside impact	15	567
Nature Reserve	8	400

Table 4. comparison of spider densities between Vegetation and Substrate Associations.

VSA	N Transects	Mean density/ha
VSA 1. Salmon Gum/ Gimlet	8	312.5
VSA 2. <i>Eucalyptus loxopleba ssp lissophloia</i>	8	525
VSA 3. Rough barked Mallee	6	900
VSA 4. Tammar on Sand over gravel	8	50
VSA 5. Smooth barked Mallee on pale clay	8	87.5

Appendix H – Tree avoidance – Baandee North Road 2329 (Copeland 2020; 2021)

Road Number 4090006

Clearing area no.	SLK From	Side	Total foliage depth	Total foliage length	Area m2	Vegetation type	Habitat tree	Photo notes
BN G67	24.56	East	8	7	56	Eucalyptus	No	Euc back left to stay
BN G69	24.56	West	10	7	70	Mallee	No	
BN G68	24.62	West	12	6	72	Mallee	No	Back left mallee stays
BN G63	25.17	East	19	27	513	Two large eucalyptus	Hollows observed	
BN G62	25.35	East	9	8	72	Large eucalyptus	Hollows observed	
BN G64	25.52	West	11	10	110	Eucalyptus	Hollows observed	
BN G60	25.58	East	6	8	48	Eucalyptus	No	
BN G61	25.58	East	10	9	90	Eucalyptus	Hollows observed	
BN G70	25.58	West	8	9	72	Eucalyptus	Hollows observed	
BN G65	25.6	West	10	12	120	Two eucalyptus (3 stems)	No hollows observed	
BN G66	25.61	West	8	11	88	Two eucalyptus	No hollows observed	
BN G42	25.64	East	15	21	315	Two eucalyptus	Hollows observed	Two green
BN G43	25.67	East	10	12	120	Eucalyptus	No hollows observed	One green, 3 white
BN G59	25.75	West	18	19	342	Large eucalyptus	Hollows observed	
BN G58	25.78	West	10	10	100	Eucalyptus	No	
BN G44	25.79	East	7	7	49	Eucalyptus	No	
BN G57	25.79	West	11	16	176	Large eucalyptus	No hollows observed	
BN G56	25.84	West	16	14	224	Large eucalyptus	Hollows observed	Both staying but only left one measured
BN G45	25.96	East	11	11	121	Eucalyptus	Hollows observed	
BN G55	25.96	West	7	7	49	Eucalyptus	Hollows observed	
BN G46	25.98	East	18	13	234	Eucalyptus	No hollows observed	
BN G54	25.99	West	13	18	234	Eucalyptus stand	No	
BN G47	26.03	East	7	7	49	Eucalyptus	No	White and green
BN G53	26.08	West	11	13	143	Eucalyptus	No hollows observed	
BN G48	26.13	East	9	7	63	Eucalyptus	No	
BN G49	26.2	East	6	8	48	Eucalyptus	No	Two green
BN G52	26.21	West	13	16	208	Large eucalyptus	No hollows observed	
BN G50	26.29	East	14	10	140	Eucalyptus	No hollows observed	One white one green
BN G51	26.46	East	14	14	196	Large eucalyptus	No hollows observed	

