NATIVE VEGETATION CLEARING PERMIT APPLICATION SUPPORTING DOCUMENT

ROAD WIDENING
WICKEPIN-CORRIGIN ROAD

PREPARED AND SUBMITTED ON BEHALF OF

SHIRE OF CORRIGIN

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ENDPLAN ENVIRONMENTAL

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Our Reference:
ECO242_01_Final

DOCUMENT STATUS:

REVISION CONTROL:			
Document Title:	**Native Vegetation Clearing Permit Application Supporting Document Road Widening Wickepin-Corrigin Road**		
File Name/Version No:	**Issue Date:**	**Prepared By:**	**Issued to:**
ECO242_01_rev0	9/01/2025	[redacted]	Ecoscape (Australia) Pty Ltd
ECO242_01_rev1	21/01/2025	[redacted]	Ecoscape (Australia) Pty Ltd
ECO242_01_Draft	3/02/2025	[redacted]	Shire of Corrigin
ECO242_01_DraftA	10/02/2025	[redacted]	Shire of Corrigin
ECO242_01_Final	26/02/2027	[redacted]	Shire of Corrigin

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LIST OF ACRONYMS AND ABBREVIATIONS

BAM Act	Western Australian *Biosecurity and Agriculture Management Act 2007*
BC Act	Western Australian *Biodiversity Conservation Act 2016*
BoM	Bureau of Meteorology
C1, C2, C3	Declared Pest categories under the BAM Act
CD	Conservation Dependent (fauna; specially protected species under the Western Australian BC Act)
CR	Critically Endangered (listed under the Commonwealth EPBC Act and/or Western Australian BC Act)
DAFWA	Department of Agriculture and Food, Western Australia (2006-2017, now DPIRD)
DAWE	Commonwealth Department of Agriculture, Water and Environment (2020-2022, now DCCEEW)
DBCA	Western Australian Department of Biodiversity, Conservation and Attractions
DBH	Diameter at Breast Height (1.3 m)
DEWHA	Commonwealth Department of the Environment, Water, Heritage and the Arts (2007-2010, now DCCEEW)
DPAW	Western Australian Department of Parks and Wildlife (2013-2017, now DBCA)
DoE	Commonwealth Department of the Environment (2013-2016, now DCCEEW)
DotEE	Commonwealth Department of the Environment and Energy (2016-2020, now DCCEEW)
DPIRD	Western Australian Department of Primary Industries and Regional Development
DSEWPaC	Commonwealth Department of Sustainability, Environment, Water, Population and Communities (2010-2013, now DCCEEW)
DWER	Western Australian Department of Water and Environmental Regulation
EN	Endangered (listed under the Commonwealth EPBC Act and/or Western Australian BC Act)
EP Act	Western Australian *Environmental Protection Act 1986*
EPA	Western Australian Environmental Protection Authority
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
GDA 94	Geographic Datum of Australia 1994
GIS	Geographic Information System
GPS	Global Positioning System
ha	hectare(s)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for Conservation of Nature
km	kilometre(s)
m	metre(s)
MGA	Map Grid of Australia
MI	Migratory species (fauna; specially protected species under the Western Australian BC Act)
NVIS	National Vegetation Inventory System
MNES	Matters of National Environmental Significance
MRWA	Main Roads Western Australia
P, P1, P2, P3, P4, P5	Priority Flora and Fauna species rankings (P1-P4) or Priority Ecological Communities (P1-P5

PEC	Priority Ecological Community
PMST	Protected Matters Search Tool (Commonwealth hosted by DDCCEEW)
PTA	Public Transport Authority
sp./spp.	Specie(s)
subsp.	Subspecies (infrataxon)
S1	Schedule 1 Fauna species listed under the Western Australian BC Act
TEC	Threatened Ecological Community
TF	Threatened Flora (formerly termed Declared Rare Flora, DRF, in Western Australia)
var.	Variety (infrataxon)
VU	Vulnerable (listed under Commonwealth EPBC Act and/or Western Australian BC Act)
WAH	Western Australian Herbarium
WAM	Western Australian Museum
WAOL	Western Australian Organism List
WONS	Weeds of National Significance
*	Introduced flora species (i.e., weed)

EXECUTIVE SUMMARY

In order to improve road safety, the Shire of Corrigin (the Shire) is proposing to widen **1.4 km** of the Wickepin-Corrigin Road between its intersection with Ling Road southwards towards Bullaring townsite.

In 2023, the Shire appointed Ecoscape (Australia) Pty Ltd (Ecoscape) to undertake a biological survey of the road reserve to inform environmental approvals. Between the 7-10 November 2023, Ecoscape conducted biological survey of the survey area including a Detailed flora and vegetation survey, Basic fauna survey and targeted searches for Black Cockatoo (Carnaby's Cockatoo) and their habitat.

In order to provide flexibility, 6 m of the road reserve on either side of the Wickepin-Corrigin Road from the Ling Road intersection to Bullaring townsite were assessed to identify potential areas of lowest environmental impact. The survey area comprised **21.63 ha** which included 11.71 ha native vegetation, 0.10 ha revegetation and 9.82 ha non-native vegetation, cleared areas and roadway.

Flora and Vegetation Findings of the 2023 Survey Area (Bullaring to Ling Road)

Desk-top Assessment:

- Two pre-European vegetation associations intersect the survey area:
  - Association 955: *Mosaic: Shrublands; scrub-heath (South East Avon) / Shrublands; Allocasuarina campestris thicket*, intersecting 11.49% of the survey area that has between 9.76% of its original extent remaining at local government area scale and 13.51% remaining at IBRA subregion scale; and
  - Association 1023: *Medium woodland; York gum, wandoo and salmon gum (Eucalyptus salmonophloia)*, intersecting 88.51% of the survey area that has between 7.59% of its original extent remaining at local government area scale and 12.32% remaining at IBRA subregion scale
- The survey area intersects 17 indicatively mapped representatives of the *Eucalypt Woodlands of the Western Australian Wheatbelt* Threatened Ecological Community ('Wheatbelt Woodlands TEC').
- The DBCA database search indicates 10 TF and 47 PF have been recorded from within 30 km of the survey area (inclusive of another Shire of Corrigin survey area located approximately 8 km to the east).

Field Survey

- 221 vascular flora species, 38 (17.2%) of them introduced.
- Three Priority-listed flora: *Phebalium drummondii* (P3), *Synaphea drummondii* (P3) and *Calothamnus brevifolius* (P4). The post-survey likelihood assessment determined that no other conservation-listed flora were likely to occur.
- No Threatened or Priority-listed Flora (TF, PF) have been recorded.
- Seven vegetation types and three mosaics of these were recorded, including representatives of the Wheatbelt Woodlands TEC/PEC.
- Five road reserve occurrences within vegetation type **EsElEkMW** (*Eucalyptus salmonophloia*, *Eucalyptus longicornis* and *Eucalyptus kondininensis* mid woodland) and one indicative occurrence in vegetation type **EcMW** (*Eucalyptus capillosa* mid woodland) within the Bullaring town reserve, noting that this is considered indicative as adjacent similar vegetation was not viewed in detail to determine if it was all suitable to be included (patch included under the precautionary principle).
- Vegetation condition ranged from Completely Degraded to Very Good with the majority in Completely Degraded condition and only 16.03% of the vegetated portion of the survey area in Good or Very Good condition.

Fauna Survey Findings of the 2023 Survey Area (Bullaring to Ling Road)

Desktop Assessment

- The DBCA database search identified 15 mammals (11 Threatened and four Priority-listed) and 15 birds (four Threatened species and the remainder Priority-listed or otherwise conservation-listed or significant) have been recorded from within 60 km of the survey area (inclusive of the nearby survey area as above).
- The survey area is within the mapped distribution of Carnaby's Cockatoo.
- There is a known Carnaby's Cockatoo breeding site located approximately 22 km to the south-west of the survey area and the survey area is approximately 10 km north-west of the buffer edges of a known Carnaby's Cockatoo breeding area.

Field Survey:

- Three fauna habitat types: Shrubland occupying 1.44 ha, Tall Shrubland occupying 1.83 ha and Woodland occupying 8.39 ha. All habitat types occur commonly in the local area and more regionally and, for the majority of the survey area, are not considered to represent high quality habitat due to the survey area largely consisting of road reserve not connected to larger areas of bushland and interspersed with degraded areas. The portion of the survey area through Bullaring town reserve represents better quality habitat as it is connected to a larger area of bushland with more diverse habitat available.
- 12 vertebrate fauna species were recorded. The post-survey likelihood assessment determined that no conservation-listed fauna species were likely to occur although Peregrine Falcon (DBCA – OS) and Malleefowl (EPBC and BC Act – VU) may occur on occasion but would not be dependent on any resources present.
- No Threatened or Priority-listed Fauna were recorded.
- 269 trees of suitable species and size occurred in the survey area. Nine were potentially suitable for Carnaby's Cockatoo nesting as they had hollows that may be suitable, however, were not investigated in detail to determine if they were hollow or had a chamber of sufficient size for breeding. There were no chew marks to indicate they were or had been used for breeding.
- The survey area was assessed as being poor quality foraging habitat for Carnaby's Cockatoo and, due to distance from known breeding habitat and lack of food sources, is unlikely to be used for breeding (regardless of if the potential tree hollows are suitable) or for foraging. They may occur in the survey area but only during landscape traverses (overflying).
- No Threatened or Priority-listed Fauna were recorded from within the survey area.

Flora and Fauna Field Survey Findings in Relation to the Proposed Clearing Area

In relation to the proposed **0.69 ha** clearing area, the following flora and fauna field survey findings are pertinent:

- No Threatened or Priority-listed Flora were recorded.
- Three vegetation types and three mosaics were recorded.
- Vegetation condition ranged from Completely Degraded (0.2 ha), Degraded (0.50 ha) and Good (0.17 ha).
- 0.04 ha of the Wheatbelt Woodlands TEC/PEC was mapped and comprised two areas within the eastern road reserve: 0.03 ha and 0.01 ha. The vegetation was assessed as Good condition but was surrounded by vegetation in Degraded – Completely Degraded condition.
- Two fauna habitat types (Tall Shrubland 0.24 ha) and Woodland (0.46 ha) occur.
- No conservation-listed fauna were recorded.
- 18 Class 4 and 5 potential Carnaby's Cockatoo breeding trees were identified.
- Carnaby's Cockatoo foraging habitat was assessed as being poor quality due to distance from known breeding habitat and lack of known/preferred Carnaby Cockatoo food sources.

Potential impacts associated with the proposed vegetation clearing of up to **0.69 ha** to allow for the widening of a **1.4 km** stretch of the Wickepin-Corrigin Road south of the Ling Road intersection, have been considered with respect to the 10 Clearing Principles outlined in Schedule 5 of the EP Act.

It is concluded that the proposed clearing of up to **0.69 ha** of remnant native vegetation is likely to be at variance with Clearing Principle **(d)** maintenance of a Threatened Ecological Community (TEC) and Clearing Principle **(e)** Significant Remnant in an Extensively Cleared Area.

