

# Reconnaissance and Targeted Flora and Vegetation Survey


Orchard Road & Clayton Road, Kulin

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Prepared for the Shire of Kulin  
March 2020



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V1			10/02/2020		
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## Executive Summary

Ecoedge was engaged by the Shire of Kulin to undertake a Reconnaissance and Targeted flora and vegetation survey of approximately 0.64 ha of vegetation at the intersection of Orchard Road and Clayton Road 21.5 km west of the town of Kulin.

The Shire plan to modify the intersection to improve safety for road uses. The design has been modified to take a route with the minimal amount of clearing. The new road will require a 10m wide clear zone, with the removal of approximately four eucalyptus trees and some mallee shrubs.

The flora and vegetation survey was undertaken on the 11 October 2019 in accordance with the Environmental Protection Authority (EPA) Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016).

Twenty-two native flora taxa were identified.

No Threatened flora, Priority flora or other flora of conservation significance were found.

There were no Declared Pest Plants or serious environmental weeds.

There are no ESAs within or in close proximity to the Survey Area that will constrain the proposed road upgrade. The closest is located approximately 27 km west of the Survey Area.

Vegetation within the Survey Area does not form part of a formally recognised ecological linkage. Aerial imagery shows that it occurs within a predominantly cleared agricultural landscape and is only loosely connected via narrow and sparsely vegetated road side corridors of vegetation to other isolated patches of vegetation.

One vegetation association is mapped for the Survey Area: Association 1023 'Medium woodland; York gum, wandoo and salmon gum'. The extent remaining of this association (at 10.79 %) is significantly below the Commonwealth government's 30% retention threshold. It is also poorly represented in the DBCA managed conservation estate (1.18%). These statistics are comparable for the Avon Wheatbelt IBRA region and the Shire of Kulin.

One vegetation unit (Salmon Gum woodland) was recognised within the Survey Area. This vegetation unit meets the diagnostic criteria for it to be regarded as an occurrence of the "Eucalypt Woodlands of the Western Australian Wheatbelt" which is a Federally-listed Threatened Ecological Community and a State-listed Priority Ecological Community.

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## Statement of Limitations

### Reliance on Data

In the preparation of this report, Ecoedge has relied on data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report. Unless stated otherwise in the report, Ecoedge has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report are based in whole or in part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Ecoedge will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, unavailable, misrepresented or otherwise not fully disclosed to Ecoedge.

### Report for Benefit of Client

The report has been prepared for the benefit of the Client and for no other party. Ecoedge assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including, without limitation, matters arising from any negligent act or omission of Ecoedge or for any loss or damage suffered by any other party relying on the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions, and should make their own enquiries and obtain independent advice in relation to such matters.

## 1 Introduction

Ecoedge was engaged by the Shire of Kulin to undertake a Reconnaissance and Targeted flora and vegetation survey of approximately 0.64 ha at the intersection of Orchard Road and Clayton Road and adjacent to Yealering-Kulin Road (Survey Area) (**Figure 1** and **Figure 2**). The Survey Area was part of a larger area of native vegetation bounded by Orchard Road, Clayton Road and Yealering-Kulin Road covering approximately 1.2 ha.

The Shire plan to modify the intersection to improve safety for road uses. The design has been modified to take a route with the minimal amount of clearing. The new road will require a 10m wide clear zone, with the removal of approximately four eucalyptus trees and some mallee shrubs.

A flora and vegetation survey was undertaken on the 11 October 2019 in accordance with the Environmental Protection Authority (EPA) Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, 2016).

This report compiles findings of the field survey.

## 2 Scope and Objectives

Conduct a Reconnaissance and Targeted Flora and Vegetation Survey and prepare an associated report and maps consistent with the requirements of EPA (2016). Specifically, the survey and report were required to:

- Document and map ecological values of the site including quality and extent;
- Provide a description of the vegetation complex of the site;
- Provide a description of the geology and soil types of the site;
- Identify known environmentally sensitive areas;
- Survey for threatened & priority listed flora within and immediately adjacent to the proposed development area;
- Survey for threatened habitat within and immediately adjacent to the proposed development area;
- Identify potential impacts to these ecological values from the proposed development;
- Outline appropriate measures to avoid, mitigate or offset potential impacts, if required.
- verify/groundtruth the desktop assessment findings through field surveys;
- undertake vegetation community/type mapping;

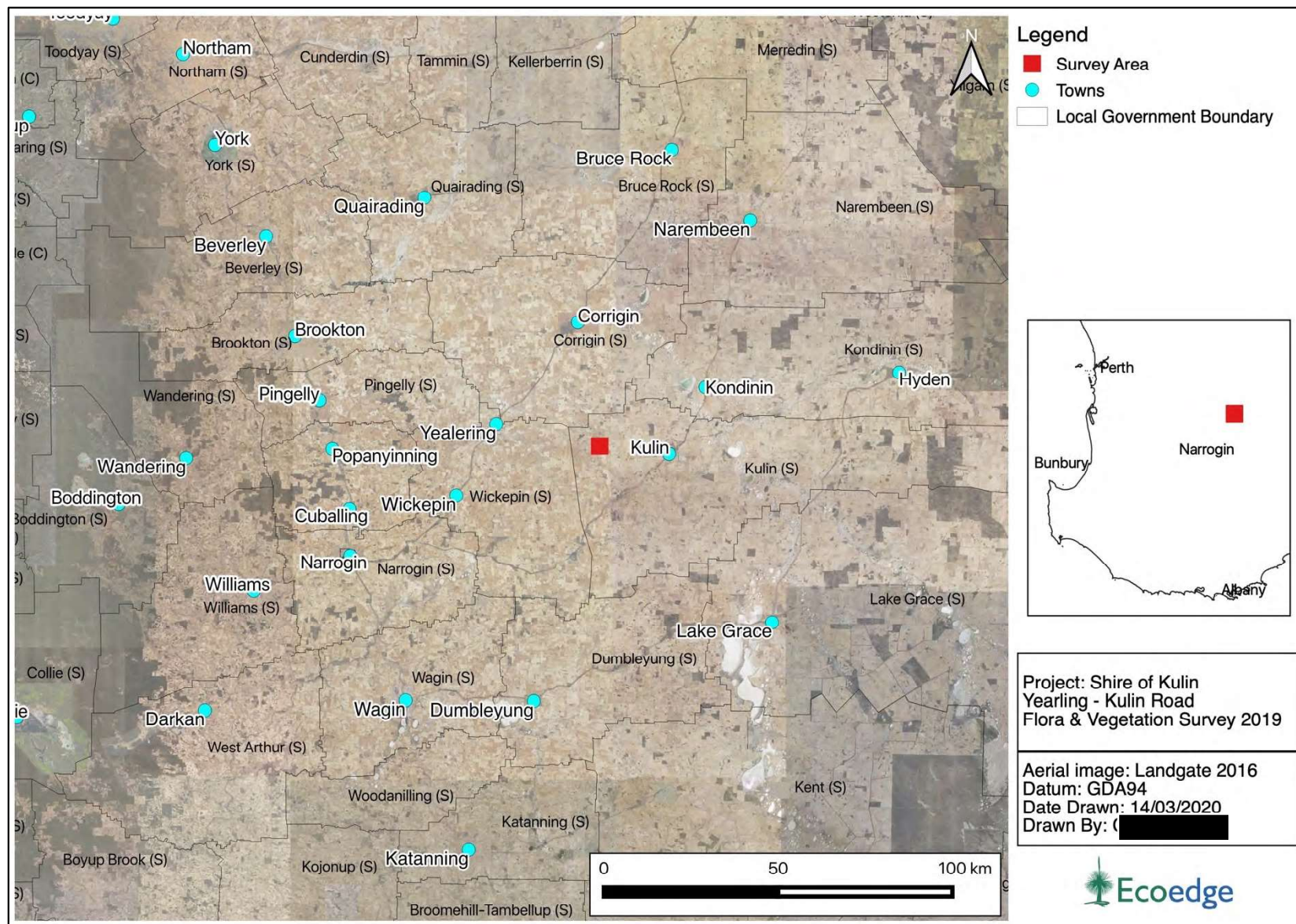
- assess the Survey Area's plant species diversity, composition, structure and weed cover;
- undertake vegetation condition mapping using EPA (2016) condition scale;
- undertake a targeted survey for rare and priority flora based on desktop likelihood of occurrence and habitat availability. When populations are identified, survey and map extent of populations to determine number and habitat area for each population. Shapefiles shall be provided if required with point data indicating the number of plants identified at each point. If more than 100, the edges of the population boundary will be mapped. If the population extends outside the survey area, the survey will map the extent of the population. All Threatened flora will be mapped with a GPS;
- identify the location of any Weeds of National Significance.

### 3 Desktop Assessment

#### 3.1 Biogeographic Region and Location

The Survey Area is situated within the Avon Wheatbelt P2 (AW2) sub-region of the Avon Wheatbelt biogeographic region as defined in the Interim Biogeographical Regionalisation for Australia (IBRA) (Commonwealth of Australia, 2016). It occurs within the road reserve at the intersection of Orchard Road, Clayton Road and Yealering- Kulin Road approximately 20 km East of the town of Kulin (**Figure 2**). The Survey Area is surrounded by privately managed cleared agricultural land.