Clearing area no.	SLK From	Side	Total foliage depth	Total foliage length	Area m2	Vegetation type	Habitat tree	Photo notes
BN G38	26.75	West	8	14	112	Two eucalyptus and leafless ballart	No hollows observed	Only two in front to go
BN G36	27.03	East	9	9	81	Eucalyptus	No hollows observed	
BN G39	27.03	West	5	4	20	Eucalyptus	No	
BN G35	27.07	East	11	13	143	Eucalyptus	No hollows observed	Middle eucalyptus stays
BN G40	27.07	West	20	9	180	Two Melaleucas and two eucalyptus	No	
BN G34	27.11	East	7	12	84	Two thin trees	No	Some green in background
BN G41	27.11	West	9	14	126	Two eucalyptus	No hollows observed	
BN G26	27.13	West	6	9	54	Eucalyptus	No hollows observed	
BN G27	27.18	West	14	11	154	Mallee	No hollows observed	
BN G33	27.23	East	16	14	224	Eucalyptus	No hollows observed	Includes acacia from above
BN G32	27.26	East	9	12	108	Eucalyptus	No hollows observed	
BN G28	27.27	West	11	9	99	Mallee	No	
BN G31	27.3	East	10	11	110	Big eucalyptus	No hollows observed	
BN G29	27.34	West	10	13	130	Four capillosa	No	
BN G30	27.37	East	3	3	9	Melaleuca	No	Above white on right
BN G18	27.64	East	5	6	30	Poorly looking eucalyptus	Main trunk is hollow	Blue marker in foreground
BN G19	27.66	West	11	12	132	Eucalyptus	No hollows observed	
BN G17	27.67	East	11	10	110	Two eucalyptus	No hollows observed	One white cross in foreground and gateway
BN G20	27.7	West	8	12	96	Eucalyptus	No hollows observed	
BN G21	27.74	West	6	7	42	Eucalyptus	Hollows observed	
BN G16	27.77	East	7	8	56	Eucalyptus	No	
BN G22	27.8	West	13	14	182	Three eucalyptus	No hollows observed	Greens and whites mixed together
BN G23	27.91	West	4	6	24	Small mallee	No	
BN G24	28.03	West	5	6	30	Small eucalyptus	No	
BN G15	28.05	East	13	12	156	Eucalyptus	No hollows observed	
BN G25	28.13	West	7	15	105	Eucalyptus	Hollows observed	
BN G10	28.23	East	6	5	30	Mallee	Hollows observed	White and green
BN G09	28.33	East	7	6	42	Mallee	No	

Clearing area no.	SLK From	Side	Total foliage depth	Total foliage length	Area m2	Vegetation type	Habitat tree	Photo notes
BN G11	28.34	West	8	9	72	Eucalyptus big	Hollows observed	
BN G12	28.37	West	16	18	288	Really big eucalyptus	Hollows observed	
BN G13	28.52	West	17	16	272	Big eucalyptus	Hollows observed	
BN G08	28.53	East	7	6	42	Eucalyptus	Hollows observed	
BN G07	28.62	East	11	9	99	Mallee	Hollows observed	
BN G14	28.81	West	12	13	156	Eucalyptus	Hollows observed	
BN G06	28.92	East	8	10	80	Mallee	No hollows observed	Gateway
BN G05	29.05	West	9	11	99	Eucalyptus	No hollows observed	Drain
BN G37	29.06	East	7	14	98	Large eucalyptus	Hollows observed	
BN G01	29.09	East	8	13	104	Eucalyptus	Hollows observed	
BN G04	29.1	West	6	11	66	Eucalyptus	No	White and green in same photo
BN G03	29.13	West	6	10	60	Two eucalyptus	No	
BN G02	29.17	West	8	16	128	Three trees	No hollows observed	
					8355			

Clearing area no.	SLK From	Side	Total foliage depth	Total foliage length	Area m2	Vegetation type	Habitat tree	Photo notes
BN W012	29.07	East	10	11	110	Large eucalyptus	Hollows observed	
BN W013	29.06	East	12	11	132	Large eucalyptus	Hollows observed	
BN W015	29.01	East	13	13	169	Mallet and a mallee	Bee hive	Talk to Rod about green cross
BN W040	28.43	West	10	11	110	One live one dead	Hollows observed	Drain
BN W046	27.69	East	13	21	273	Two eucalyptus	Hollows observed	Two trees
BN W046	27.69	East	13	21	273	Two eucalyptus	Hollows observed	Two trees
BN W047	27.69	East	6	7	42	Eucalyptus	Hollow main trunk	White and green crosses
BN W048	27.67	East	10	12	120	Two eucalyptus and small acacia	No hollows observed	Two green crosses in background
BN W055	27.57	West	9	19	171	Two eucalyptus	Hollows observed	
BN W087	27.11	East	10	11	110	Big eucalyptus and small shrubs	Hollows observed	Some green in background
BN W089	27.00	East	6	7	42	Eucalyptus	Hollows observed	
BN W094	26.78	West	11	14	154	Big eucalyptus	No hollows observed	
BN W096	26.91	West	8	11	88	Two big eucalyptus (one dead, one partially) and one fallen. Understory.	Hollows observed. Pink and greys in tree behind.	