The WA Environmental Offsets Calculator (Environmental Protection Authority 2014) has been used to assess the residual impacts associated with the proposed clearing and the quantum of impact has been based on the proposed clearing of up to **0.69 ha** of native vegetation having a quality (scale) score of **4** and for Wheatbelt Woodlands TEC/PEC a quality (scale) score of **4**, with a conservation significance score of:

- **1.2%** for Wheatbelt Woodlands TEC/PEC; and
- **0.1%** for terrestrial native vegetation complex <30% extent remaining in the bioregion.

In light of the quality and conservation significance scores inherent in the proposed clearing area, the offset area will need to cover a quantum of impact of **2.10 ha**. The Shire proposes that on-ground management comprising re-vegetation and rehabilitation of a **2.10 ha** area of a Shire Reserve 24520 (Bullaring Town Reserve) be undertaken to improve environmental values within a degraded portion of the Reserve (to be nominated following ecological assessment).

The revegetation and rehabilitation conducted within the proposed offset site will be guided by a Rehabilitation Management Plan (MRP) prepared by the Shire in consultation with the Department of Water and Environmental Regulation (DWER). When approved by the DWER, the RMP will be implemented by the Shire.

1. INTRODUCTION

The Shire of Corrigin (the Shire) is a local government authority located in the central wheatbelt region, and situated approximately 234 km south-east of Perth.

The townsite of Corrigin was first gazetted in 1913 and is named after Corrigin Well, a local Aboriginal name, first recorded in 1877. The Corrigin Road Board was established in 1913 under the terms of *The Roads Act 1911* and gazetted on the 4th February 1913 (Shire of Corrigin 2024[1]).

In order to improve road safety, the Shire of Corrigin is proposing to widen a **1.4 km** stretch of the Wickepin-Corrigin Road south of the Ling Road intersection (**Figure 1**). Currently, the road pavement width just meets Australian road safety standards. However, the road shoulders are very steep and it is not possible for slow moving vehicles (i.e. farm machinery) or for vehicle breakdowns to move over off the road pavement should they need to do so.

To inform the environmental approvals process, in 2023 the Shire appointed Ecoscape (Australia) Pty Ltd (Ecoscape) to undertake a biological survey of the road reserves on both sides of Wickepin-Corrigin Road from Ling Road southwards to the Bullaring townsite. To provide flexibility, a 6 m extent of the road reserves on both sides of the road, measured from the outer edge of the existing cleared road shoulders, were assessed to identify areas of lowest impact (**Appendix 1**). Overall, the survey area comprised **21.63 ha** of which **11.71 ha** comprised native vegetation.

The proposed clearing area, the subject of this application supporting document, encompasses both sides of the roadway for **2.5 m** outwards from the edge of the existing cleared road shoulder and comprises approximately **0.69 ha** of which **0.04 ha** intersects a mapped Threatened Ecological Community.

This document has been prepared to support the granting of a NVCP for the Proposal under Part V Division 2 of the *Environmental Protection Act 1986* (EP Act), and includes the following information:

- Size and location of the NVCP application area.
- The justification for the proposal.
- An overview of the existing environmental conditions of the survey area and proposed clearing area.
- An evaluation of potential impacts of the proposed native vegetation clearing.
- Proposed environmental mitigation and management actions.
- An evaluation of compliance of the proposed clearing against the ten clearing principles listed under Schedule 5 of the EP Act.

1.1 Project Location and Land Management

The proposed clearing area extends for approximately **1.4 km** from the Corrigin-Wickepin Road and Ling Road intersection southwards towards Bullaring townsite. The proposed clearing area has been measured 2.5 m into the vegetated road reserve from the edge of the existing cleared road shoulder and on both sides of the road. The locations of the survey area and proposed clearing area are shown in **Figure 1**.

The Shire is the local government responsible for the enforcement and implementation of the Shire of Corrigin Scheme No.2 (gazetted 21 March 2000[2]) and the execution of any works required to be executed under this Scheme (Department of Planning, Lands and Heritage 2024).

[1] https://www.corrigin.wa.gov.au/council/about-us/profile.aspx
[2] Shire of Corrigin Scheme No. 2, online at https://www.wa.gov.au/system/files/2021-10/LPSC-Corrigin-Scheme-Text.pdf

With respect to management of the proposed clearing area, the Shire has advised[3] that the state government delegates responsibility to local governments for the care, control and management of road reserves as described in section 55 of the *Land Administration Act 1997*:

55. Property in and management etc. of roads

(1) Subject to this section and to section 57, the absolute property in land comprising a road is by this subsection revested in the Crown.

(2) Subject to the Main Roads Act 1930 and the Public Works Act 1902, the local government within the district of which a road is situated has the care, control and management of the road.

As such the Shire of Corrigin is responsible for the road reserve subject to the clearing permit.

The Authority to Act correspondence provided by the Shire is included as **Appendix 2**.

1.2 Project Justification

Widening of the road pavement and shoulders for a **1.4 km** length of the Wickepin-Corrigin Road from the intersection with Ling Road southwards towards Bullaring townsite is required to improve the safety for all road users.

As shown in **Plates 1 and 2** (over the page), the existing road is narrow and the road reserves in the proposed clearing area are too steep for vehicular traffic to pull across in the event of an emergency and, on occasion, have vegetation too close to the current road shoulder to provide sufficient clear width for a vehicle to completely clear the roadway.

PLATE 1: Wickepin-Corrigin Road drop-off to road reserve

[3] Ms Natalie Manton (CEO Shire of Corrigin) pers. comm. 31 January 2025

PLATE 2: Wickepin-Corrigin Road drop-off to road reserve near quadrat WC2304

Information from the biological survey indicate that the proposed clearing area has reduced environmental impacts compared to other stretches of the road.

Eighteen Class 4 and Class 5 Carnaby's Cockatoo trees were identified in the 6 m road reserve survey area. Class 4 trees have unsuitable hollows that were not of the size or orientation used by Carnaby's Cockatoo for nesting. Class 5 trees do not have hollows, but are of sufficient diameter to potentially form hollows in the future.

Subsequent to the 2023 biological survey, the engineering design and proposed vegetation clearing method has been modified by the Shire to retain as many of the Class 4 and 5 Carnaby's Cockatoo trees as possible.

Prior to road shoulder widening taking place, a loader and grader will be used to remove the understorey regrowth within the existing "lateral clearance area" to undertake "maintenance in the existing transport corridor" and the vegetation will be removed to the closest gravel pit as part of the rehabilitation of the gravel pit. To reduce road shoulder steepness, the road shoulders will be widened using a grader and additional fill added and then compacted. All works will be undertaken by the Shire's Works Division.

The proposed clearing area is site-specific and linear in nature due to the need to improve road safety along this particular section of the Wickepin-Corrigin Road. No alternative project options are therefore available to the Shire.

2. SITE DESCRIPTION

2.1 Climate

According to the Köppen-Geiger climate classification, the proposed clearing area has a temperate climate with hot, dry summers (Class Csa) (Peel, Finlayson and McMahon 2007). This classification is considered to represent a Mediterranean climate where average summer maximum temperatures exceed 22°C and the average coldest month maximum is between 18° and -3°C, and summer rainfall is less than one third of winter rainfall.

The nearest open Bureau of Meteorology (BoM) site is Corrigin (Site 010536) which has rainfall data dating back to 1910 (BoM 2024). The annual mean rainfall is approximately 371.3 mm falling predominantly between May-August (Bureau of Meteorology 2024). The total rainfall during the 6-month period prior to the survey (May–October 2023) was 72.89% of the long-term average (Ecoscape 2024).

Corrigin temperature data has been collected since 1948. The average annual temperature ranges between 4.8–32.6 °C, mean maximum summer temperatures ranges between 30.5-32.6 °C, while mean maximum winter temperatures range between 15.4-16.5 °C (Bureau of Meteorology 2024).

2.2 Land Systems

Soil landscapes and land system mapping of Western Australia prepared by the Department of Primary Industries and Regional Development (DPIRD) describes broad soil and landscape characteristics from regional to local scales, ranging from 1:20,000 to 1:250,000 (DPIRD 2024). A search of the DPIRD database indicated that the proposed clearing area is comprised of one land systems as identified in **Table 1**.

TABLE 1: Land Systems

Mapping unit	Land system	Description
259Ke_3u	Kweda 3 undifferentiated phase	Slopes and rises on colluvium derived from granite and dolerite bedrock with grey sandy duplexes, loamy duplexes and minor gravelly and sandy soils

Source: Ecoscape (Australia) Pty Ltd 2024

The soil-landscape distribution throughout the proposed clearing area and surrounds is shown in **Figure 2**. **Table 2** lists the land degradation risk categories for the Kweda 3 undifferentiated phase land system identified in **Table 1**.

TABLE 2: Land Degradation Risk Categories

Land Degradation Risk Category	Kweda 3 undifferentiated phase
Water Erosion	0% of map unit has a very high to extreme water erosion risk
Wind Erosion	10% of map unit has a high to extreme wind erosion risk
Waterlogging	0% of map unit has a moderate to very high waterlogging risk
Flooding	0% of map unit has a moderate to high flood risk
Salinity	<3% of map unit has a moderate to extreme salinity risk

Source: Department of Primary Industries and Regional Development 2024

2.3 Hydrology

The proposed clearing area does not lie within any Public Drinking Water Source areas (Department of Water and Environmental Regulation (DWER) 2024).

The proposed clearing area is located within the Swan-Avon catchment (DWER 2018), with the overall drainage flowing towards Lake Yealering to the southwest.

No creeks, rivers or wetlands intersect the proposed clearing area (DWER 2022).

2.4 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are defined under s51B of the *Environmental Protection Act 1986* (Government of Western Australia 1986) and are declared by the DWER to prevent the degradation of important environmental values such as Threatened Flora, Threatened and Priority Ecological Communities (TEC/PEC), conservation lands or significant wetlands.

The proposed clearing area does not intersect any mapped Environmentally Sensitive Areas (ESAs) (DWER 2021 and Government of Western Australia 2005). The nearest ESAs are located:

- 1.2 km to the west, corresponding with the location of a Threatened Flora species.
- 3.4 km to the west, corresponding with the location of a Threatened Flora species.
- 10.7 km to the south-west, corresponding with the lake system associated with Nonalling Nature Reserve.

2.5 Conservation Lands

The proposed clearing area does not intersect any conservation lands. The nearest land vested for conservation is Sewell Nature Reserve, located approximately 6.5 km to the south-east.