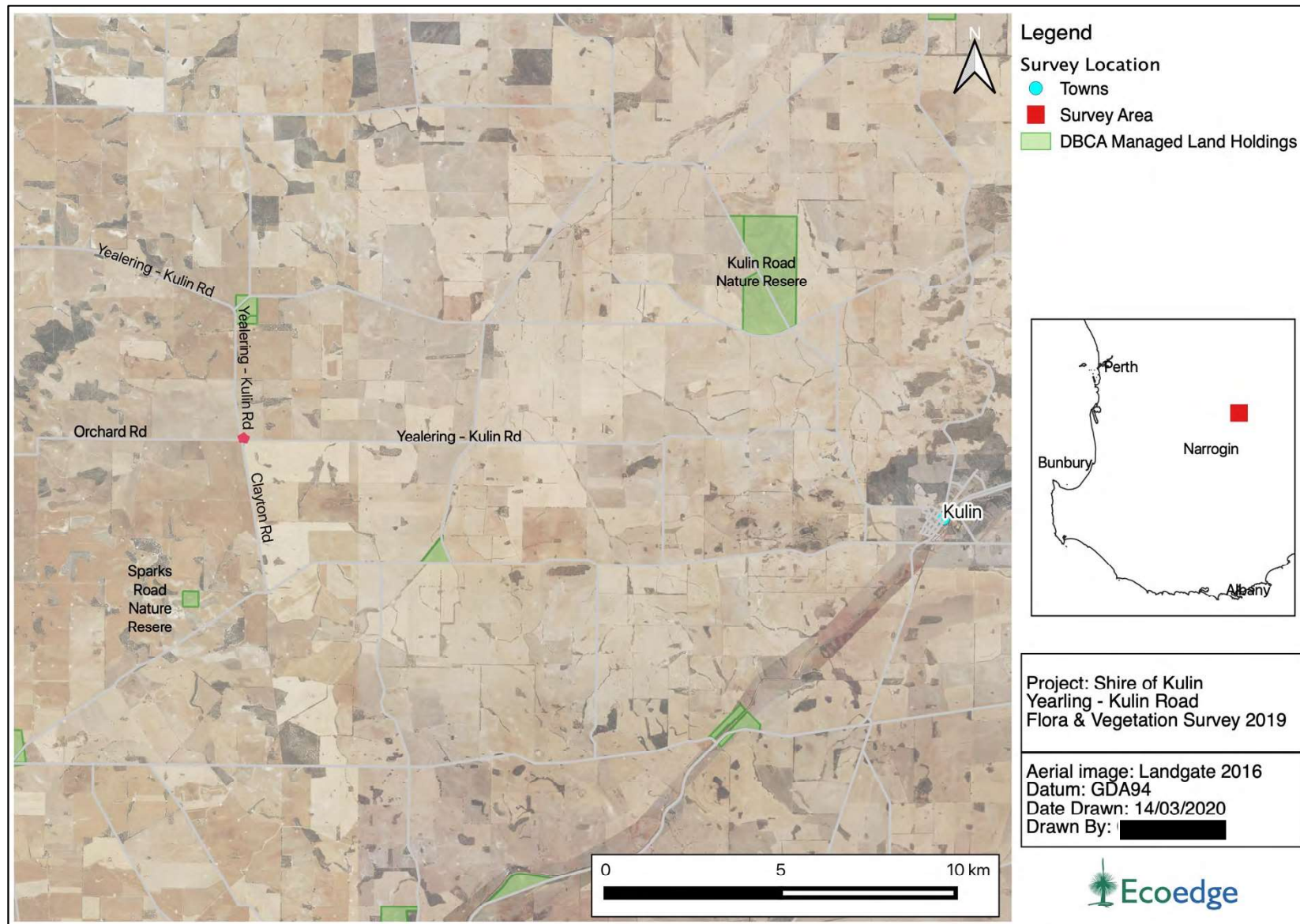


Figure 2.The Survey Area in context of surrounding land uses.

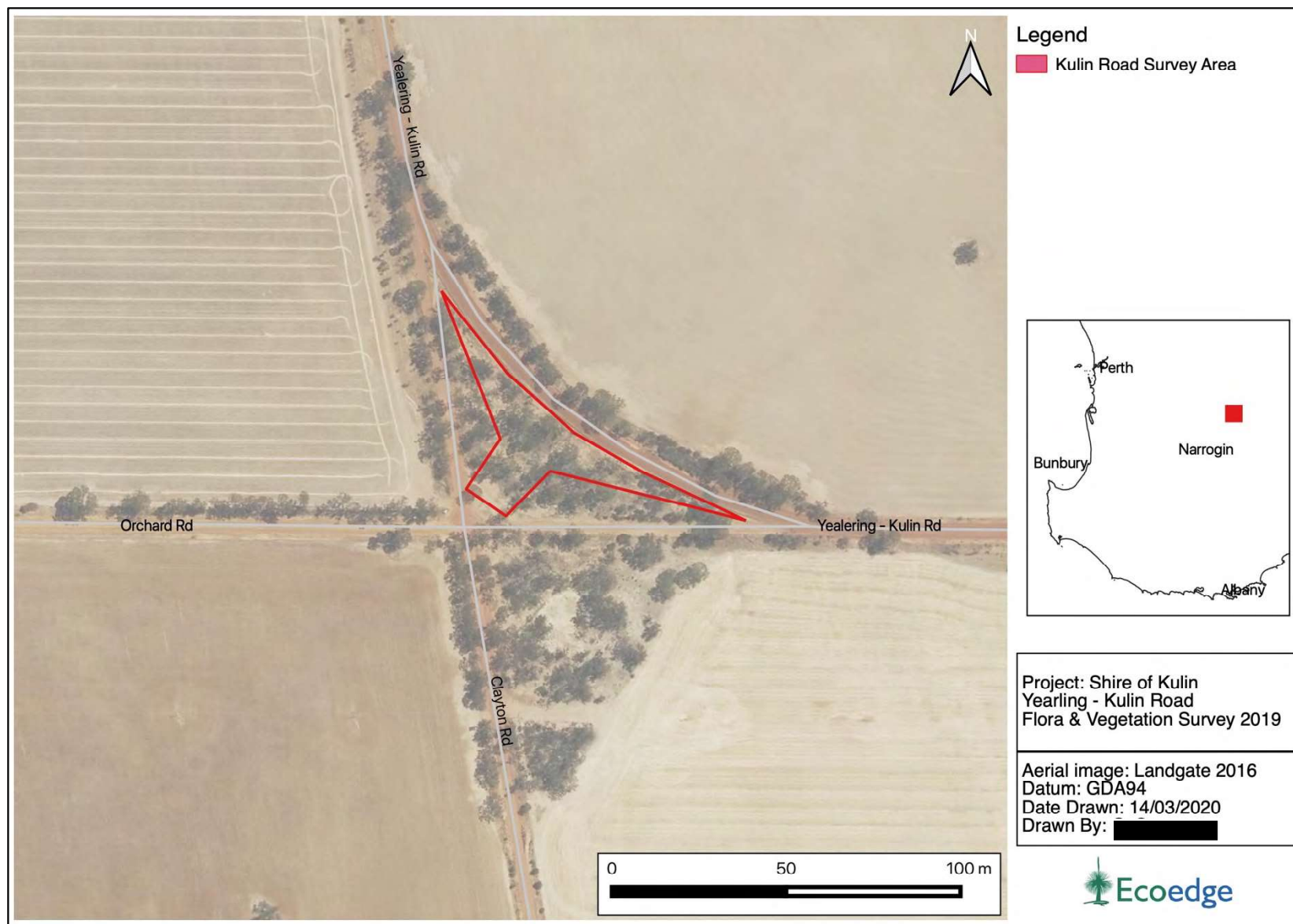


Figure 3. The Survey Area in context of surrounding land uses.

### 3.2 Geology

The Survey Area occurs within the South western Zone of Ancient Drainage (259) (SWZAD) which is described as “an ancient peneplain of low relief on weathered granites with sluggish drainage systems and uplands dominated by sands and gravels. Lateritic uplands dominated by grey sandy gravel plain predominately with Proteaceous species (Tille and Schoknecht, 2004; Verboom and Galloway, 2004).

The SWZAD has been divided into landscape systems, subsystems and subsystem phases. Within the SWZAD, the Survey Area is situated within the Corrigin 3 Subsystem phase 259Co\_3u of the Corrigin soil landscape system (259Co). A description of the System and subsystem phase is described in **Table 1**.

Table 1. Soil Mapping Units for the Survey Area (Verboom and Galloway, 2004)

Zone	Landscape System	Subsystem Phase
259 – South-western Zone of Ancient Drainage	259Co – Characterised by undulating low hills, on mafic bedrock, that form the divide between the catchment draining to the main Avon River valley to the west and the slopes draining to the salt-lakes of the Camm and Lockhardt Rivers to the east. Lateritic landscapes are common and are typified by subdued breakaways and crests of duricrust, merging to long slopes of sandy and loamy gravels	259Co_3u - Colluvial and residual mantle, gently undulating slopes, with acid to neutral duplexes under mallee on upper to mid slopes and Mallee, Gimlet and Salmon Gum vegetation on neutral to alkaline duplexes and clays in lower positions.