Clearing area no.	SLK From	Side	Total foliage depth	Total foliage length	Area m2	Vegetation type	Habitat tree	Photo notes
BN W096	26.91	West	8	11	88	Two big eucalyptus (one dead, one partially) and one fallen. Understory.	Hollows observed. Pink and greys in tree behind.	
BN W104	26.28	East	11	9	99	Eucalyptus	No hollows observed	One white one green
BN W107	26.63	East	9	8	72	Large eucalyptus	Hollows observed	
BN W113	26.61	West	8	12	96	Large eucalyptus	Hollows observed	
BN W115	26.47	West	14	13	182	Large eucalyptus	Hollows observed	
BN W116	26.22	West	13	17	221	Large eucalyptus and huge leafless ballart (ballart will probably stay)	Hollows observed	
BN W117	26.13	West	17	17	289	Eucalyptus	No hollows observed	

Appendix I – Habitat tree retention locations

ID (Bamford 2020a)	EASTING	NORTHING	SPECIES	DBH	Rank
294	589077	6528767	<i>Eucalyptus salmonophloia</i>	500	4
295	589065	6528781	<i>Eucalyptus salmonophloia</i>	500	4
298	588981	6528861	<i>Eucalyptus salubris</i>	700	3
305	588900	6531608	<i>Eucalyptus salubris</i>	700	3
328	588906	6532081	<i>Eucalyptus salmonophloia</i>	700	3
335	588905	6532233	<i>Eucalyptus salmonophloia</i>	700	3
345	588912	6532700	<i>Eucalyptus salubris</i>	400	4
347	588910	6532719	<i>Eucalyptus salmonophloia</i>	550	3
378	588920	6532172	<i>Eucalyptus salubris</i>	400	3
406	588910	6531430	<i>Eucalyptus salubris</i>	650	3
431	588909	6530950	<i>Eucalyptus loxophleba</i>	550	3
610	588990	6528876	<i>Eucalyptus salmonophloia</i>	700	3
611	588995	6528871	<i>Eucalyptus salubris</i>	800	3
689	588890	6529981	<i>Eucalyptus salmonophloia</i>	800	3
699	588890	6530224	<i>Eucalyptus salmonophloia</i>	700	3
711	588890	6530354	<i>Eucalyptus salmonophloia</i>	650	3
816	588901	6531312	<i>Eucalyptus longicornis</i>	550	3
838	588903	6530200	<i>Eucalyptus salmonophloia</i>	750	3
841	588904	6530078	<i>Eucalyptus longicornis</i>	1100	3
927	588896	6529254	<i>Eucalyptus salubris</i>	550	3
933	588896	6529092	<i>Eucalyptus salmonophloia</i>	1000	3