2.6 Vegetation and Flora

2.6.1 Biogeographic Region

Biogeographic regions are delineated on the basis of similar climate, geology, landforms, vegetation and fauna and are defined in the Interim Biogeographical Regionalisation for Australia (IBRA) (Department of Agriculture, Water and the Environment 2020). The proposed clearing area is located in the Avon Wheatbelt IBRA region in the Katanning subregion (AW2), and is described by Beecham (2002) as:

> *"an area of active drainage dissecting a Tertiary plateau in Yilgarn Craton. Gently undulating landscape of low relief. Proteaceous scrubheaths, rich in endemics, on residual lateritic uplands and derived sandplains; mixed eucalypt, Allocasuarina huegeliana and Jam-York Gum woodlands on Quaternary alluvials and eluvials. Within this, AW2 is the erosional surface of gently undulating rises to low hills with abrupt breakaways. Continuous stream channels that flow in most years. Colluvial processes are active. Soil formed in colluvium or in-situ weathered rock. Includes woodland of Wandoo, York Gum and Salmon Gum with Jam and Casuarina. The climate is Semi-arid (Dry) Warm Mediterranean, and area is 3,012,977 ha."*

2.6.2 Pre-European Vegetation

The pre-European vegetation type and extent mapping undertaken by Beard *et al.* (2013), attempted to depict the native vegetation as it was presumed to be at the time of settlement. Digital mapping (Shepherd, Beeston and Hopkins 2002) was subsequently updated by the DPIRD (DPIRD 2019) and published by the Department of Biodiversity, Conservation and Attractions (DBCA) (2023).

A GIS search of vegetation classification identified the proposed clearing area as intersecting with two Vegetation Associations:

- Association 955: *Mosaic: Shrublands; scrub-heath (South East Avon)/Shrublands; Allocasuarina campestris thicket*, intersecting 11.49% of the survey area; and
- Association 1023: *Medium woodland; York gum, wandoo and salmon gum (Eucalyptus salmonophloia)*, intersecting 88.51% of the survey area.

The pre-European vegetation associations identified from within the proposed clearing area, their pre-European and current extents are shown in **Table 3**.

TABLE 3: Vegetation Association Representation at State, Bioregion and Local Government Level

Region	Vegetation association	Original extent (ha)	Current extent (ha)	% remaining
Western Australia	955	139,324.02	15,281.57	10.97
	1023	1,601,605.76	172,875.16	10.79
IBRA biogeographic region (Avon Wheatbelt)	955	120,564.93	12,900.72	10.70
	1023	1,522,680.40	165,123.60	10.84
IBRA biogeographic sub-region (AW2)	955	35,701.39	4,824.00	13.51
	1023	1,123,736.23	138,408.96	12.32
LGA (Shire of Corrigin)	955	27,299.83	2,663.91	9.76
	1023	196,862.70	14,949.44	7.59

Source: Department of Biodiversity Conservation and Attractions 2019a

3. BIOLOGICAL SURVEYS

Ecoscape conducted a Detailed flora and vegetation survey and Basic fauna survey of the **21.63 ha** survey area during 7-10 November 2023. The fauna survey incorporated a targeted search for Carnaby's Cockatoo (*Calyptorhynchus latirostris*) and their habitat.

The survey area included **11.71 ha** of native vegetation, **0.10 ha** revegetation and **9.82** ha of non-native vegetation, cleared areas and roadway.

The requirements of the survey were to undertake biological surveys to identify the features of the survey area that have the potential to affect the environmental approvals process. The survey was required to be compliant with the following Environmental Protection Authority (EPA) guidance:

- *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment*, known herein as the Fauna Technical Guidance (2020)
- *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment*, known herein as the Flora and Vegetation Technical Guidance (2016a).

The environmental assessment was conducted in accordance with the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Government of Australia 1999) and State environmental legislation and guidelines. Summaries of the main Acts under which this assessment was conducted, and related criteria and definitions, are available in **Appendix 1**.

As well as those listed above, the assessment complied with EPA requirements for environmental survey and reporting in Western Australia, as outlined in:

- EPA (2016b) *Environmental Factor Guideline – Flora and Vegetation*
- EPA (2016c) *Environmental Factor Guideline – Terrestrial Fauna*
- EPA (2016d) *Environmental Factor Guideline – Terrestrial Environmental Quality*
- EPA (2018) *Environmental Factor Guideline – Landforms*
- EPA (2023) *Statement of environmental principles, factors, objectives and aims of EIA*.

The following also formed part of the Black Cockatoo assessment:

- Department of Agriculture, Water and the Environment (2022) *Referral Guideline for 3 WA Threatened Black Cockatoo species. Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Cockatoo.*
- Bamford Environmental Consulting (2020) *Scoring system for the assessment of foraging value of vegetation for Black Cockatoos.*
- Bamford Environmental Consulting (2021) *Black Cockatoo potential nest tree grading system.*

The flora and vegetation survey was conducted[4] during 7-10 November 2023. Taxonomic plant identification was undertaken by Dr Udani Sirisena. Three specimens were submitted to the Western Australian Herbarium (WAH) for formal identification (Accession #: 10,754). They were identified as *Banksia purdieana*, *Olearia imbricata* and *Synaphea drummondii* (P3). The fauna survey was conducted by Lyn Atkins during 7-10 November 2023.

Ecoscape's report *Wickepin-Corrigin Road Widening Biological Survey* (2024) is included as **Appendix 1**[5]. The key findings from the survey report are summarised below. While much of the information provided has been based on an extensive survey area, wherever possible, information relating specifically to the proposed clearing area has been highlighted.

[4] Lyn Atkins (Principal Ecologist, Flora Collecting Permit FB62000003-2; Threatened Flora Collecting Permit TFL 2223-0089)

[5] Refer to Section 3 in **Appendix 1** for field survey aim, principles, analysis and methodology; Section 4.1.6 for botanical limitations; Section 4.2.4 for fauna survey limitations.

3.1 Flora

The desktop *Protected Matters Search Tool* (PMST) search (DCCEEW 2024) which identifies *Matters of National Environmental Significance*[6] (MNES) within the search area, identified 25 Threatened Flora (TF) species listed under the EPBC Act (that are either known (or habitat is known) to occur within the 30 km search buffer area (eight species), 'species or habitat likely to occur within area' (six) and 'species or species habitat may occur within area' (11).

The requested DBCA databases (search reference 21-1023FL (Ecoscape Australia)) was conducted using a 30 km buffer around the supplied shapefiles that incorporate a separate Shire of Corrigin survey area located approximately 8 km to the east (Grein 1994). The results incorporate the TPFL List, taken from Threatened and Priority Flora Report Forms and Department of Biodiversity, Conservation and Attractions (DBCA) surveys, and Western Australian Herbarium (WAH) (1998-), taken from vouchered specimens held in the WAH (WAH 2024). The DBCA search identified 57 taxa: 10 TF, four Priority (P) P1, seven P2, 26 P3 and 10 P4. Three fungi species not included within the survey scope have been deleted from the database search results outlined in this report.

The combined database searches identified 73 species consisting of 26 TF (10 from records known to occur within the DBCA database search buffer and a further 16 from the PMST where associated habitat could occur), four P1, seven P2, 26 P3 and 10 P4.

During the field survey, 221 vascular flora species consisting of 47 families and 129 genera, were found from the 20 quadrats, opportunistic observations and searches for conservation-listed flora within the survey area. Of these, 38 were introduced (17.2%) and seven (3.2%) could not be identified to species level due to insufficient diagnostic reproductive material.

The most commonly represented families were Myrtaceae (36 taxa), Fabaceae (27), Poaceae (26), Proteaceae (22) and Asteraceae (20). The most commonly represented genera were *Melaleuca* with 11 taxa, *Eucalyptus* (10), *Acacia* (9) and *Grevillea* (7).

The number of species per quadrat ranged from six in quadrat WC2318 to 38 in quadrat WC2301, with an average species diversity per quadrat of 20.65. The most commonly recorded species were all grasses (Poaceae): *Austrostipa elegantissima* and **Ehrharta longiflora* recorded from 18 quadrats, **Avena barbata* (15) and *Rytidosperma setaceum* (13).

3.2 Conservation Significant Flora

Threatened Flora (TF)

No Commonwealth EPBC Act or Western Australian *Biodiversity Conservation Act* (BC Act) listed TF were recorded during the field survey. No taxa not identified with certainty resembled any currently described TF.

Priority Flora (PF)

During the field survey, three PF were recorded from within the survey area:

- ***Phebalium drummondii* (P3)** - one plant of this species was observed to be a shrub to 0.6 m high occurring in *Eucalyptus capillosa* woodland (**EcMW**).
- ***Synaphea drummondii* (P3)** - three plants of this species were growing in vegetation type **AcLeHsMOS**. *Synaphea drummondii* is morphologically similar to *S. interioris* which is not conservation-listed and occurred commonly in the same portion of the survey area. There is

[5] Department of the Environment Water Heritage and the Arts; Commonwealth of Australia 2009

potential that these two species may on occasional have been misinterpreted thus *S. drummondii* may occur more frequently than indicated.

- ***Calothamnus brevifolius*** **(P4)** - five plants of this species was observed as an erect shrub occurring entirely in disturbed vegetation, including parts otherwise without native vegetation and in Completely Degraded representatives of vegetation types **AcLeHsMOS** and **EsElEkMW**.

No PF occur within the proposed clearing area.

3.3 Introduced/Weed Flora

Thirty-eight introduced flora species (weeds) were recorded during the field survey, representing 17.2% of the overall flora inventory. Weed density was highly variable throughout the survey area, from 100% ground cover to virtually no weeds.

None of the introduced flora have any specific significance i.e., none are listed as a 'Declared Pest' under s22(2) of the *Biosecurity and Agriculture Management Act 2007* (Government of Western Australia 2007) or classed as a 'Weed of National Significance' (WONS) species under the EPBC Act (Department of Agriculture Water and the Environment 2021).

3.4 Vegetation

3.4.1 Vegetation Types

Seven vegetation types and three 'mosaics' were recorded from within the survey area based on a combination of structural vegetation type as identified in the field, floristic analysis and subsequent desktop review. Within the proposed clearing area, three vegetation types were identified (shown bolded).

The vegetation types within the survey area were:

- AaEllMW: *Acacia acuminata* and *Eucalyptus loxophleba* subsp. *loxophleba* mid woodland, noting that either of the two-listed species were dominant
- AcLeHsMOS: *Allocasuarina campestris*, *Leptospermopsis erubescens* and *Hakea scoparia* mid open shrubland
- AhMW: *Allocasuarina huegeliana* mid woodland
- **EcMW**: *Eucalyptus capillosa* mid woodland
- EoMMW: *Eucalyptus orthostemon* mid mallee woodland
- **EsElEkMW**: *Eucalyptus salmonophloia*, *Eucalyptus longicornis* and *Eucalyptus kondininensis* mid woodland, noting that dominance of these species varied although *Eucalyptus salmonophloia* was the most frequent characteristic and dominant species
- **EtEcEaaMMW/LW**: *Eucalyptus tenera*, *Eucalyptus capillosa* and *Eucalyptus arachnaea* subsp. *arachnaea* mid mallee woodland/low woodland.