### 3.3 Vegetation Description according to pre-European Mapping Datasets

The Survey Area contains approximately 0.6 ha of remnant native vegetation.

#### 3.3.1 Vegetation Associations

A systematic survey of native vegetation in Western Australia was undertaken by J. S. Beard (along with others) during the 1970s, which described vegetation systems in the south-west of Western Australia at a scale of 1:250,000. Beard's vegetation maps attempted to depict the vegetation as it might have been prior to European settlement in terms of type and extent (Beeston *et al.*, 2001). The Beard Vegetation Association dataset, also referred to as the pre-European native vegetation extent dataset, was digitised by Shepherd *et al.* (2002).

Beard vegetation associations have been described to a minimum standard of Level 3 "Broad Floristic Formation" for the National Vegetation Inventory System (NVIS) (state-wide to regional scale)<sup>1</sup>. One Beard vegetation association was mapped as occurring within the Survey Area: association 1023 'Medium woodland; York gum, wandoo and salmon gum' (Beard, 1980).

#### 3.3.2 Assessment of Remaining Extent against Pre-European Extent

In 2001, the Commonwealth of Australia stated National Targets and Objectives for Biodiversity Conservation, which recognised that the retention of 30%, or more, of the pre-clearing extent of each ecological community was necessary if Australia's biological diversity was to be protected (Environment Australia, 2001).

In its report on the Statewide Vegetation Statistics incorporating the Comprehensive, Adequate and Representative (CAR) Reserve Analysis, the Government of Western Australia provides information on the pre-European and current extent of the ecological communities of Western Australia and reports on the status of the CAR reserve system for WA (Government of Western Australia, 2018). This system is also based on the National retention targets of 30% overall. Only reserves managed by the Department of Biodiversity, Conservation and Attractions (DBCA) under the *Conservation and Land Management Act 1984* are considered for inclusion in the "CAR Reserve Analysis".

An assessment of Beard's vegetation association 1023 against the *Statewide Vegetation Statistics* for the Avon Wheatbelt biogeographic region is presented in **Table 2**. The extent remaining of association 1023 falls well below the 30% retention target.

The red, orange and yellow shading in the tables indicates the status of the Commonwealth 30% retention target.

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<sup>1</sup> Beard's vegetation mapping units are referred to as 'associations' however these do not correspond to the NVIS Level 5 'Associations'. The NVIS system was developed long after Beard's work was completed, and while both classification systems use the same term, NVIS 'Associations' describe vegetation in more detail than do Beard's.

Colour indicator	>30%	<30%	<10%
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Table 2. Vegetation Associations within the Survey Area with regard to the Commonwealth retention targets (Government of Western Australia, 2019).

Beard Vegetation Association	Pre-European (ha)	Current Extent (ha)	% Remaining	% remaining in DBCA Managed Land
Association 1023 'Medium woodland; York gum, wandoo and salmon gum'				
State-wide	1,601,605.76	172,875.16	10.79	1.18
IBRA region: Avon Wheatbelt	1,522,680.40	165,123.60	10.84	1.23
Shire of Kulin	56,109.92	4,762.09	8.48	0.35



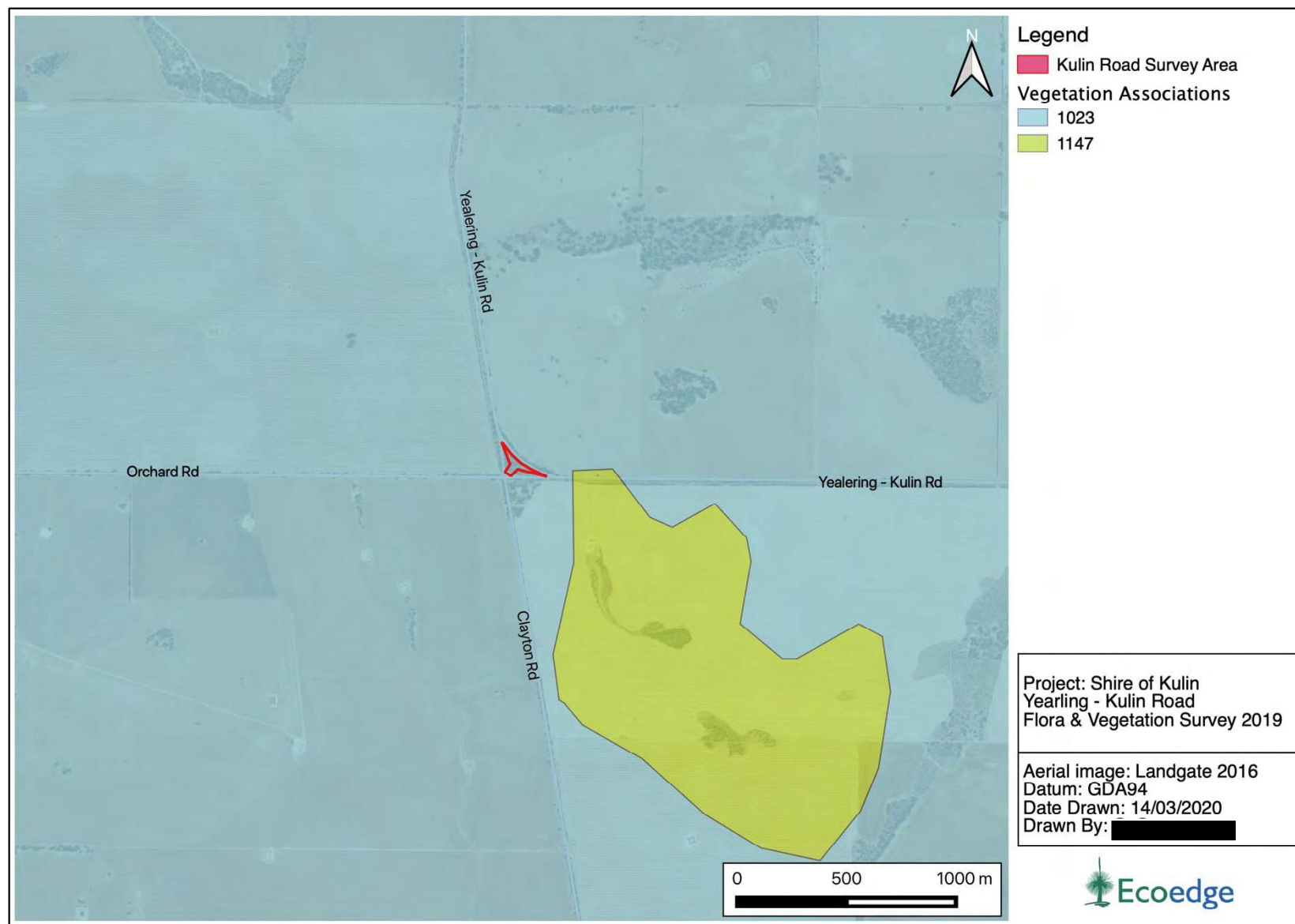


Figure 4. Vegetation Associations mapped for the Survey Area (Beard, 1980).

### 3.4 Threatened and Priority Ecological Communities

Ecological communities are defined by Western Australia's DBCA (previously DPaW and the Department of Environment and Conservation (DEC)) as "...naturally occurring biological assemblages that occur in a particular type of habitat. They are the sum of species within an ecosystem and, as a whole, they provide many of the processes which support specific ecosystems and provide ecological services." (DEC, 2013).

Under Section 27 of the *Biodiversity Conservation Act 2016* (BC Act) the Western Australian Minister for Environment may list communities that are considered to be under significant threat as a Threatened ecological communities (TEC). These TECs can be listed under one of three conservation categories; critically endangered (CE), endangered (EN), vulnerable (V). The BC Act also provides for listing communities as collapsed ecological communities.

Possible TECs that do not meet survey criteria are added to the DBCA's Priority ecological community lists under Priorities 1, 2 or 3 (referred to as P1, P2, P3). Ecological communities that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4 (P4). These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5 (P5) (DEC, 2013).

The current listing of Threatened and Priority ecological communities is specified in DBCA (2018a, 2019a). The conservation categories for these Threatened and Priority ecological communities are defined in **Appendix 1**.

Threatened ecological communities can also be listed under the Commonwealth *Environment and Biodiversity Conservation Act 1999* (EPBC Act). Conservation categories listed under section 182 of the Act for these Federally protected communities are: Critically Endangered (CE), Endangered (E) and Vulnerable (V). Definitions for these conservation categories are provided in **Appendix 2**.

Under both the State (BC Act) and Federal Act (EPBC Act) ministerial authorisation is required where significant permanent modification to a TEC will occur.

A Protected Matters Search Tool report for communities listed under the EPBC Act occurring within a 10 km radius of the Survey Area was undertaken (DotEE, 2019a, **Appendix 3**), and the current DBCA TEC and PEC listings were consulted (DBCA, 2018a; DBCA, 2019a). Outcomes of these searches are presented in **Table 3**.

Noting that if an occurrence of a threatened ecological community is found during a survey conducted under the auspices of the *Environmental Protection Act 1986* (EP Act) it must be mandatorily reported to the Chief Executive Officer of the DBCA under Section 49 of the BC Act.