Figure 1: Habitat tree retention locations

Appendix J – Road design

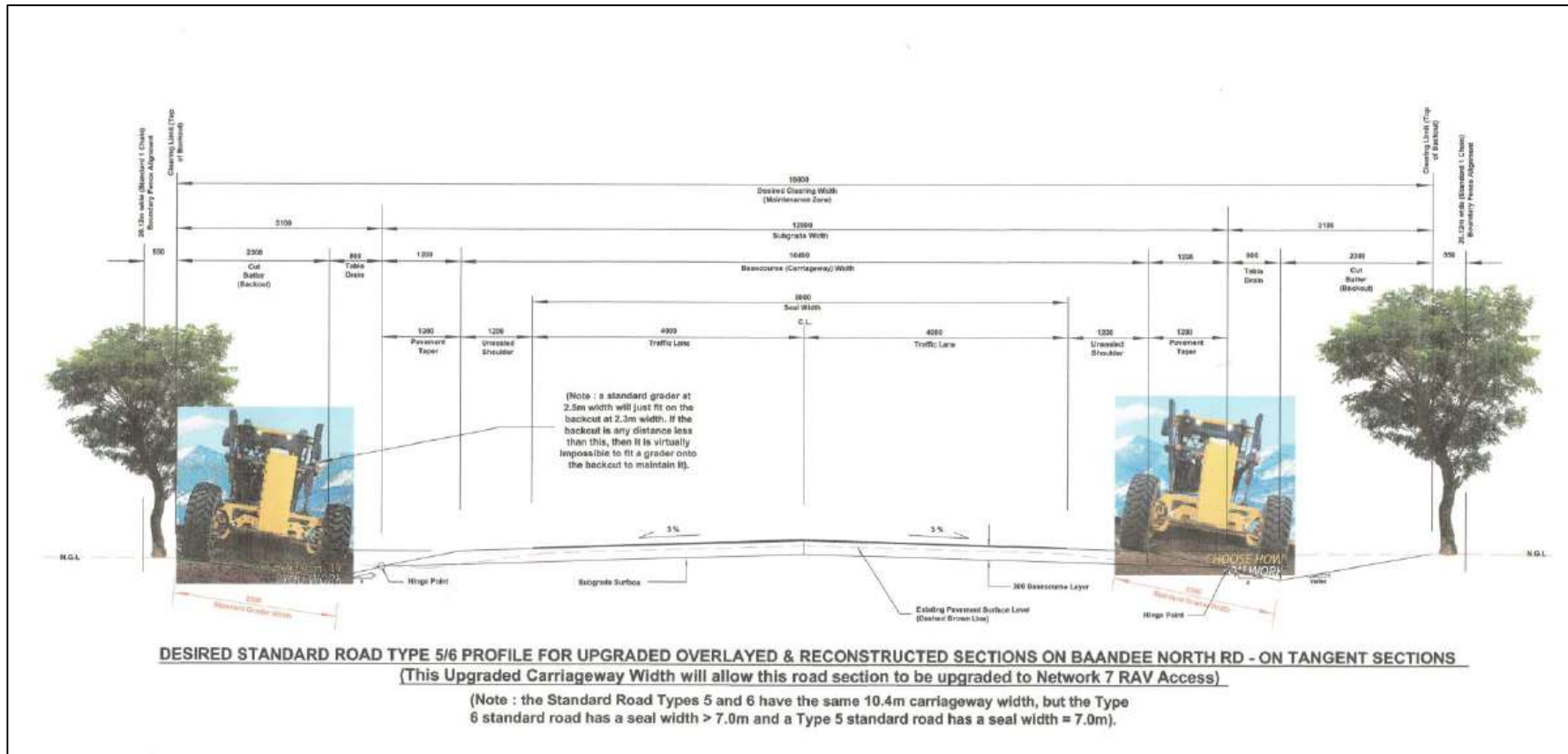


Figure 1 Desired standard road type

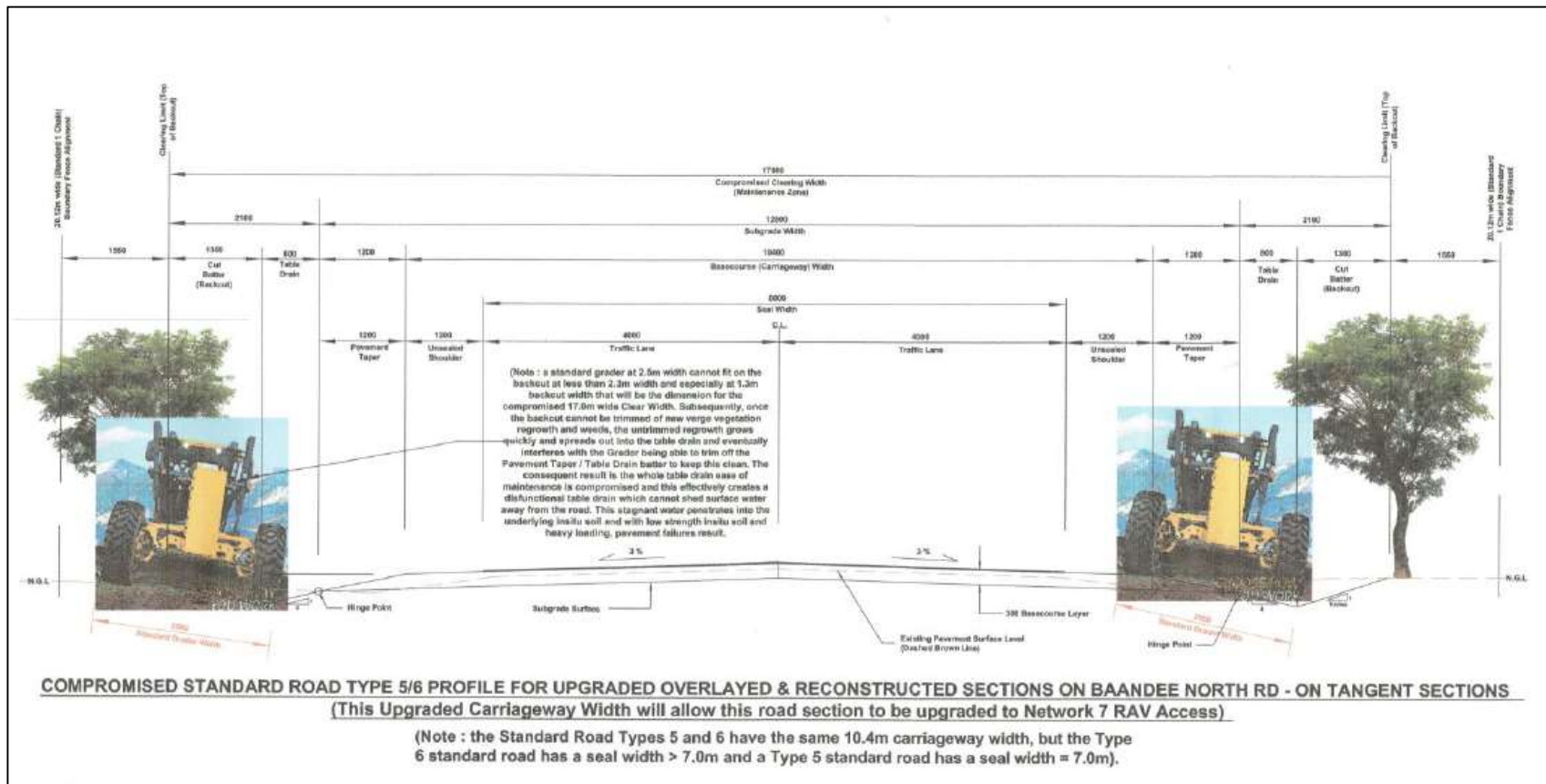


Figure 2 – Compromised standard road type

Appendix K – Offset calculator value justification

Field Name	Description	Justification for value used
<i>IUCN Criteria</i>	The IUCN criteria for the value being impacted	(6.8%) Afforded to Eucalypt Woodlands of the Western Australian Wheatbelt as this community is listed as Critically Endangered under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
<i>Area of impact (habitat/community) or Quantum of impact (features/individuals)</i>	The area of habitat/community impacted or number of features/individuals impacted	(1.10) The proposed clearing will see 1.10 hectares of the Eucalypt Woodlands of the Western Australian Wheatbelt TEC cleared.
<i>Quality of impacted area (habitat/community)</i>	The quality score for area of habitat/community being impacted - a measure of how well a particular site supports a particular threatened species or ecological community and contributes to its ongoing viability	(6) The vegetation of the TEC is predominantly in a Very Good condition (value 6), comprising <i>Eucalyptus</i> woodlands over variable understorey.
<i>Time over which loss is averted (habitat/community)</i>	This describes the timeframe over which changes in the level of risk to the proposed offset site can be considered and quantified	(20) The purpose of the offset site will amended to 'conservation'. 20 years is the maximum value associated with this field.