In addition to the above, woodlands and mallees frequently intergraded, termed as 'mosaics' were identified from within the survey area and proposed clearing area:

- **EcMW/EsElEkMW**: Mosaic of *Eucalyptus capillosa* mid woodland AND *Eucalyptus salmonophloia*, *Eucalyptus longicornis* and *Eucalyptus kondininensis* mid woodland
- **EcMW/EtEcEaaMMW/LW**: Mosaic of *Eucalyptus capillosa* mid woodland AND *Eucalyptus tenera*, *Eucalyptus capillosa* and *Eucalyptus arachnaea* subsp. *arachnaea* mid mallee woodland/low *woodland*
- **EsElEkMW/EtEcEaaMMW/LW***: Mosaic of Eucalyptus salmonophloia, Eucalyptus* longicornis and *Eucalyptus kondininensis* mid woodland AND *Eucalyptus tenera*, *Eucalyptus capillosa* and *Eucalyptus arachnaea* subsp. *arachnaea* mid mallee woodland/low woodland.

Vegetation types within the proposed clearing area are shown in **Figure 3**.

TABLE 4: Vegetation Type, Description and Extent (ha) from within the Survey Area and Proposed Clearing Area

Vegetation Type	Vegetation Description	Survey Area (ha)	Clearing Area (ha)
AaEllMW	*Acacia acuminata* and *Eucalyptus loxophleba* subsp. *loxophleba* mid woodland over **Bromus diandrus*, **Ehrharta longiflora* and **Avena barbata* low closed grassland	0.89	-
AcLeHsMOS	*Allocasuarina campestris*, *Leptospermopsis erubescens* and *Hakea scoparia* mid open shrubland over **Avena barbata*, **Bromus diandrus* and *Waitzia acuminata* var. *acuminata* low grassland/forbland	1.11	-
AhMW	*Allocasuarina huegeliana* mid woodland over *Gastrolobium spinosum* and *Banksia sphaerocarpa* var. *sphaerocarpa* mid sparse shrubland over **Bromus diandrus*, **Ehrharta longiflora* and **Ursinia anthemoides* subsp. *anthemoides* mid dense grassland/forbland	0.54	-
EcMW	*Eucalyptus capillosa* mid woodland over *Melaleuca marginata*, *Allocasuarina campestris* and *Gastrolobium spinosum* mid open shrubland over **Ursinia anthemoides* subsp. *anthemoides*, *Austrostipa elegantissima* and *Rytidosperma setaceum* low forbland/tussock grassland	2.95	0.05
EoMMW	*Eucalyptus orthostemon* mid mallee woodland over *Santalum acuminatum* and *Grevillea hakeoides* subsp. *hakeoides* mid scattered shrubs over **Ehrharta longiflora*, *Austrostipa elegantissima* and *Gahnia trifida mid* grassland/tussock grassland/sedgeland	0.33	-
EsElEkMW	*Eucalyptus salmonophloia*, *Eucalyptus longicornis* and *Eucalyptus kondininensis* mid woodland over *Olearia* sp. Eremicola (Diels & Pritzel s.n. PERTH 00449628) mid sparse shrubland over **Lolium perenne x rigidum*, **Ehrharta longiflora* and *Austrostipa elegantissima* low closed grassland/tussock grassland	3.14	0.17
EtEcEaaMMW/LW	*Eucalyptus tenera*, *Eucalyptus capillosa* and *Eucalyptus arachnaea* subsp. *arachnaea* mid mallee woodland/low woodland over *Melaleuca scalena* and *Melaleuca marginata* mid open shrubland over **Ehrharta longiflora* and *Austrostipa elegantissima* low closed grassland/tussock grassland	1.34	0.24
EcMW / EsElEkMW	Mosaic of: *Eucalyptus capillosa* mid woodland AND *Eucalyptus salmonophloia*, *Eucalyptus longicornis* and *Eucalyptus kondininensis* mid woodland	0.81	0.07
EcMW / EtEcEaaMMW/LW	Mosaic of: *Eucalyptus capillosa* mid woodland AND *Eucalyptus tenera*, *Eucalyptus capillosa* and *Eucalyptus arachnaea* subsp. *arachnaea* mid mallee woodland/low woodland	0.54	0.15
EsElEkMW / EtEcEaaMMW/LW	Mosaic of: *Eucalyptus salmonophloia*, *Eucalyptus longicornis* and *Eucalyptus kondininensis* mid woodland AND *Eucalyptus tenera*, *Eucalyptus capillosa* and *Eucalyptus arachnaea* subsp. *arachnaea* mid mallee woodland/low woodland	0.05	0.02
	Not native vegetation (cleared, including roadway)	9.82	0
	Revegetation area	0.10	0
	TOTAL EXTENT	**23.63**	**0.69**

Source: Ecoscape (Australia) Pty Ltd 2024

3.4.2 Vegetation Condition

The vegetation condition for the survey area and proposed clearing area has been mapped using the condition rating scale (adapted from Keighery 1994) outlined in *EPA Flora and Vegetation Survey Technical Guidance* (2016a).

Within the proposed clearing area, the vegetation condition ranged from Completely Degraded to Good condition with the majority in Degraded condition. The main factor affecting vegetation condition was weediness, which at least in part is due to partial (or almost complete) historical clearing of the road reserve with few species persisting or sparse regeneration of some species occurring. Fertiliser drift, favouring fast-growing introduced species, may also be a factor affecting vegetation condition.

Poor condition (i.e. Degraded-Completely Degraded condition ratings) is considered to be the most common vegetation condition within the agricultural region of Western Australia, with most road reserved being weedy and disturbed.

TABLE 5: Vegetation Condition within the Survey Area and Proposed Clearing Area

Vegetation condition	Survey Area Extent (ha)	Clearing Area Extent (ha)
Pristine	-	-
Excellent	-	-
Very Good	0.83	-
Good	1.06	0.17
Degraded	3.85	0.50
Completely Degraded	6.07	0.02
Not native vegetation/cleared	9.82	0
TOTAL	**11.81**	**0.69**

Source: Ecoscape (Australia) Pty Ltd 2024

Vegetation condition within the proposed clearing area is shown in **Figure 4**.

3.4.3 Conservation Significant Ecological Community

The proposed clearing area is located within the Avon Wheatbelt IBRA region in the Katanning subregion (AW2) subregion, and is therefore within the boundaries of the location criteria for the *Eucalyptus Woodlands of the Western Australian Wheatbelt* (Wheatbelt Woodlands TEC/PEC). The Wheatbelt Woodlands TEC/PEC is listed under the EPBC Act as Critically Endangered and categorised as a Priority 3 PEC by the DBCA.

The potential occurrence of the Wheatbelt Woodlands TEC/PEC was identified by a PMST search (DCCEEW 2024) using a 30 km buffer around the survey area and a paid DBCA database search request (search reference 10-1023EC-Corrigin-Ecoscape) using a 20 km buffer, noting that the DBCA provided joint results for two Shire of Corrigin survey areas, the other being located approximately 8 km to the east.

Database searches identified that the Wheatbelt Woodlands TEC/PEC has been indicatively mapped as occurring within the survey area. It should be noted that mapped representatives indicated in the DBCA mapping data (2023) are indicative only and may not have been 'ground truthed' (refer to Section 3.6.1 in TSSC 2015).

Potentially three vegetation types (**AaEllMW** where Ell – *Eucalyptus loxophleba* subsp. *loxophleba* – is dominant[7], **EcMW** and **EsElEkMW**) identified from within the survey area may be representative of the

[7] Note that this vegetation type is not found within the proposed clearing area.

Wheatbelt Woodlands TEC/PEC if they meet the minimum extent (or road reserve width), condition and tree cover thresholds as outlined in the Approved Conservation Advice (TSSC 2015).

Six occurrences were considered to occur within the survey area (refer to **Map 5** in **Appendix 1**), occupying 0.34 ha (1.59% of the survey area). The majority of patches of these vegetation types were not representative as they did not meet the minimum condition threshold of Good or, for the **EcMW** woodland at the northern end of the Bullaring town reserve, did not meet the extent threshold of 5 ha to be representative.

Two of the six occurrences were considered to occur within the proposed clearing area and are identified in **Figures 3-2 and 3-3**. Approximately 0.04 ha of the Wheatbelt Woodlands TEC/PEC was mapped and comprised of two areas within the eastern road reserve: 0.03 ha and 0.01 ha. The vegetation was assessed as being in Good condition but was surrounded by vegetation in Degraded – Completely Degraded condition.

3.5 Terrestrial Fauna

The fauna survey, conducted by Lyn Atkins (Principal Ecologist) during 7-10 November 2023, was conducted in accordance with the requirements for a Basic survey as outlined in the EPA's Fauna Technical Guidance (2020).

The survey area was traversed on foot or by slow driving traverses along adjacent firebreaks or along the road, with all habitats were assessed for quality and capability of supporting both locally common and significant fauna species.

3.5.1 Fauna Habitat

Three fauna habitat types were identified within the survey area:

- Shrubland: Tamma (*Allocasuarina*) over various shrubs including some shrubby *Banksia* spp. (<10% cover)
- Tall Shrubland: Mallee over *Melaleuca* shrubs or Sheoak over shrubs including some Proteaceous species (*Banksia*, *Grevillea*; <10% cover)
- Woodland: Eucalypt trees (small-fruited species) over low shrubs or grasses.

Detailed descriptions and extent of each habitat type is shown in **Table 6** (over the page).

Areas without native vegetation was not considered to constitute a fauna habitat type. The quality of each habitat type was based on the field surveyor's experience and takes into consideration the level of disturbance to habitats from weeds, the amount of native vegetation, vegetation cover (density) and the context of the habitat with the surrounding landscape.

There is no habitat suitable for waterbirds or waders within the survey area.

The Shrubland habitat does not occur within the proposed clearing area. The locations of the Tall Shrubland (**0.24 ha**) and Woodland (**0.45 ha**) fauna habitats occurring within the proposed clearing area are shown in **Figure 5**.