Table 3. TECs and PECs occurring within 10 km of the Survey Area (DBCA, 2018a, 2019a; DotEE, 2019a).

Community Name	Status (WA)	Status (EPBC Act)
'Eucalypt Woodlands of the Western Australian Wheatbelt'; a federally listed TEC consisting of numerous State-listed communities	Various	CE

Note: This table only includes formally recognised TECs that are known of and mapped by DBCA and are included in their database.

### 3.5 Threatened and Priority Flora

Species of flora and fauna are defined as having a Threatened or Priority conservation status where their extant populations are restricted geographically and or under threat of possible extinction. The Department of Biodiversity, Conservation and Attractions recognises these threats and consequently applies regulations towards population and species protection.

Threatened extant flora species are listed under Section 19 of the BC Act and are ranked according to their level of threat using the International Union for Conservation of Nature (IUCN) Red List categories and criteria of; critically endangered (CE), endangered (EN), vulnerable (VU). It is an offence to “take” or damage threatened flora without Ministerial approval. Section 5 of the Act defines “to take” as “... to gather, pluck, cut, pull up, destroy, dig up, remove, harvest or damage flora by any means”.

Priority flora are under consideration for future declaration as “Threatened flora”, dependent on more information. Species classified as Priority One to Three (referred to as P1, P2 and P3) are in need of further survey to determine their status, while Priority Four (P4) species are adequately known rare or threatened species that require regular monitoring.

Threatened flora lists are formally reviewed on an annual basis, whilst the priority flora list is subject to a less formal ongoing review. The current listing of Threatened and Priority flora was updated on the 5th December 2018 (DBCA, 2018b).

Categories of State listed Threatened and Priority flora are presented in **Appendix 4**, (DBCA, 2019b).

Threatened flora may also be protected under the Commonwealth EPBC Act (Section 179) and be listed in one of six categories; the definitions of these categories are provided in **Appendix 5**.

Threatened or Priority flora occurring within 10 km of the Survey Area generated from a NatureMap search (DBCA, 2019c) are listed in **Table 4**. Taxa listed under the EPBC Act (based on results of the Protected Matters Search Tool query (DotEE, 2019a)) were also considered

in the preparation of the table. Several of the species listed in **Table 4** could potentially occur within the Survey Area, based on an assessment of their preferred habitats.

Noting that if any threatened flora species are found during a survey conducted under the auspices of the EP Act that they must be mandatorily reported to the CEO of the DBCA under Section 43 of the BC Act.

Table 4. Threatened and Priority List flora known to occur within 5 km of the Survey Area (DBCA, 2019a, 2018d; DotEE, 2019a.)

<i>Species</i>	<b>Cons Status*</b>	<b>Flowering</b>	<b>Description and Habitat</b>	<b>Likelihood</b>
<i>Acacia lanuginophylla</i>	T (EN)	Jul to Oct	Dense shrub, 0.5-1.2 m high. Fl. yellow. White/grey sand, clayey sand, gravelly soils. Flats, along drainage lines.	Low
<i>Banksia oligantha</i>	T (EN)	Oct-Nov	Non-lignotuberous shrub, to 3 m high. Fl. red & cream/orange-brown. Yellow or yellow-brown sand.	Moderate
<i>Boronia capitata</i> subsp. <i>capitata</i>	T (EN)	Aug to Dec or Feb	Slender shrub, 0.3-1.3 m high. Fl. pink. Sand, often over laterite. Sandplains.	Moderate
<i>Caladenia hoffmanii</i>	T (EN)	Aug-Oct	Tuberous, perennial, herb, 0.13-0.3 m high. Fl. green & yellow & red. Clay, loam, laterite, granite. Rocky outcrops and hillsides, ridges, swamps and gullies.	Low
<i>Grevillea dryandroides</i> subsp. <i>hirsuta</i>	T (EN)	May or Sep to Nov	Prostrate, vigorously suckering shrub, 0.05-0.3 m high. Fl. red/pink-red. White or yellow sand, laterite.	Low - moderate
<i>Rhizanthella gardneri</i>	T (EN)	May to Jul	Tuberous, perennial, herb, flowers develop under the surface and break through as they mature; flowers c. 6 mm long, 5 mm wide. Fl. pink-purple. Sand. Grows in association with <i>Melaleuca uncinata</i> .	Low - moderate
<i>Thysanotus sabulosus</i>	P1	Oct to Dec	Rhizomatous, perennial, herb, to 0.2 m high. Fl. purple. Sand, lateritic gravel.	Low - moderate
<i>Banksia dallanneyi</i> subsp. <i>agricola</i>	P2	Sep-Oct	Prostrate, lignotuberous shrub. Fl. yellow. Sandy loam or sand over laterite.	Moderate
<i>Leucopogon amplexans</i>	P2	Apr to Jul.	Erect shrub, 0.3-0.75 m high. Fl. White. Sandy soils.	Moderate
<i>Oxymyrrhine cordata</i>	P2	Oct to Dec	Decumbent to ascending shrub, 0.1-0.45 m high. Fl. pink-white. Sandy loam with lateritic gravel. Rises, sandplains.	Moderate
<i>Banksia meganotia</i>	P3	Oct	Straggly or erect, prickly, lignotuberous shrub, 0.3-1 m high. Fl. yellow. Sand, sandy loam or clay loam over laterite.	Moderate

<i>Species</i>	<b>Cons Status*</b>	<b>Flowering</b>	<b>Description and Habitat</b>	<b>Likelihood</b>
<i>Daviesia nudiflora</i> subsp. <i>drummondii</i>	P3	Jul to Aug	Bushy shrub, 0.3-1.5 m high. Fl. orange/yellow & red. White or grey sand. Undulating low rises.	Low - Moderate
<i>Eucalyptus erythronema</i> subsp. <i>inornata</i>	P3	Spring - Summer	Mallee to 7 m, Bark smooth, powdery, seasonally colourful from grey-white to dark reddish - purple. Branchlets not glaucous, pith glands present. Leaves narrow lanceolate, dull green. Fl. Pale creamy yellow to white. Lateritic and sandy gravel rises to slight slopes of pale-red to grey loamy soils.	Moderate
<i>Microcorys cephalantha</i>	P3	Oct to Dec	Decumbent to ascending shrub, 0.1-0.45 m high. Fl. pink-white. Sandy loam with lateritic gravel. Rises, sandplains.	Moderate
<i>Lechenaultia pulvinaris</i>	P4	Oct to Dec	Hemispherical, procumbent shrub, 0.03-0.2 m high. Fl. blue. White/grey sand.	Moderate

Note: The BC Act Conservation Status is shown, EPBC Act status, where relevant, is in brackets.

### 3.6 Ecological Corridors and Connectivity

Vegetation within the Survey Area does not form part of a recognised ecological linkage. The Survey Area largely occurs as an isolated patch of vegetation within a mostly cleared agricultural landscape. Aerial photography shows that it is 'loosely connected' by narrow and sparsely vegetated corridors of roadside vegetation to other largely isolated and poorly connected patches of vegetation. These patches of native vegetation occur mostly on privately managed farms with one DBCA managed nature reserve approximately three km north of the site along the Yealering – Kulin Road.

### 3.7 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are protected under the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 and are selected for their environmental values at state or national levels (Government of Western Australia, 2005). They include;

- Defined wetlands and riparian vegetation within 50 m;
- Areas covered by Threatened Ecological Communities;
- Area of vegetation within 50 m of Threatened flora;
- Bush Forever sites; and
- Declared World Heritage property sites.

There are no ESAs in close proximity to the Survey Area. The nearest is located approximately 27 km west of the Survey Area.