<i>Time until ecological benefit (habitat/community) or Time horizon (features/individuals)</i>	This describes the estimated time (in years) that it will take for the main benefit of the quality (habitat/community) or value (features/individuals) improvement of the proposed offset to be realised	(3) The process for implementing actions to improve the TEC condition from Good (value 4) to Good to Very Good (value 5) is expected to be achieved within three years.
<i>Start area (habitat/community) or Start value (features/individuals)</i>	The area of habitat/community or number of features/individuals proposed to offset the impacts	(9.01) Approximately 9.01 hectares of TEC occurs within the offset area.
<i>Start quality (habitat/community)</i>	The quality score for the area of habitat/community proposed as an offset - a measure of how well a particular site supports a particular threatened species or ecological community and contributes to its ongoing viability	(4) The calculation is based upon an averaged start condition of the Eucalypt Woodlands TEC within R14411 of Good (value 4)
<i>Future quality without offset (habitat/community) or Future value without offset (features/individuals)</i>	The predicted future quality score (habitat/community) or value (features/individuals) of the proposed offset site without the offset	(4) It is assumed that the vegetation would remain in an averaged Good condition (value 4) due to the reserve not currently being utilised to extract gravel.
<i>Future quality with offset (habitat/community) or Future value with offset (features/individuals)</i>	The predicted future quality score (habitat/community) or value (features/individuals) of the proposed offset site with the offset	(5) It is assumed that the condition of the TEC would increase to Good to Very Good (value 5) over three years with management actions proposed by the Shire.