TABLE 6: Fauna Habitat Types within the Survey Area and Proposed Clearing Area

Habitat type	Description	Survey Area (ha)	Clearing Area (ha)
Shrubland	The Shrubland habitat is of low height, generally <2 m high, with areas of dense cover near to the ground; these dense shrubs provide shelter and nest sites for smaller birds. The Shrubland generally has a higher diversity of plant species and therefore has a range of food sources that could vary throughout the seasons, including flowers, seeds and insects. This habitat type is well suited to smaller birds including honeyeaters and insectivores, but less suited to larger species due to the lack of trees suited as perches or nest sites. Ground-feeding granivore birds (e.g. parrots, pigeons) may forage seasonally. It is not considered suitable to support any conservation-listed birds, at least within the road reserve section that constitutes the survey area. Small mammals may inhabit the Shrubland habitat, with larger mammals including kangaroos foraging on occasion. Reptiles may also inhabit the Shrubland habitat, although there are few logs that suit lizards and only shallow burrows are possible for burrowing species.	1.44	-
Tall Shrubland	The Tall Shrubland habitat is characterised by having a taller plant layer (Rock Oak trees or mallees) over a ground layer of shrubs and/or grasses, and near-continuous canopy joining these plant strata. The soil is variously sandy (Sheoak areas; potentially suitable for mammals and reptiles constructing burrows) or shallow duplex soil (mallee areas). This habitat type is suitable for small and medium-sized birds, providing shelter, food and nest sites. Of note, this habitat type is not suited to Malleefowl within the survey area as it does not occur as a larger contiguous area. Smaller mammals or reptiles may occupy this habitat type. Larger mammals may traverse or intermittently forage within this habitat type. This habitat type may be used during traverses of the landscape (e.g. Chuditch during dispersal by young animals).	1.88	0.24
Woodland	The Woodland consists of tall-medium height trees with an upper canopy and ground layer of (occasionally) low shrubs or more often grasses, including native species or introduced weeds. There is generally no continuous cover between the trees and ground. The soil is most frequently hard clay loam not suited to burrowing. This habitat type is suited to larger and medium-sized birds as it provides perches and nest sites; these species also frequently forage in the adjacent paddocks. Smaller birds, generally insectivores may also occur. Although theoretically possible it is unlikely that this habitat type would be significantly utilised by conservation-listed species including Carnaby's Cockatoo which, if it occurred, is likely to visit rather than be resident due to the lack of favoured foraging species. Due to the lack of shelter the Woodland habitat is largely not suited to smaller mammals. Reptiles are likely to be present due to fallen timber providing shelter.	8.39	0.45
	TOTAL AREA	**11.71**	**0.69**

Source: Ecoscape (Australia) Pty Ltd 2024

3.5.2 Fauna Assemblage

The PMST search identified 11 EPBC-listed Threatened Fauna that are either known (or habitat is known) to occur within the 30 km search buffer area (one bird), 'species or habitat likely to occur within area' (one mammal and one bird) and 'species or species habitat may occur within area' (three mammals and five birds).

The DBCA database search was conducted using a 60 km buffer around the two Shire of Corrigin survey areas[8].

Twenty-nine conservation-listed species were identified as having previously been recorded from within the search area buffer, consisting of 15 mammals and 14 birds (noting that *Zanda* sp. 'white-tailed black cockatoo' has been combined with *Zanda latirostris* (Carnaby's Black Cockatoo) listed as Endagered under the EPBC Act and the BC Act as this is the only species of this genus with a distribution that includes the survey area).

The fauna inventory was collected opportunistically throughout the field survey and 11 vertebrate fauna species were recorded during the survey, none of which are conservation listed (**Table 7**).

TABLE 7: Recorded Fauna Species

Species	Common name	Observation type
Mammals		
Macropus fuliginosus	Western Grey Kangaroo	Scat
Birds		
Barnardius zonarius	Australian Ringneck	Sighted
Cacatua pastinator	Western Long-billed Corella	Sighted
Coracina novaehollandiae	Black-faced Cuckoo-shrike	Sighted
Corvus coronoides	Australian Raven	Sighted
Cracticus torquatus	Grey Butcherbird	Sighted
Eolophus roseicapilla	Galah	Sighted
Grallina cyanoleuca	Magpie-lark	Sighted
Gymnorhina tibicen	Australian Magpie	Sighted
Lophoictinia isura	Square-tailed Kite	Sighted
Neophema elegans	Elegant Parrot	Sighted

Source: Ecoscape (Australia) Pty Ltd 2024

While no introduced fauna species were recorded during the survey, it is likely that some species such as the European Rabbit (*Oryctolagus cuniculus*), Red Fox (*Vulpes vulpes*) and Feral Cat (*Felis catus*) would occur.

3.6 Black Cockatoo Habitat Assessment

Of the three WA threatened black cockatoos; Carnaby's Cockatoo, Baudin's Cockatoo and Forest Red-Tailed Black Cockatoo, only Carnaby's Cockatoo 'modelled distribution' falls within the survey area (Department of Agriculture, Water and the Environment (DAWE) 2022).

The DBCA fauna database search identified that the survey area is located approximately 22 km north-west of a known Carnaby's Cockatoo breeding site. This record, from 2000, is described as 'confirmed' and 'natural' in the DBCA data.

[8] DBCA Search Reference: 7976_-_FaunaSearch_Ecoscape_Atkins7976

According to DBCA mapping the survey area is located:

- Approximately 10 km north-east of confirmed Carnaby's Cockatoo breeding areas (DBCA 2018a)
- Over 100 km south-east of unconfirmed (indicative) Carnaby's Cockatoo breeding areas (DBCA 2018b)
- Over 100 km south-east or northeast of buffer edges of Black Cockatoo breeding sites (DBCA 2019b)
- Over 100 km south-east of confirmed Carnaby's Cockatoo roost sites (DBCA 2018c)
- Over 100 km south-east of unconfirmed (indicative) Carnaby's Cockatoo roost sites (DBCA 2018d)
- Approximately 73 km north-east of buffer edges of Black Cockatoo roost sites (DBCA 2019c)
- Approximately 75 km north-east of areas under investigation as Carnaby's Cockatoo feeding habitat (DBCA 2018e)

Figure 2 in EPA (2019) indicates that the survey area is approximately 100 km north and 100 km south-east of the nearest approximate breeding zone.

Black Cockatoo habitat trees were assessed according to the criteria outlined in Commonwealth guidelines (DAWE 2022) with additional information recorded using the Bamford (2021) classifications to identify the potential suitability of trees to be used for nesting based on the presence of, size and orientation of hollows (refer to Table 26 in **Appendix 1**).

3.6.1 Breeding Habitat

A total of 269 trees of suitable diameter to be Black Cockatoo habitat trees were recorded within the survey area. The majority were Wheatbelt Wandoo (*Eucalyptus capillosa*, 138; 51.3%), Salmon Gum *(Eucalyptus salmonophloia*, 118; 43.9%), dead (unspecified species, eight, 3.0%), York Gum (*Eucalyptus loxophleba* subsp. *loxophleba*, four; 1.5%) and Gimlet (*Eucalyptus salubris*, one; 0.4%).

Nine (3.3%) of the trees were Class 3 and potentially had hollows that may be suitable for Carnaby's Cockatoo breeding, noting that none had evidence of use by Carnaby's Cockatoo or other species, and they have not been examined in detail to determine if the broken-off stags are actually hollow on the inside and have a chamber suitable for use. The remainder of the trees were Class 4 which had unsuitable hollows that were not of the size or orientation used by Carnaby's Cockatoo for nesting (32 trees; 11.9%) or Class 5 which did not have hollows, but which were of sufficient diameter to potentially form hollows in the future (228 trees; 84.8%).

There is no requirement to measure the DBH of all trees (DAWE 2022), only to ensure that all trees that meet the minimum size to be potentially suitable for breeding are recorded. The size of all trees were recorded within 25 cm DBH classes (noting that Wandoo, in this case Wheatbelt Wandoo *Eucalyptus capillosa*, and Salmon Gum *Eucalyptus salmonophloia*'s minimum DBH is 30 cm compared to 50 cm for all other species) and measured where they were near to a size class change. Size classes with species and count of trees in each category are summarised in **Table 8** (over the page), which also identified those that are Class 3 (Bamford Consulting Ecologists 2021).

TABLE 8: Survey Area - Tree DBH Class Summary

Size class (DBH in cm)	Wheatbelt Wandoo (*Eucalyptus capillosa*)	Salmon Gum (*Eucalyptus salmonophloia*)	Dead	York Gum (*Eucalyptus loxophleba* subsp. *loxophleba*)	Gimlet (*Eucalyptus salubris*)
30-50	83	55	-	-	-
50-75	46	41	5	4	-
75-100	5 (1 x Class 3)	15 (1 x Class 3)	2 (1 Class 3)	-	1
100-125	3 (1 x Class 3)	6	1	-	-
>125	1	1	-	-	-

Source: Ecoscape (Australia) Pty Ltd 2024

The locations of **all** potential breeding trees within the survey area are shown in **Appendix 1** (refer to the Map 7 series).

The location of **18** Class 4 and 5 Black Cockatoo habitat trees (*Eucalyptus capillaris* and *E. salmonophloia*) recorded within the survey area are shown in **Figure 5**. Class 4 trees have unsuitable hollows that were not of the size or orientation used by Carnaby's Cockatoo for nesting; Class 5 trees do not have hollows, but are of sufficient diameter to potentially form hollows in the future.

The road widening design and method of vegetation clearing has been modified to locate as many as possible of the trees outside of the proposed clearing area avoiding the need to remove the least number of significant trees as possible.

3.6.2 Roosting Habitat

According to the Commonwealth guidelines (DAWE 2022), Black Cockatoo night roosting habitat is generally in or near riparian areas and includes tall trees, with generally the tallest used for roosting.

The survey area is not near any known roosting areas (DBCA 2018c, 2018d, 2019c).

No riparian habitat occurs within the survey area, nor nearby, although farm dams that are a potential water source occur frequently. Although there are tall trees within the survey area, they are unlikely to be used for roosting due to the low amount of suitable water, lack of preferred foraging and there being more suitable roosting habitat in other areas, including Shire's Bullaring town reserve (in the south of the 2023 survey area) and Corrigin water reserve (approximately 2 km to the west of Corrigin townsite and outside of the survey area).

3.6.3 Foraging Habitat

The suitability of the survey area for breeding (additional to the specific tree survey) and as foraging habitat was assessed and mapped as per the Commonwealth scoring tool (DAWE 2022) and Bamford (2020) foraging habitat methodology.

Three fauna habitat types were identified within the proposed clearing area and relevant aspects of these for Carnaby's Cockatoo foraging are:

- Tall Shrubland: Mallee over *Melaleuca* shrubs or Sheoak over shrubs including some Proteaceous species (*Banksia*, *Grevillea*; <10% cover)
- Woodland: Eucalypt trees (small-fruited species) over low shrubs or grasses.

The total extent of suitable foraging habitat within the survey area is 0.69 ha, with the habitat quality scores tabulated using the Commonwealth (DAWE 2022) guidelines example. Foraging habitat quality for the Black Cockatoo species likely to occur was assessed and scored as detailed in **Table 9** (over the page). Final scores of 5-10 indicate 'high quality native foraging habitat' and 0-4 indicate 'lower quality native foraging habitat'.

According to the DAWE (2022) calculator, none of the Tall Shrubland habitat is considered as foraging habitat as this habitat type is not a native shrubland dominated by proteaceous species or a woodland containing foraging species and therefore do not qualify for a starting score.