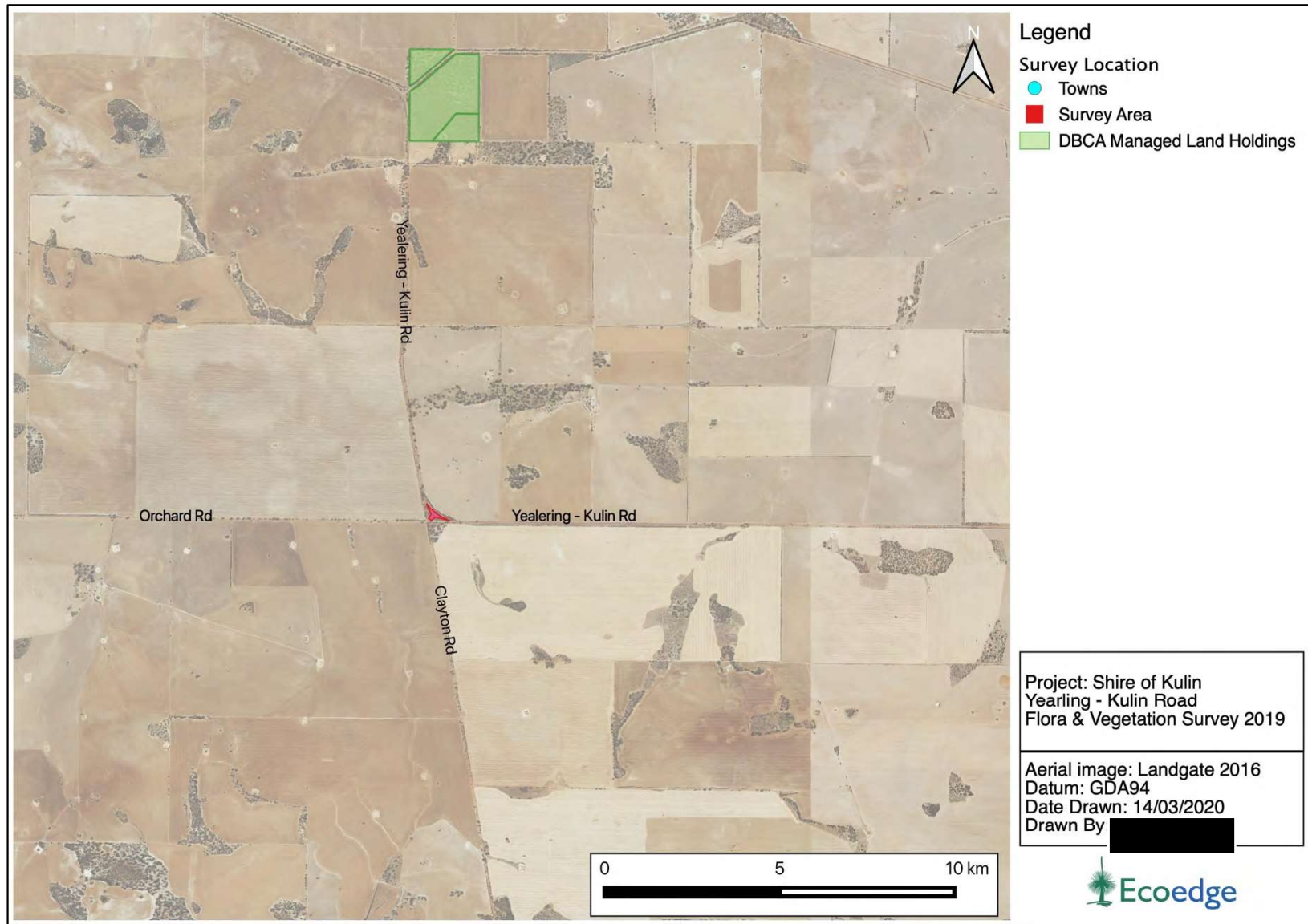


Figure 5. Loosely connected patches of vegetation near the Survey Area.

## 4 Methods

### 4.1 Desktop Assessment

Prior to the field survey, a “desktop assessment” was carried out by downloading a NatureMap report listing all flora (including Threatened flora) occurring within 10 km of the Survey Area (DBCA 2019c) (**Appendix 3**). A Protected Matters Search report was also generated to provide information regarding Matters of National Environmental Significance (MNES) known or potentially occurring within 10 km of the Survey Area (DotEE, 2019a) (**Appendix 3**). This data was used to establish the list of Threatened and Priority flora to target during the survey, as well as providing a list of what other plant taxa might be encountered during the survey.

### 4.2 Field Survey

The field survey was undertaken by Russell Smith (SL flora permit FB62000192) on 11 October 2019. The Survey Area covered a total of approximately 0.64 ha most of which was native vegetation. A comprehensive list was made of native and introduced flora and information on vegetation structure, dominant species and vegetation condition at regular intervals through the Survey Area.

Flora species that were not identified in the field were photographed for later identification. Taxonomy and conservation status of flora species was checked against DBCA databases (MAX download, 26/09/2019, DBCA, 2019d).

Vegetation condition was assessed against the method of the EPA (2016) (**Appendix 6**).

### 4.3 Survey Limitations

Potential limitations with regard to the assessment are addressed in **Table 5**.

Table 5. Limitations of the field survey with regard to assessment adequacy and accuracy.

Aspect	Constraint	Comment
Scope	No	The survey scope was prepared in consultation with the client and was designed to comply with EPA requirements.
Proportion of flora identified	Minor	The survey was carried out in only one visit in October which is within the optimal survey time.
Climatic and seasonal effects	Minor	The survey area recorded about 70-80% of the average rainfall during the 2019 wet season (Apr-Nov). Herbaceous species germination may have been reduced.
Availability of contextual information	Minor	Some regional surveys have been carried out in the wheatbelt, and some contextual information is available.
Completeness of the survey	Negligible	All of the Survey Area vegetation was easily accessible.
Skill and knowledge of the botanists	No	The botanist has over 25 years' experience working in Western Australia, including 10 years' experience in the Avon Wheatbelt IBRA region.



## 5 Results

### 5.1 Flora

Twenty-two flora taxa were identified within the Survey Area. No Threatened flora, Priority flora or other flora of conservation significance were found.

In addition, no introduced species, including Declared Pest Plants and serious environmental weeds were found.

The list of vascular flora recorded during the field survey is included in **Appendix 7**.

### 5.2 Vegetation Units

One vegetation unit (Salmon Gum woodland) was recognised within the Survey Area. It is described below with accompanying pictures and mapped in **Figure 7**. Based on a comparison of species composition it probably belongs to the Salmon Gum over Mallee (EsalmMallee) community (Harvey and Keighery, 2012).



Figure 6. Vegetation within the Survey Area

Woodland of *Eucalyptus salmonophloia* over low open woodland of *E. phenax* subsp. *phenax* and *Allocasuarina campestris* over very open shrubland of *A. humilis*, *Eremophila decipiens*, *Grevillea paniculata*, *G. pectinata* and *Westringia rossii* over low very open shrubland of *Dampiera lavandulacea*, *Hibbertia acerosa*, *Olearia muelleri*, *O. ramosissima* and very open grassland of *Austrostipa elegantissima*, *A. flavescens* and *Rytidosperma setaceum* and scattered herbs of *Dianella revoluta*, *Enchylaena tomentosa* and *Lomandra effusa* and sedges of *Lepidosperma resinosum* on yellow-brown loam.

### 5.3 Vegetation Condition

Almost all (93.7%) of the Survey Area was assessed Excellent condition (**Table 6**). A small area in the south-west corner of the Survey Area has been cleared.

Table 6. Summary of vegetation condition classes within the Survey Area.

Vegetation Unit	Vegetation Condition	Area (Ha)	%
Salmon Gum woodland	Excellent	0.60	93.7
Cleared	Cleared	0.04	6.3
	<b>Total</b>	<b>0.64</b>	<b>100.0</b>

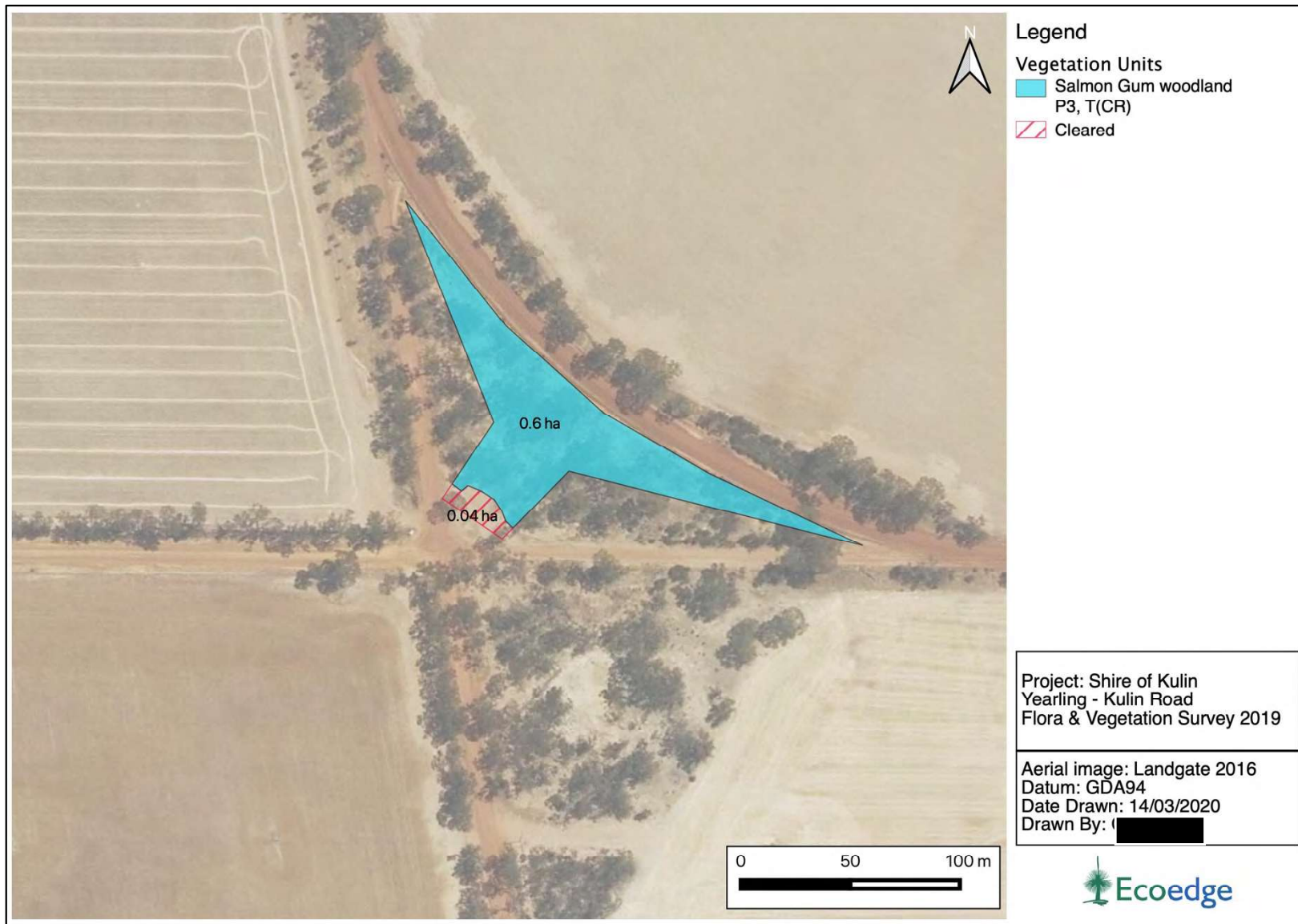


Figure 7. Vegetation units mapped within the Survey Area.