<i>Risk of loss (%) without offset (habitat/community)</i>	This describes the chance that the habitat/community on the proposed offset site will be completely lost (i.e. no longer hold any value for the protected matter of concern) over the foreseeable future without an offset	(30%) The vegetation in gravel reserves within the Wheatbelt Region are subject to continuing clearing and land degradation pressures.
<i>Risk of loss (%) with offset (habitat/community)</i>	This describes the chance that the habitat/community on the proposed offset site will be completely lost (i.e. no longer hold any value for the protected matter of concern) over the foreseeable future with an offset	(10%) A change of purpose for R14411 from 'gravel' to 'conservation' will reduce the risk of loss to 10%.

Field Name	Description	Justification for value used
<i>Confidence in result (%) – risk of loss (habitat/community)</i>	The capacity of measures to mitigate risk of loss of the proposed offset site	(90%) There is a high level of confidence that the change in purpose of reserve R14411 will mitigate the risk of loss of the proposed offset site.
<i>Confidence in result (%) – Change in quality (habitat/community) or Change in value (features/individuals)</i>	The level of certainty about the successful achievement of the proposed change in quality (habitat/community) or value (features/individuals)	(90%) There is a high level of confidence that active management, will improve the condition of the TEC at the offset site.
<i>% of impact offset</i>	% of the significant residual impact that would be offset by the proposed offset (note: the offset calculations combined should equate to 100% for each residual impact)	(100%) The residual impact to the TEC, and to a significant remnant within an extensively cleared landscape, is offset by proposed site and management actions.