TABLE 9: Foraging Habitat Scoring Tool (DAWE 2022) – Woodland Habitat

Habitat Summary for Carnaby's Cockatoo Foraging Habitat		Score
Starting Score:		
	10 if the site is **>1 ha in extent**, is **within the usual range** of the species, and is: • native shrubland, kwongan heathland or woodland dominated by proteaceous species • **native woodland** or forest **containing foraging species**, including roadsides, parkland cleared areas and planted native vegetation.	+10 (Bullaring townsite and road reserves contiguous with bushland)
Context adjustor (subtractions):		
	No evidence of foraging	-2
	More than 12 km from breeding habitat	-2
	More than 20 km from known night roosting habitat	-1
	FINAL SCORE	**5**

Source: Ecoscape (Australia) Pty Ltd 2024

According to the DAWE (2022) calculator, the Woodland habitat scores 5 out of a possible 10, which indicates the lower end of the 'high quality native foraging habitat'. However, the Eucalypts present are small-fruited species that are not favoured for foraging and there are virtually no preferred Proteaceous foraging species within the habitat type. Therefore, this score is considered optimistic and the habitat type is more likely to represent 'lower quality foraging habitat'.

The Bamford Consulting Ecologists (2021) foraging value tool[9] has been applied to each of the habitat types within the proposed clearing area. Refer to **Tables 10 and 11** (over the page).

TABLE 10: Carnaby's Cockatoo Foraging Value– Tall Shrubland Habitat

Score	Carnaby's Cockatoo	Score
Site condition	Mallee of small-fruited (or not preferred species); proteaceous species (where present) <10% cover	2
Site context	No local breeding	0
Species density/stocking rate	Species not regularly reported and no foraging evidence	0
	TOTAL SCORE	**2**

Source: Ecoscape (Australia) Pty Ltd 2024

The Tall Shrubland Habitat scores 2 of a possible total of 10 (**Table 10**). This represents potentially low value foraging habitat. This score may be slightly pessimistic as the mallees include larger-fruited species which is not taken into consideration in the available descriptions, however, none of the descriptors of any of the other starting scores are applicable. As a consequence, it is possible that '3' is the appropriate starting score, however, this is still regarded as representing low quality foraging habitat.

[9] Refer to **Appendix 1 –** Table 28 in Appendix Two for details of foraging value tool calculation.

TABLE 11: Carnaby's Cockatoo Foraging Value – Woodland Habitat

Score	Carnaby's Cockatoo	Score
Site condition	Woodland of small-fruited species	2
Site context	No local breeding	0
Species density/stocking rate	Species not regularly reported and no foraging evidence	0
	TOTAL SCORE	**2**

Source: Ecoscape (Australia) Pty Ltd 2024

The Woodland habitat scores 2 of a possible total of 10 (**Table 11**). This represents potentially low value foraging habitat.

Based on the results of the two scoring tools, the proposed clearing area is considered to represent low quality foraging habitat for Carnaby's Cockatoo.

4. CLEARING OF NATIVE VEGETATION

Excluding activities that are exempt under the Clearing Regulations (Section 5 – Prescribed Clearing) (DWER 2021) all native vegetation clearing conducted by the Shire (or its contractors) will be undertaken in accordance with conditions attached to a Native Vegetation Clearing Permit.

4.1 Measures to Avoid and Minimise Clearing

4.1.1 Impact Avoidance through Alternative Project Options

Through the process of reviewing alternative project design options, the Shire has taken into consideration the results of the November 2023 environmental surveys and the mitigation hierarchy to reduce the project's potential environmental impacts. As a result, the decision was made to restrict the road widening to the proposed clearing area.

Avoid

In order to avoid areas of higher quality vegetation, the Shire requested Ecoscape conduct the environmental surveys on the road reserves on both sides of the Wickepin-Corrigin Road from its intersection with Ling Road southward to Bullaring townsite. Through the findings of the environmental surveys, the Shire has minimised impacts to environmental values as far as is reasonably practicable by focussing on the northern end of the road alignment where the environmental surveys indicated that the native vegetation is in a predominantly Degraded to Completely Degraded condition.

The proposal to conduct native vegetation clearing in order to undertake road widening for **1.4 km** southwards from the Wickepin-Corrigin Road/Ling Road intersection has enabled the area of vegetation and number of significant trees required to be cleared to be reduced to nil, with the existing lateral clearance zone to be maintained via the removal regrowth shrubs, sucklings and grasses.

This decision has resulted in avoiding impacts to key environmental values within the proposed clearing area:

- Reduction of potential clearing of a terrestrial native vegetation complex <30% extent remaining in the bioregion to **0.69 ha**.
- Reduction of potential clearing of Wheatbelt Woodlands TEC/PEC to **0.04 ha**.

Minimise

The proposed vegetation clearing area comprises **0.69 ha** and is inclusive of all road reserve areas that may be impacted by the proposed road widening works.

Manage

The Shire is amenable to undertaking replanting in areas where the native vegetation will not impact the continuance of existing infrastructure.

4.1.2 Impact Avoidance Through Environmental Management

A range of mitigation strategies are proposed to further minimise indirect impacts to native vegetation and fauna. These will be described in detail in a Construction Environmental Management Plan (CEMP), which will be prepared prior to the commencement of proposed native vegetation clearing and implemented accordingly.

4.2 Impact Mitigation through Rehabilitation

To mitigate the clearing **0.69 ha** remnant native vegetation within a landscape that has been extensively cleared, 0.04 ha of Wheatbelt Woodlands TEC/PEC, the Shire proposes a potential revegetation area outside of the proposed clearing area and will prepare and implement a Rehabilitation Management Plan (RMP).

The RMP will be prepared in consultation with the DWER and implemented by the Shire upon approval by the DWER.

4.3 Offset Site

Under the WA Environmental Offsets Policy 2011, environmental offsets are actions that provide environmental benefits to counterbalance the significant residual environmental impacts or risks of a project or activity (Government of Western Australia 2014). Environmental offsets will be used as a 'last resort' after avoidance and mitigation measures have been given due consideration.

The EPA's WA Environmental Offsets Calculator[10] has been utilised **(Appendix 3)** to determine the quantum of impact based on the proposed clearing of **0.69 ha** of native vegetation having a quality (scale) score of **4** with a conservation significance score of:

- **1.2%** for Wheatbelt Woodlands TEC/PEC
- **0.1%** for terrestrial native vegetation complex <30% extent remaining in the bioregion.

In light of the quality and conservation significance scores inherent in the proposed clearing area, the offset area will need to cover a quantum of impact of **2.10 ha**.

The Shire proposes that on-ground management comprising re-vegetation and rehabilitation of a **2.10 ha** area Shire Reserve 24520 (Bullaring Town Reserve) be undertaken to improve environmental values within a degraded portion of the Reserve. Previously used as a golf course, the Reserve is located approximately 8 km from the proposed clearing area and has been partially rehabilitated with tree plantings. Details of Reserve 24520 are included as **Appendix 4**.

The revegetation and rehabilitation conducted within the offset site will be guided by a Mitigation and Rehabilitation Plan as discussed in **Section 4.2**.

[10] **Government of Western Australia 2014**, *WA Environmental Offsets Guidelines*. Prepared by the Environmental Protection Authority, August 2014. Available from : https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/WA%20Environmental%20Offsets%20Guideline%20August%202014.pdf

5. APPLICATION OF THE TEN CLEARING PRINCIPLES

The proposal to clear **0.69 ha** of native vegetation against the Ten Clearing Principles outlined in Schedule 5 of the EP Act is provided in **Sections 5.1 – 5.10**. A summary of the assessment outcomes is shown in **Table 12**.

TABLE 12: Summary of Assessment Against the Ten Clearing Principles

Clearing principle	Not at variance	Likely to be at variance	Is at variance
Principle (a) Native vegetation should not be cleared if it comprises a high level of biological diversity (refer to **Section 5.1**).	X		
Principle (b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia (refer to **Section 5.2**).	X		
Principle (c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora (refer to **Section 5.3**).	X		
Principle (d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community (refer to **Section 5.4**).			X
Principle (e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared (refer to **Section 5.5**).			X
Principle (f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland (refer to **Section 5.6**).	X		
Principle (g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation (refer to **Section 5.7**).	X		
Principle (h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area (refer to **Section 5.8**).	X		
Principle (i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water (refer to **Section 5.9**).	X		
Principle (j) 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 (refer to **Section 5.10**).	X		

5.1 Comprises a High Level of Biological Diversity

Principle (a): Native vegetation should not be cleared if it comprises a high level of biological diversity.

As identified in **Section 3.4.1**, native vegetation present within the proposed clearing area was limited to an area of **0.69 ha** containing three vegetation units and three mosaics of differing vegetative structure and floristic composition. Vegetation condition within the proposed clearing area ranged from Completely Degraded (0.02 ha), Degraded (0.50 ha) Good (0.17 ha).

The presence of 221 vascular flora species (including 38 introduced species) detected from within the 11.71 ha vegetated portion of the 21.63 ha survey area identified that less than one fifth of the total flora inventory (38 species; 17.2%) were introduced species. This underrepresents the 'weediness' of the survey area and reflects the overall diversity of the native flora located particularly in the Bullaring town reserve at the southern end of the survey area.

Within the proposed clearing area, no flora species listed as Threatened under the BC Act or under the EPBC Act were recorded, and no Priority flora listed under the BC Act were recorded.

The survey area is not within the vicinity of a recognised Biodiversity Hotspot (as determined by the Threatened Species Scientific Committee; DWER 2014).

As identified in **Section 3.5.1** two fauna habitats (Woodland and Tall Shrubland) comprising 0.69 ha were identified from within the proposed clearing area. Twelve fauna species were identified within the survey area; none were Threatened under the BC Act or under the EPBC Act were recorded, and no Priority fauna listed under the BC Act were recorded.

Given the condition, weed presence and moderately low diversity of flora and fauna species, clearing is considered unlikely to reduce the biological diversity of the proposed clearing area.

The proposed clearing of 0.69 ha of native vegetation is <u>not</u> considered to be at variance with this principle.

5.2 Potential Impact to any Significant Habitat for Fauna Indigenous to Western Australia

Principle (b): Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Three different fauna habitats were identified within the survey area, two of which (Tall Shrubland and Woodland) occur within the proposed clearing area.

During the survey 11 fauna taxa were recorded; 10 birds and one mammal. No fauna species of conservation significance (Threatened or Priority), or evidence of these species such as tracks, scats, nest, diggings, burrows, or direct sightings were recorded within the survey area.

Habitat constraints (e.g. lack of continuous canopy cover and no contiguous large extents of vegetation) limited the occupancy of the survey area by larger mammal species. The Tall Shrubland habitat does provide shelter, food and nesting sites for small and medium-sized birds, while the Woodland habitat is suited to larger and medium-sized birds as it provides perches and nesting sites.

As identified in **Section 3.6**, Black Cockatoo habitat trees were assessed according to the criteria outlined in Commonwealth guidelines (DAWE 2022). No evidence of Carnaby's Cockatoo breeding, foraging or roosting was observed within the survey area. Within the proposed clearing area, a total of **18 Class 4 and 5** habitat trees were identified, none of which bore hollows suitable for use by Carnaby's Cockatoo. Subsequent to the 2023 biological survey, the engineering design and proposed vegetation clearing method has been modified by the Shire to retain as many of the Class 4 and 5 Carnaby's Cockatoo trees as possible.