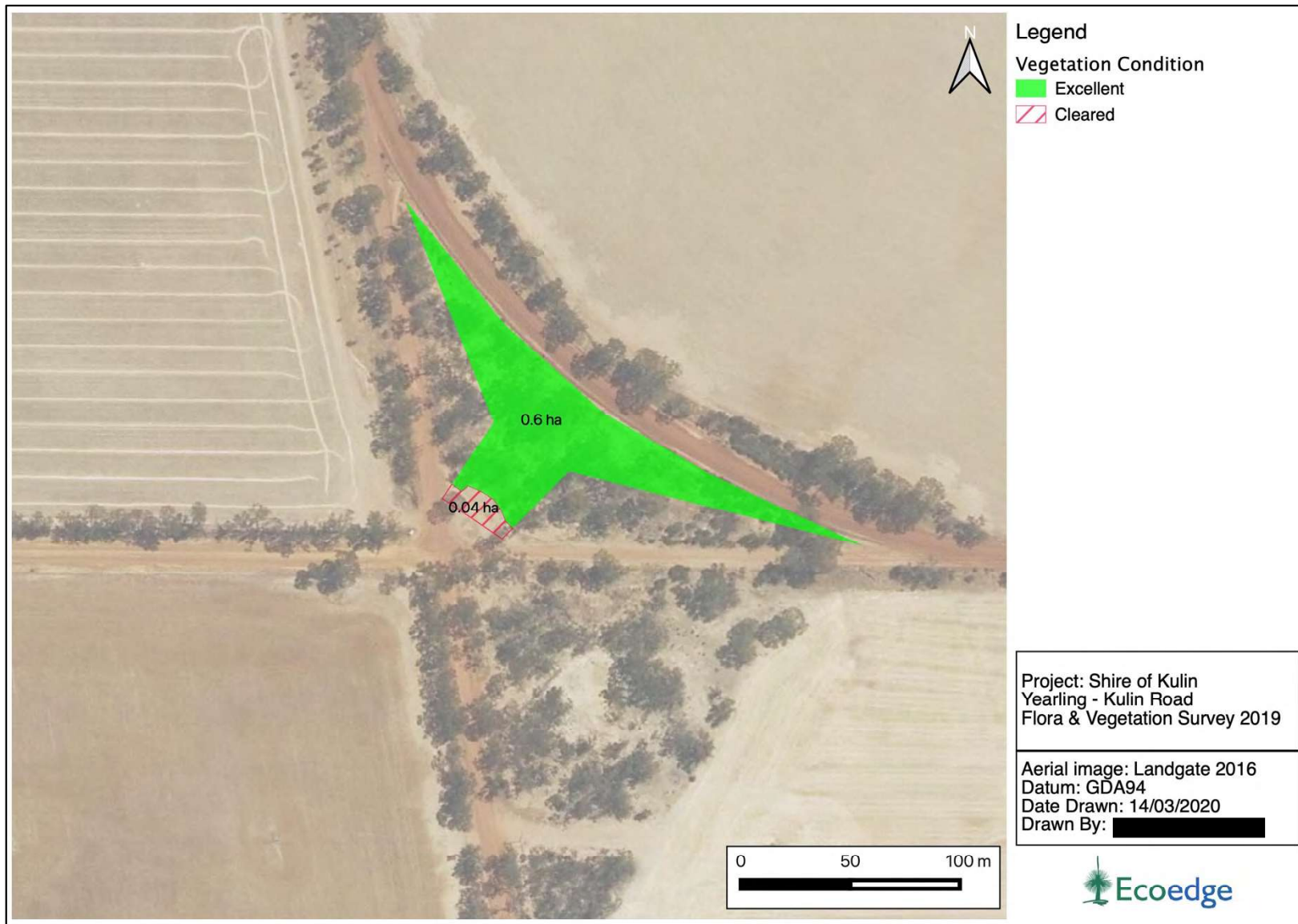


Figure 8. Vegetation condition mapped within the Survey Area.

## 6 Discussion

The Salmon Gum woodland vegetation unit meets the key diagnostic traits (minimum vegetation condition and width criteria) for the Critically Endangered Federally-listed TEC “Eucalypt Woodlands of the Western Australian Wheatbelt” (DotEE, 2015). **Table 7** shows how the Survey Area meets the key diagnostic criteria and **Table 8** shows how it meets the condition and width thresholds. The Survey Area is part of a larger area of vegetation (of 1.2 ha in total), all of which is in excellent condition, and all of which meets the key diagnostic criteria for it to be an occurrence of the TEC.

A copy of the completed Threatened Ecological Community Report form is provided at **Appendix 8**.

Table 7. Comparison of the Survey Area vegetation with the Eucalypt Woodlands of the Western Australian Wheatbelt TEC key diagnostic characteristics criteria (DotEE, 2015).

Condition Category	Comment
It occurs in one of the appropriate IBRA regions.	Yes, it occurs in the Avon Wheatbelt IBRA region
The structure of the ecological community is a woodland in which the minimum crown cover of the tree canopy in a mature woodland is 10% (crowns measured as if they are opaque).	Yes, criteria met.
The key species of the tree canopy are species of <i>Eucalyptus</i> (typically with a single trunk).	Yes, it contains <i>Eucalyptus salmonophloia</i> .
A native understorey is present but is of variable composition, being a combination of grasses, other herbs and shrubs.	Yes, criteria met.

Table 8. Comparison of the Survey Area vegetation with Eucalypt Woodlands of the Western Australian Wheatbelt TEC condition and area criteria adapted from DotEE, 2015.

Condition Category	Mature trees	Minimum Patch Width (roadsides only)	Comment
'Pristine, Excellent, Very Good'	Mature trees may be present or absent.	5 metres or more	Forms part of roadside vegetation along Yealering-Kulin Road of >5m width for over 200 m.
'Good'	Mature trees are present with at least 5 trees per 0.5 ha.	5 metres or more	N/A
'Good'	Mature trees either absent or less than 5 trees per 0.5 ha are present.	5 metres or more	N/A
'Degraded to Good'	Mature trees are present with at least 5 trees per 0.5 ha.	5 metres or more	N/A

The Salmon Gum woodland vegetation unit also meets the criteria of the State-listed Priority Three ecological community "Eucalypt Woodlands of the Western Australian Wheatbelt".

An assessment of this TEC occurrence, against seven significant impact criteria for critically endangered TECs, indicates three potential impacts on the occurrence (**Table 9**). Item one refers to a reduction of the extent of the occurrence by about 50%, item 2 to fragmentation of the occurrence and item 6 to potential effects on the integrity of the remaining bushland. The exact extent of this impact could not be determined at time of the survey as the proposed clearing boundaries were not demarcated.

Table 9. Comparison of the Survey Area Vegetation against the Critically Endangered TEC significant impact criteria, adapted from DoTEE, 2013.

Item	Significant impact criteria	Comment
1	Reduce the extent of an ecological community	Potential reduction in extent of the occurrence of 50%.
2	Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	Yes. The proposed works would lead to a fragmentation of the occurrence.
3	Adversely affect habitat critical to the survival of an ecological community	No

Item	Significant impact criteria	Comment
4	Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	No
5	Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	No
6	<p>Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:</p> <ul style="list-style-type: none"> <li>- assisting invasive species, that are harmful to the listed ecological community, to become established, or</li> <li>- causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community.</li> </ul>	Yes. The occurrence would be fragmented (i.e. split by the proposed road intersection modification). Potential increase in "edge effects".
7	Interfere with the recovery of an ecological community.	No

## Conclusions

A spring survey of a 0.64 ha area at the intersection of Orchard Road and Clayton Road 20 km west of the town of Kulin resulted in 22 flora taxa (all native species) being identified.

No Declared Threatened flora, priority flora or other flora of conservation significance were found.

The Survey Area was comprised of 0.6 ha of Salmon Gum woodland in Excellent condition which meets the criteria for the Federally-listed TEC “Eucalypt Woodlands of the Western Australian Wheatbelt” and the State Priority 3 listed “Eucalypt Woodlands of the Western Australian Wheatbelt” ecological community. The Survey Area forms part of a larger area (1.2 ha) of Salmon Gum woodland also in Excellent condition.