Appendix L – References and databases

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2. GIS datasets

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

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)

- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

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

Threatened Ecological Communities and Priority Ecological Communities (Buffers)

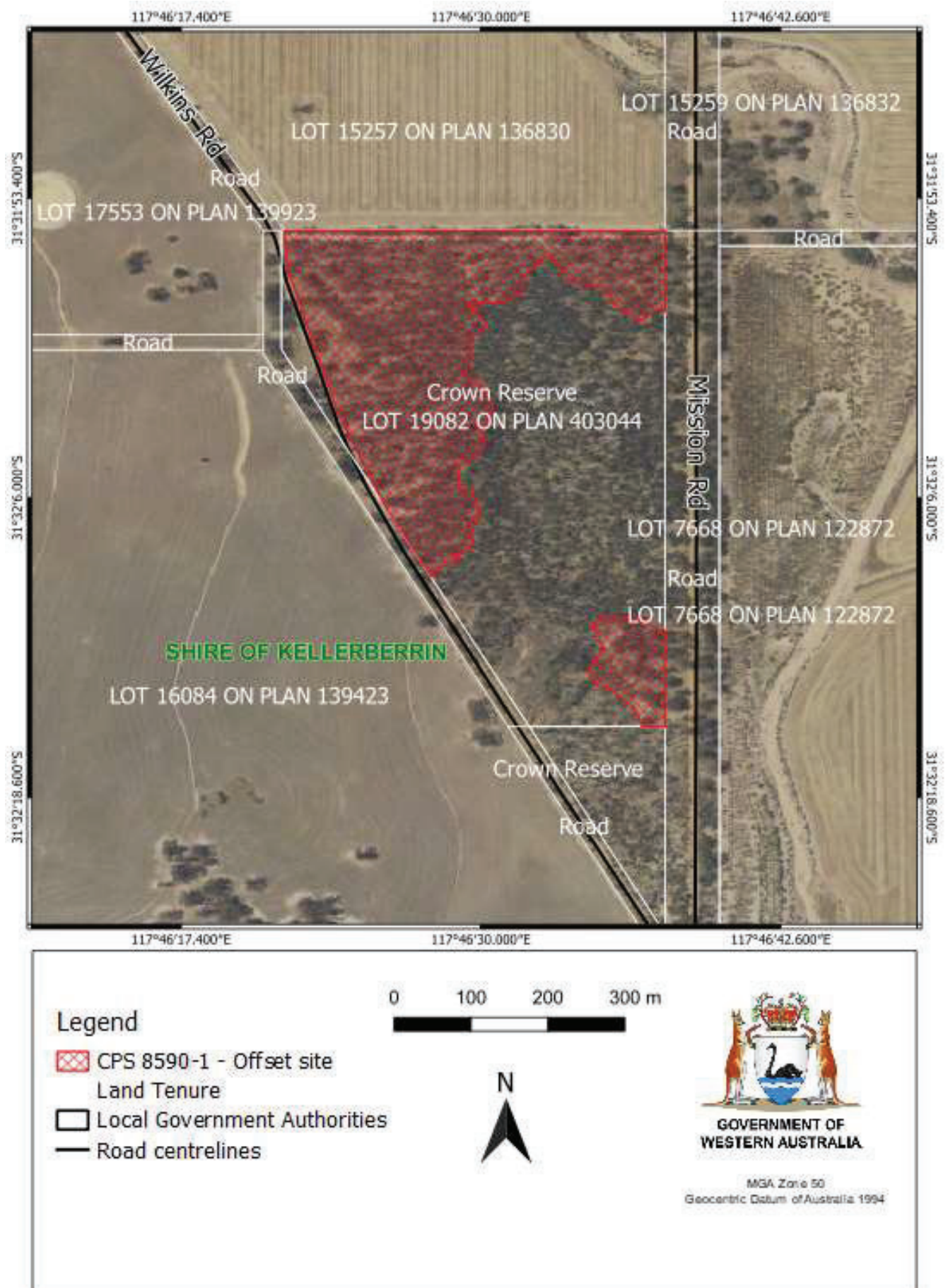


Figure 3: Map of CPS 8590/1 Offset Site