No riparian habitat occurs within the proposed clearing area, nor nearby, although farm dams that are a potential water source occur frequently. Although there are tall trees within the proposed clearing area, they are unlikely to be used for roosting due to the low amount of suitable water, lack of preferred foraging and there being more suitable roosting habitat in other areas, including Bullaring town reserve

(at the southern end of the survey area) and Corrigin Water Reserve (located 2 km west of the Corrigin townsite).

According to the DAWE (2022) calculator, the Tall Shrubland habitat is not considered foraging habitat for Carnaby's Cockatoo as these habitat types are not a native shrubland dominated by proteaceous species or a woodland containing foraging species. Results from application of the 'Foraging Habitat Tool' (Bamford Consulting Ecologists 2020) indicate that foraging habitat for Carnaby's Cockatoo, within the Woodland habitat scored 5 out of 10 which indicates the lower end of the 'high quality native foraging habitat'. Within the proposed clearing area, the Woodland habitat comprised approximately **0.46 ha**. However, the Eucalypt species present are small-fruited species not favoured for foraging and there are virtually no preferred Proteaceous species present. The habitat type is therefore considered more likely to represent 'lower quality foraging habitat'.

The proposed clearing of 0.69 ha of native vegetation is <u>not</u> considered to be at variance with this Principle.

5.3 Potential Impact to any Rare Flora

Principle (c): Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

As identified in **Section 3.1**, the combined database searches of the survey area and a 30 km buffer identified 73 species consisting of 26 TF (10 from records known to occur within the DBCA database search buffer and a further 16 from the PMST where associated habitat could occur), four P1, seven P2, 26 P3 and 10 P4.

No Threatened Flora (TF) pursuant to the BC Act or the EPBC Act were recorded during the survey.

One *Phebalium drummondii* (P3), three *Synaphea drummondii* (P3) and five *Calothamnus brevifolius* (P4) were detected within the survey area. Priority is not a listing category under the BC Act.

No Priority species were recorded within the proposed clearing area.

The proposed clearing of 0.69 ha of native vegetation is <u>not</u> considered to be at variance with this principle.

5.4 Presence of any Threatened Ecological Community

Principle (d): Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

As discussed in **Section 3.4.3**, database searches using a 20-30 km buffer, identified that the Wheatbelt Woodlands TEC/PEC has been indicatively mapped as occurring within the survey area. Vegetation potentially representative of the Wheatbelt Woodlands TEC/PEC was assessed against the criteria outlined in the Approved Conservation Advice for the community (TSSC 2015).

Six occurrences were considered to occur within the survey area occupying approximately **0.34 ha** (1.59% of the survey area). Two of the occurrences are located within the proposed clearing area comprising **0.03 ha** (northern occurrence) and **0.01 ha** (southern occurrence). The vegetation condition for both occurrences were assessed as Good.

The proposed clearing of 0.69 ha of native vegetation is considered to be at variance with this principle.

5.5 Significance of Remnant Vegetation

Principle (e): Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

As identified in **Section 2.6.2**, two pre-European native vegetation associations intersect the proposed clearing area: were determined pre-survey to be occurring within the area: 955: *Mosaic: Shrublands;*

scrub-heath (South East Avon) / Shrublands; Allocasuarina campestris thicket, and 1023: *Medium woodland; York gum, wandoo and salmon gum (Eucalyptus salmonophloia)* (Beard *et al.* 2013).

Vegetation Association 955 is currently mapped as having 9.76% remaining within the Shire and 10.70% remaining within the Avon Wheatbelt IBRA bioregion (GoWA 2019). This is below the 30% threshold for qualification as being extensively cleared. Therefore, the remnant native vegetation is significant, and its clearing will result in further fragmentation of native vegetation within an already extensively cleared district.

Vegetation Association 1023 is currently mapped as having 10.84% remaining within the Avon Wheatbelt IBRA bioregion, and 7.59% remaining within the Shire (GoWA 2019). This is also below the 30% threshold for qualification as being extensively cleared.

The proposed clearing of 0.69 ha of native vegetation is considered to be <u>at</u> variance with this Principle.

5.6 Potential Impact on Watercourses and/or Wetlands

Principle (f): Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

As discussed in **Section 2.3**, no significant watercourses or wetlands intersect or are within the vicinity of the proposed clearing area.

The proposed clearing of 0.69 ha of native vegetation is <u>not</u> considered to be at variance with this Principle.

5.7 Potential to Cause Appreciable Land Degradation

Principle (g): Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

As identified in **Section 2.2**, the proposed clearing area is located within the Kweda 3 undifferentiated phase (259Ke_3u) land system. The land degradation risk categories applying to this land system include:

- Wind erosion: 10% of the map unit has a high to extreme wind erosion risk.
- Water erosion: 0% of map unit has a very high to extreme water erosion risk.
- Flooding: 0% of the map unit has a moderate to high flooding risk.
- Waterlogging: 0% of map unit has a moderate to very high waterlogging risk.
- Salinity risk: <3% of map unit has a moderate to extreme salinity risk.

Given that these land degradation risks have been assessed over the whole of the Kweda 3 land system, the small area proposed to be cleared is unlikely to cause appreciable land degradation.

Potential impacts to prevent soil movement and appreciable land degradation will be minimised and managed during construction in accordance with an approved Construction Environmental Management Plan as discussed in **Section 4.1.2**.

The proposed clearing of 0.69 ha of native vegetation is <u>not</u> considered to be at variance with this Principle.

5.8 Potential Impact on Adjacent or Nearby Conservation Areas

Principle (h): Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

The proposed clearing area does not intersect any mapped conservation areas. As identified in **Section 2.4**, the nearest conservation area is located 10.7 km to the south-west of the survey area, corresponding with the lake system associated with Nonalling Nature Reserve.

The proposed clearing of 0.69 ha of native vegetation is <u>not</u> considered to be at variance with this Principle.

5.9 Potential Deterioration in the Quality of Surface or Underground Water

Principle (i): Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

As identified in **Section 2.3**, the proposed clearing area contains no significant surface water features with the closest surface water features being man-made dams. The vegetation units present within the proposed clearing area contain deep-rooted perennial vegetation, primarily in the form of eucalypt trees, and scattered mature shrubs such as *Acacia* and *Hakea* species. Removal of deep-rooted vegetation may cause a rise in the underground water table, potentially resulting in secondary salinisation over the long-term.

Clearing of the shallow-rooted vegetation dominated by invasive species in the 'Completely Degraded' areas of the vegetation remnants would be unlikely to cause extreme deterioration in underground water quality, however, the removal may result in changes in surface run-off regime and erosion unless preventative procedures are put in place. Potential indirect impacts will be mitigated through implementing an approved CEMP during construction.

The proposed clearing of 0.69 ha of native vegetation is <u>not</u> considered to be at variance with this Principle.

5.10 Potential for Clearing to Cause or Exacerbate the Incidence of Flooding

Principle (j): Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

The scale of the project was not considered significant enough to warrant conducting flood modelling of the local catchment. In addition, the proposed clearing area is not sited within any special control areas relating to flooding and is not located within a known floodplain.

As noted in **Table 2** (**Section 2.2**), 0% of the mapped land system in which the proposed clearing area is located is considered to be susceptible to flooding during heavy rainfall events.

The proposed clearing of 0.69 ha of native vegetation is <u>not</u> considered to be at variance with this Principle.

6. SUMMARY AND CONCLUSION

Clearing **0.69 ha** of native vegetation located within road reserves managed by the Shire is required to enable the widening of **1.4 km** of the Wickepin-Corrigin Road south of its intersection with Ling Road.

In November 2023, a Detailed flora and vegetation survey and Basic fauna and targeted searches for Carnaby's and their habitat was undertaken of the road reserves (6 m) on either side of the Wickepin-Corrigin Road from its intersection with Ling Road in the north, to the Bullaring townsite. The survey area was approximately **21.63 ha** in extent of which **11.71 ha** comprised native vegetation.

6.1 Flora and Vegetation Summary of the 2023 Survey Area

Desk-top Assessment:

- Two pre-European vegetation associations intersect the survey area:
  - Association 955: *Mosaic: Shrublands; scrub-heath (South East Avon) / Shrublands; Allocasuarina campestris thicket*, intersecting 11.49% of the survey area that has between 9.76% of its original extent remaining at local government area scale and 13.51% remaining at IBRA subregion scale; and
  - Association 1023: *Medium woodland; York gum, wandoo and salmon gum (Eucalyptus salmonophloia)*, intersecting 88.51% of the survey area that has between 7.59% of its original extent remaining at local government area scale and 12.32% remaining at IBRA subregion scale
- The survey area intersects 17 indicatively mapped representatives of the *Eucalypt Woodlands of the Western Australian Wheatbelt* Threatened Ecological Community ('Wheatbelt Woodlands TEC').
- No Threatened or Priority-listed Flora (TF, PF) have been recorded from within the survey area. The DBCA database search indicates 10 TF and 47 PF have been recorded from within 30 km of the survey area (inclusive of another Shire of Corrigin survey area located approximately 8 km to the east)

Field Survey:

- 221 vascular flora species were observed within the survey area, 38 (17.2%) of them introduced.
- Three Priority-listed flora: *Phebalium drummondii* (P3), *Synaphea drummondii* (P3) and *Calothamnus brevifolius* (P4) were observed within the survey area; none of which occur within the proposed clearing area. The post-survey likelihood assessment determined that no other conservation-listed flora were likely to occur.
- Seven vegetation types and three mosaics of these were recorded, including representatives of the Wheatbelt Woodlands TEC were identified within the survey area; three vegetation types and three mosaics were recorded in the proposed clearing area.
- Five road reserve occurrences within vegetation type **EsElEkMW** (*Eucalyptus salmonophloia*, *Eucalyptus longicornis* and *Eucalyptus kondininensis* mid woodland) and one indicative occurrence in vegetation type **EcMW**) *Eucalyptus capillosa* mid woodland) within the Bullaring Reserve, noting that this is considered indicative as adjacent similar vegetation was not viewed in detail to determine if it was all suitable to be included (patch included under the precautionary principle).
- Vegetation condition ranged from Completely Degraded to Very Good with the majority in Completely Degraded condition and only 16.03% of the vegetated portion of the survey area in Good or Very Good condition. The vegetation condition within the proposed clearing area ranged from Completely Degraded (0.2 ha), Degraded (0.50 ha) and Good (0.17 ha).

6.2 Fauna Summary of the 2023 Survey Area

Desktop Assessment:

- No Threatened or Priority-listed Fauna have been recorded from within the survey area. The DBCA database search identified 15 mammals (11 Threatened and four Priority-listed) and 15 birds (four Threatened species and the remainder Priority-listed or otherwise conservation-listed or significant) have been recorded from within 60 km of the survey area (inclusive of the nearby survey area as above).
- The survey area is within the mapped distribution of Carnaby's Cockatoo.
- There is a known Carnaby's Cockatoo breeding site located approximately 22 km to the south-west of the survey area and the survey area is approximately 10 km north-west of the buffer edges of a known Carnaby's Cockatoo breeding area.