One vegetation association is mapped for the Survey Area: Association 1023 ‘Medium woodland; York gum, wandoo and salmon gum’ (Beard, 1980). The extent remaining of this association (at 10.79 %) is significantly below the Commonwealth government’s 30% retention threshold. It is also poorly represented in the DBCA managed conservation estate (1.18%). These statistics are comparable for the Avon Wheatbelt IBRA region and the Shire of Kulin.

There are no ESAs within or in close proximity to the Survey Area that will constrain the proposed road upgrade. The closest is located approximately 27 km west of the Survey Area.

Vegetation within the Survey Area does not form part of a formally recognised ecological linkage. Aerial imagery shows that it occurs within a predominantly cleared agricultural landscape and is only loosely connected via narrow and sparsely vegetated road side corridors of vegetation to other isolated patches of vegetation.

According to the Federally approved conservation advice for this TEC, any areas meeting the “Eucalypt Woodlands of the Western Australian Wheatbelt” criteria, are critical to the survival of the TEC (DotEE, 2015). This is because this ecological community occurs in a landscape that has been very heavily cleared and modified, and now exists as mostly very small and highly fragmented patches. This means that any clearing of the Salmon Gum woodland vegetation unit may be regarded as having a potentially significant impact on the overall TEC.



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## Appendix

## Appendix 1. Categories of threatened and priority ecological communities (DEC, 2013).

Conservation code	Category
(T) Threatened ecological community pursuant to Sect 27 of the <i>Biodiversity Conservation Act 2016</i> .	
T	<p>(T) CR – Critically endangered</p> <p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.</p>
	<p>(T) EN - Endangered</p> <p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.</p>
	<p>(T) VU - Vulnerable</p> <p>An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.</p>
(P) Priority species – possible threatened communities.	
p1	<p>Poorly known communities</p> <p>Ecological communities that are known from very few occurrences with a very restricted distribution (generally <math>\leq 5</math> occurrences or a total area of <math>\leq 100\text{ha}</math>). Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.</p>

Conservation code	Category
P2	<p>Poorly known communities</p> <p>Communities that are known from few occurrences with a restricted distribution (generally <math>\leq 10</math> occurrences or a total area of <math>\leq 200</math>ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.</p>
P3	<p>Poorly known communities</p> <ul style="list-style-type: none"> <li>a) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:</li> <li>b) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or;</li> <li>c) communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc.</li> </ul> <p>Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.</p>
P4	<p>Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.</p> <ul style="list-style-type: none"> <li>a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.</li> <li>b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.</li> <li>c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</li> </ul>

Conservation code	Category
P5	<p>Conservation dependent ecological communities</p> <p>Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.</p>

## Appendix 2. Categories of Threatened Ecological Communities under Section 182 of the EPBC Act.

Category	Definition
Critically endangered	If, at that time, an ecological community is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years).
Endangered	If, at that time, an ecological community is not critically endangered but is facing a very high risk of extinction in the wild in the near future (indicative timeframe being the next 20 years).
Vulnerable	If, at that time, an ecological, community is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium-term future (indicative timeframe being the next 50 years).



# NatureMap Species Report

Created By Guest user on 01/10/2019

Current Names Only Yes  
Core Datasets Only Yes  
Method 'By Circle'  
Centre 117° 56' 30" E, 32° 39' 03" S  
Buffer 10km  
Group By Kingdom

Kingdom	Species	Records
Animalia	24	46
Plantae	119	141
<b>TOTAL</b>	<b>143</b>	<b>187</b>

Name ID	Species Name	Naturalised	Conservation Code	Endemic To Query Area
<b>Animalia</b>				
1.	24260 <i>Acanthiza apicalis</i> (Broad-tailed Thornbill, Inland Thornbill)			
2.	24561 <i>Anthochaera carunculata</i> (Red Wattlebird)			
3.	<i>Barnardius zonarius</i>			
4.	24734 <i>Calyptorhynchus latirostris</i> (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)		T	
5.	24321 <i>Chenonetta jubata</i> (Australian Wood Duck, Wood Duck)			
6.	24289 <i>Circus assimilis</i> (Spotted Harrier)			
7.	25592 <i>Corvus coronoides</i> (Australian Raven)			
8.	25595 <i>Cracticus tibicen</i> (Australian Magpie)			
9.	<i>Eolophus roseicapillus</i>			
10.	25530 <i>Gerygone fusca</i> (Western Gerygone)			
11.	24443 <i>Grallina cyanoleuca</i> (Magpie-lark)			
12.	24557 <i>Leipoa ocellata</i> (Malleefowl)		T	
13.	24583 <i>Manorina flavigula</i> (Yellow-throated Miner)			
14.	48024 <i>Notamacropus eugenii</i> subsp. <i>derbianus</i> (Tammar Wallaby, Tammar)		P4	
15.	24407 <i>Ocyphaps lophotes</i> (Crested Pigeon)			
16.	25682 <i>Pardalotus striatus</i> (Striated Pardalote)			
17.	48061 <i>Petrochelidon nigricans</i> (Tree Martin)			
18.	24681 <i>Polioccephalus poliocephalus</i> (Hoary-headed Grebe)			
19.	25722 <i>Polytelis anthopeplus</i> (Regent Parrot)			
20.	24683 <i>Pomatostomus superciliosus</i> (White-browed Babbler)			
21.	48096 <i>Rhipidura albiscapa</i> (Grey Fantail)			
22.	30948 <i>Smicrornis brevirostris</i> (Weebill)			
23.	24331 <i>Tadorna tadornoides</i> (Australian Shelduck, Mountain Duck)			
24.	24386 <i>Vanellus tricolor</i> (Banded Lapwing)			
<b>Plantae</b>				
25.	3342 <i>Acacia fragilis</i>			
26.	11519 <i>Acacia lasiocarpa</i> var. <i>bracteolata</i>			
27.	3416 <i>Acacia leptopetala</i>			
28.	3442 <i>Acacia microbotrya</i> (Manna Wattle, Kalyang)			
29.	3470 <i>Acacia orbifolia</i>			
30.	3557 <i>Acacia stenoptera</i> (Narrow Winged Wattle)			
31.	1783 <i>Adenanthos flavidiflorus</i>			
32.	1732 <i>Allocasuarina humilis</i> (Dwarf Sheoak)			
33.	199 <i>Amphipogon strictus</i> (Greybeard Grass)			
34.	1802 <i>Banksia baueri</i> (Woolly Banksia)			
35.	32579 <i>Banksia dallanneyi</i> subsp. <i>agricola</i>		P2	
36.	32523 <i>Banksia fraseri</i> var. <i>fraseri</i>			
37.	11952 <i>Banksia gardneri</i> var. <i>hiemalis</i>			
38.	32212 <i>Banksia meganotia</i>		P3	
39.	32198 <i>Banksia obovata</i> (Wedge-leaved Dryandra)			
40.	32080 <i>Banksia sessilis</i> var. <i>sessilis</i>			
41.	12111 <i>Banksia sphaerocarpa</i> var. <i>sphaerocarpa</i> (Fox Banksia)			
42.	32031 <i>Banksia vestita</i> (Summer Dryandra)			

	Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
43.	1856	<i>Banksia violacea</i> (Violet Banksia)			
44.	5378	<i>Beaufortia bracteosa</i>			
45.	5385	<i>Beaufortia incana</i> (Grey-leaved Beaufortia)			
46.	11502	<i>Boronia capitata</i> subsp. <i>clavata</i>			
47.	11274	<i>Boronia coerulescens</i> subsp. <i>spinescens</i>			
48.	36560	<i>Callitris arenaria</i> (Sandplain Cypress)			
49.	35816	<i>Calothamnus quadrifidus</i> subsp. <i>quadrifidus</i>			
50.	5460	<i>Calytrix fraseri</i> (Pink Summer Calytrix)			
51.	5465	<i>Calytrix leschenaultii</i>			
52.	2956	<i>Cassytha pomiformis</i> (Dodder Laurel)			
53.	4561	<i>Comesperma scoparium</i> (Broom Milkwort)			
54.	4563	<i>Comesperma spinosum</i> (Spiny Milkwort)			
55.	1860	<i>Conospermum bracteosum</i>			
56.	15044	<i>Conospermum cinereum</i>			
57.	1871	<i>Conospermum ephedroides</i>			
58.	15518	<i>Conospermum filifolium</i> subsp. <i>filifolium</i>			
59.	15520	<i>Conospermum stoechadis</i> subsp. <i>sclerophyllum</i>			
60.	1444	<i>Conostylis petrophiloides</i>			
61.	7419	<i>Cooperookia strophiolata</i>			
62.	4800	<i>Cryptandra leucopogon</i>			
63.	41025	<i>Dasy mallia terminalis</i> (Native Foxglove)			
64.	11879	<i>Daviesia hakeoides</i> subsp. <i>hakeoides</i>			
65.	15506	<i>Daviesia incrassata</i> subsp. <i>teres</i>			
66.	16584	<i>Daviesia nudiflora</i> subsp. <i>drummondii</i>		P3	
67.	17846	<i>Desmocladius parthenicus</i>			
68.	3862	<i>Dillwynia acerosa</i>			
69.	4775	<i>Dodonaea pinifolia</i>			
70.	1643	<i>Elythranthera brunonis</i> (Purple Enamel Orchid)			
71.	45243	<i>Ericomyrtus parviflora</i>			
72.	19508	<i>Eucalyptus calycogona</i> subsp. <i>calycogona</i>			
73.	42026	<i>Eucalyptus erythronema</i> subsp. <i>inornata</i> (Red-flowered Mallee)		P3	
74.	5686	<i>Eucalyptus kondininensis</i> (Kondinin Blackbutt)			
75.	13530	<i>Eucalyptus macrocarpa</i> subsp. <i>macrocarpa</i> (Mottlecah)			
76.	13026	<i>Eucalyptus tephroclada</i>			
77.	12906	<i>Eucalyptus wandoo</i> subsp. <i>wandoo</i>			
78.	3889	<i>Gastrolobium bennettsianum</i> (Cluster Poison)			
79.	3924	<i>Gastrolobium spinosum</i> (Prickly Poison)			
80.	3929	<i>Gastrolobium tricuspidatum</i>			
81.	2116	<i>Grevillea uncinulata</i> (Hook-leaf Grevillea)			
82.	5013	<i>Guichenotia micrantha</i> (Small Flowered Guichenotia)			
83.	12225	<i>Hakea brownii</i>			
84.	2142	<i>Hakea commutata</i>			
85.	16909	<i>Hakea pandanica</i> subsp. <i>crassifolia</i>			
86.	2197	<i>Hakea prostrata</i> (Harsh Hakea)			
87.	2214	<i>Hakea trifurcata</i> (Two-leaf Hakea)			
88.	8024	<i>Helichrysum leucopsidium</i>			
89.	6839	<i>Hemiandra pungens</i> (Snakebush)			
90.	5108	<i>Hibbertia acerosa</i> (Needle Leaved Guinea Flower)			
91.	5112	<i>Hibbertia aurea</i>			
92.	5124	<i>Hibbertia exasperata</i>			
93.	20059	<i>Hibbertia hemignosta</i>			
94.	5157	<i>Hibbertia polystachya</i>			
95.	5173	<i>Hibbertia subvaginata</i>			
96.	12007	<i>Hybanthus floribundus</i> subsp. <i>floribundus</i>			
97.	2227	<i>Isopogon divergens</i> (Spreading Coneflower)			
98.	37902	<i>Isopogon pruinosus</i> subsp. <i>pruinus</i>			
99.	2238	<i>Isopogon teretifolius</i> (Nodding Coneflower)			
100.	4024	<i>Jacksonia racemosa</i>			
101.	6777	<i>Lachnostachys albicans</i>			
102.	5039	<i>Lasiopetalum microcardium</i>			
103.	11815	<i>Laxmannia grandiflora</i> subsp. <i>grandiflora</i>			
104.	7585	<i>Lechenaultia pulvinaris</i> (Cushion Leschenaultia)		P4	
105.	7590	<i>Lechenaultia tubiflora</i> (Heath Leschenaultia)			
106.	1075	<i>Lepidobolus preissianus</i>			
107.	5847	<i>Leptospermum erubescens</i> (Roadside Teatree)			
108.	6356	<i>Leucopogon amplexans</i>		P2	
109.	28311	<i>Leucopogon</i> sp. Great Southern (R.S. Cowan A 586)			
110.	19364	<i>Leucopogon tamminensis</i> var. <i>australis</i>			
111.	15749	<i>Melaleuca eurystoma</i>			
112.	5975	<i>Melaleuca subtrigona</i>			

Name ID	Species Name	Naturalised	Conservation Code	<sup>1</sup> Endemic To Query Area
113.	18232 <i>Melaleuca tuberculata</i> var. <i>tuberculata</i>			
114.	6889 <i>Microcorys cephalantha</i>		P3	
115.	18256 <i>Opercularia spermacoea</i>			
116.	46255 <i>Orianthera campanulata</i>			
117.	4355 <i>Oxalis perennans</i>			
118.	34844 <i>Oxymyrrhine cordata</i>		P2	
119.	12645 <i>Ozothamnus lepidophyllus</i>			
120.	12235 <i>Petrophile aspera</i>			
121.	2286 <i>Petrophile brevifolia</i>			
122.	14395 <i>Petrophile glauca</i>			
123.	2304 <i>Petrophile phyllicoides</i>			
124.	2308 <i>Petrophile seminuda</i>			
125.	11227 <i>Pimelea brevifolia</i> subsp. <i>modesta</i>			
126.	1699 <i>Rhizanthella gardneri</i> (Underground Orchid)		T	
127.	6022 <i>Rinzia fumana</i> (Polished Rinzia)			
128.	18164 <i>Schoenus</i> sp. <i>smooth culms</i> (K.R. Newbey 7823)			
129.	46824 <i>Seringia velutina</i> (Velvet firebush)			
130.	2316 <i>Stirlingia latifolia</i> (Blueboy)			
131.	7698 <i>Stylidium caricifolium</i> (Milkmaids)			
132.	7774 <i>Stylidium piliferum</i> (Common Butterfly Triggerplant)			
133.	16761 <i>Synaphea interioris</i>			
134.	15534 <i>Synaphea spinulosa</i> subsp. <i>major</i>			
135.	1349 <i>Thysanotus sabulosus</i>		P1	
136.	7666 <i>Verreauxia reinwardtii</i> (Common Verreauxia)			
137.	6073 <i>Verticordia chrysantha</i>			
138.	12411 <i>Verticordia densiflora</i> var. <i>cespitosa</i>			
139.	6103 <i>Verticordia ovalifolia</i>			
140.	15617 <i>Verticordia serrata</i> var. <i>serrata</i>			
141.	15613 <i>Verticordia tumida</i> subsp. <i>tumida</i>			
142.	13331 <i>Waitzia acuminata</i> var. <i>acuminata</i>			
143.	1254 <i>Xanthorrhoea nana</i> (Dwarf Grass tree)			

**Conservation Codes**

T - Rare or likely to become extinct  
X - Presumed extinct  
IA - Protected under international agreement  
S - Other specially protected fauna  
1 - Priority 1  
2 - Priority 2  
3 - Priority 3  
4 - Priority 4  
5 - Priority 5

<sup>1</sup> For NatureMap's purposes, species flagged as endemic are those whose records are wholly contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

## Appendix 4. Definitions of Conservation Codes for Western Australian Threatened and Priority flora (DBCA, 2019b).

Conservation code	Category
(T) Threatened species pursuant to Sect 19 of the BC Act 2016.	
T	<p>(T) CR – Critically endangered</p> <p>Threatened species considered to be <i>"facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines"</i>.</p>
	<p>(T) EN - Endangered</p> <p>Threatened species considered to be <i>"facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines"</i>.</p>
	<p>(T) VU - Vulnerable</p> <p>Threatened species considered to be <i>"facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines"</i>.</p>
(P) Priority species – possible Threatened species.	
P1	<p>Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.</p>
P2	<p>Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.</p>

Conservation code	Category
P3	Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4	<p>(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.</p> <p>(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.</p> <p>(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>

## Appendix 5. Categories of Threatened Species under Section 179 of the EPBC Act

Category	Definition
Extinct (Ex)	A native species is eligible to be included in the <b><i>extinct</i></b> category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
Extinct in the Wild (ExW)	A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered (CE)	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered (EN)	A native species is eligible to be included in the endangered category at a particular time if, at that time (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable (VU)	A native species is eligible to be included in the vulnerable category at a particular time if, at that time (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.
Conservation Dependent (CD)	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time, the species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

## Appendix 6. Vegetation condition scale (EPA, 2016).

Vegetation Condition	South West and Interzone Botanical Provinces
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and 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 and shrubs.

## Appendix 7. List of vascular flora found within the Yealering - Kulin Road Survey Area

No	FAMILY NAME	SPECIES NAME	NATURALISED	CONSV CODE
1	Asparagaceae	<i>Dichopogon preissii</i>		
2	Asparagaceae	<i>Lomandra effusa</i>		
3	Asteraceae	<i>Olearia muelleri</i>		
4	Asteraceae	<i>Olearia ramosissima</i>		
5	Casuarinaceae	<i>Allocasuarina campestris</i>		
6	Casuarinaceae	<i>Allocasuarina humilis</i>		
7	Chenopodiaceae	<i>Enchylaena tomentosa</i>		
8	Cyperaceae	<i>Lepidosperma resinosum</i>		
9	Dilleniaceae	<i>Hibbertia acerosa</i>		
10	Fabaceae	<i>Acacia erinacea</i>		
11	Fabaceae	<i>Templetonia rossii</i>		
12	Goodeniaceae	<i>Dampiera lavandulacea</i>		
13	Hemerocallidaceae	<i>Dianella revoluta</i>		
14	Lamiaceae	<i>Westringia rigida</i>		
15	Myrtaceae	<i>Eucalyptus phenax</i> subsp. <i>phenax</i>		
16	Myrtaceae	<i>Eucalyptus salmonophloia</i>		
17	Poaceae	<i>Austrostipa elegantissima</i>		
18	Poaceae	<i>Austrostipa flavescens</i>		
19	Poaceae	<i>Rytidosperma setaceum</i>		
20	Proteaceae	<i>Grevillea paniculata</i>		
21	Proteaceae	<i>Grevillea pectinata</i>		
22	Scrophulariaceae	<i>Eremophila decipiens</i>		