Field Survey:

- Two fauna habitat types occur within the proposed clearing area: Tall Shrubland (**0.24 ha**) and Woodland (**0.46 ha**). Both habitat types occur commonly in the local area and more regionally and, for the majority of the proposed clearing area, are not considered to represent high quality habitat due to the area largely consisting of road reserve and interspersed with degraded areas.
- 11 vertebrate fauna species were recorded, none of them conservation-listed. The post-survey likelihood assessment determined that no conservation-listed fauna species were likely to occur although Peregrine Falcon (DBCA – OS) and Malleefowl (EPBC and BC Act – VU) may occur on occasion but would not be dependent on any resources present.
- 269 trees of suitable species and size occurred in the survey area. Nine were potentially suitable for Carnaby's Cockatoo nesting as they had hollows that may be suitable, however, were not investigated in detail to determine if they were hollow or had a chamber of sufficient size for breeding. There were no chew marks to indicate they were or had been used for breeding.
- The proposed clearing area was assessed as being 'poor quality foraging habitat' for Carnaby's Cockatoo and, due to distance from known breeding habitat and lack of food sources, is unlikely to be used for breeding or for foraging. They may occur in the proposed clearing area but only during landscape traverses (overflying).
- No Threatened or Priority-listed Fauna were recorded from within the proposed clearing area.

6.3 Field Survey Findings in Relation to the Proposed Clearing Area

- No Threatened or Priority-listed Flora were recorded.
- Three vegetation types and three mosaics were recorded.
- Vegetation condition ranged from Completely Degraded (0.2 ha), Degraded (0.50 ha) and Good (0.17 ha).
- 0.04 ha of the Wheatbelt Woodlands TEC/PEC was mapped and comprised of two areas: 0.03 ha and 0.01 ha. The vegetation was in Good condition but surrounded by vegetation in Degraded – Completely Degraded condition.
- Two fauna habitat types: Tall Shrubland (0.24 ha) and Woodland (0.46 ha) occur.
- No conservation-listed fauna were recorded.
- Carnaby's Cockatoo foraging habitat was assessed as being poor quality due to distance from known breeding habitat and lack of food sources.
- Within the proposed clearing area **18 Class 4 and 5 trees** of suitable species and size occur. Class 4 and 5 trees do not provide breeding hollows suitable for Carnaby's Cockatoo.

6.4 Conclusions

Potential impacts associated with the proposed vegetation clearing of up to **0.69 ha** to allow for the widening of a **1.4 km** stretch of the Wickepin-Corrigin Road south of the Ling Road intersection, have been considered with respect to the 10 Clearing Principles outlined in Schedule 5 of the EP Act.

As discussed in **Section 5**, it is concluded that the proposed clearing of up to **0.69 ha** of remnant native vegetation is likely to be at variance with Clearing Principle **(d)** Maintenance of a Threatened Ecological Community, and Clearing Principle **(e)** Significant Remnant in an Extensively Cleared Area.

The WA Environmental Offsets Calculator has been used to assess the residual impacts associated with the proposed clearing and the quantum of impact based on the proposed clearing of up to **0.69 ha** of native vegetation having a quality (scale) score of **4**, with a conservation significance score of:

- **1.2%** for Wheatbelt Woodland TEC/PEC;
- **0.1%** for terrestrial native vegetation complex <30% extent remaining in the bioregion.

In light of the quality and conservation significance scores inherent in the proposed clearing area, the offset area will need to cover a quantum of impact of **2.10 ha**.

The Shire proposes that on-ground management comprising re-vegetation and rehabilitation of a **2.10 ha** area of Shire Reserve 24520 (Bullaring Town Reserve) be undertaken to improve environmental values within a degraded portion of the Reserve (to be nominated following ecological assessment). The revegetation and rehabilitation conducted within the offset site will be guided by a Rehabilitation Management Plan (RMP) prepared in consultation with the DWER. When approved by the DWER, the RMP will be implemented by the Shire.

7. REFERENCES

Australian Government. *Environment Protection and Biodiversity Conservation Act 1999.* Available from: Federal Register of Legislation - Environment Protection and Biodiversity Conservation Act 1999

Bamford Consulting Ecologists 2020, Scoring system for the assessment of foraging value of vegetation for Black Cockatoos. Available from: https://ecologists.bamford.id.au/ecological-consulting/black-cockatoos

Bamford Consulting Ecologists 2021, *Black Cockatoo potential nest tree grading system*. Available from: https://www.epa.wa.gov.au/sites/default/files/Referral_Documentation/App%209%20BC%20Assessments.pdf

Beard, J. S. Beeston, G.R. Harvey, J.M. Hopkins, A. J. M. and Shepherd D. P. 2013, The vegetation of Western Australia at the 1:3,000,000 scale. Explanatory memoir. Second edition. *Conservation Science Western Australia* 9: 1-152.

Beecham, B. 2002, ''Avon Wheatbelt 2 (AW2 - Re-juvenated Drainage subregion)'' in *Bioregional Summary of the 2002 Biodiversity Audit for Western Australia* , eds.NL McKenzie, JE May, and S McKenna.

Bureau of Meteorology 2024, *Climate Statistics for Australian Locations – Corrigin (Station #010536)* Available from: http://www.bom.gov.au/climate/averages/tables/cw_010536.shtml

Department of Agriculture, Water and the Environment 2020, *Australia's bioregions (IBRA).* Available from: Australia's bioregions (IBRA) - DCCEEW

Department of Agriculture Water and the Environment 2021, *Weeds of National Significance*. Available from: Weeds Australia

Department of Agriculture, Water and the Environment 2022, *Referral Guideline for 3 WA Threatened Black Cockatoo species. Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Cockatoo.* Department of Agriculture, Water and the Environment, Canberra, February. Available from: Referral guideline for 3 WA threatened black cockatoo species

Department of Biodiversity Conservation and Attractions 2018a, *Carnabys Cockatoo Confirmed Breeding Areas within the Swan Coastal Plain and Jarrah Forest IBRA Regions (DBCA-054)*.

Department of Biodiversity Conservation and Attractions 2018b, *Carnabys Cockatoo Unconfirmed Breeding Areas within the Swan Coastal Plain and Jarrah Forest IBRA Regions (DBCA-055)*. Available from: https://catalogue.data.wa.gov.au/dataset/carnabys-cockatoo-unconfirmed-breeding-areas

Department of Biodiversity Conservation and Attractions 2018c, *Carnabys Cockatoo Confirmed Roost Sites (DBCA-050)*.

Department of Biodiversity Conservation and Attractions 2018d, *Carnabys Cockatoo Unconfirmed Roost Sites (DBCA-051)*. Available from: https://catalogue.data.wa.gov.au/dataset/carnabys-cockatoo-roost-unconfirmed-roost-sites

Department of Biodiversity Conservation and Attractions 2018e, *Carnabys Cockatoo Areas requiring investigation as feeding habitat in the Jarrah Forest IBRA Region (DBCA-056)*. Available from: https://catalogue.data.wa.gov.au/dataset/carnabys-cockatoo-unconfirmed-feed-areas-jf

Department of Biodiversity Conservation and Attractions 2019a, *DBCA Statewide Vegetation Statistics*. Available from: https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics.

Department of Biodiversity Conservation and Attractions 2019b, *Black Cockatoo Breeding Sites - Buffered (DBCA-063)*. Available from: https://catalogue.data.wa.gov.au/dataset/black-cockatoo-breeding-sites-buffered.

Department of Biodiversity Conservation and Attractions 2019c, *Black Cockatoo Roosting Sites - Buffered (DBCA-064)*.

Department of Climate Change Energy the Environment and Water 2024, *Protected Matters Search Tool (PMST)*. Available from: https://www.dcceew.gov.au/environment/epbc/protected-matters-search-tool

Department of Environment and Energy 2015, Approved Conservation Advice (including listing advice) for the Eucalypt Woodlands of the Western Australian Wheatbelt. Available from: Approved Conservation Advice (including listing advice) for the Eucalypt Woodlands of the Western Australian Wheatbelt

Department of Planning, Lands and Heritage 2024, Shire of Corrigin Local Planning Strategy (LSP) No. 2. Available from: Shire of Corrigin Local Planning Scheme No 2 Scheme text

Department of Primary Industries and Regional Development 2019, *Pre-European Vegetation (DPIRD-006) dataset*. Available from: Pre-European Vegetation (DPIRD-006) - Datasets - data.wa.gov.au

Department of Primary Industries and Regional Development 2020, *Soil Landscape Mapping – Systems (DPIRD-064) dataset*. Available from: Soil Landscape Mapping - Systems (DPIRD-064) - Datasets - data.wa.gov.au

Department of Primary Industries and Regional Development 2024, *Natural Resource Information*. Available from: Natural Resource Information (WA)

Department of the Environment Water Heritage and the Arts; Commonwealth of Australia 2009, *Matters of National Environmental Significance. Significant impact guidelines 1.1 - Environment Protection and Biodiversity Conservation Act 1999*. Available from: https://www.dcceew.gov.au/environment/epbc/publications/significant-impact-guidelines-11-matters-national-environmental-significance

Department of Water and Environmental Regulation 2018, *Hydrographic Catchments – Catchments (DWER-028)*. Available from: Hydrographic Catchments - Catchments (DWER-028) - Datasets - data.wa.gov.au

Department of Water and Environmental Regulation 2021, *Clearing Regulations – Environmentally Sensitive Areas (DWER-046) dataset*. Available from: Clearing Regulations - Environmentally Sensitive Areas (DWER-046) - Datasets - data.wa.gov.au

Department of Water and Environmental Regulation 2022, *Hydrography, Linear (Hierarchy) (DWER-031)*. Available from: https://catalogue.data.wa.gov.au/dataset/598ba78e-e486-4731-a8f4-235ce5661ead/resource/9908c7d1-7160-4cfa-884d-c5f631185859/download/jgisprojectscorporatesdeworkingslipdwermetadatahydrography-linear-hierarchy.met

Department of Water and Environmental Regulation 2024, Public Drinking Water Source Areas (DWER033) dataset. Available from: ArcGIS Web Application

Environmental Protection Authority 2016a, *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment*, EPA, Western Australia. Available from: https://www.epa.wa.gov.au/policies-guidance/technical-guidance-flora-and-vegetation-surveys-environmental-impact-assessment

Environmental Protection Authority 2016b, *Environmental Factor Guideline - Flora and Vegetation*. Available from: https://www.epa.wa.gov.au/policies-guidance/environmental-factor-guideline-flora-and-vegetation

Environmental Protection Authority 2016c, *Environmental Factor Guideline - Terrestrial Fauna*. Available from : https://www.epa.wa.gov.au/policies-guidance/environmental-factor-guideline-terrestrial-fauna

Environmental Protection Authority 2016d, *Environmental Factor Guideline - Terrestrial Environmental Quality*. Available from: https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Guideline-Terrestrial-Environmental-Quality-131216_2.pdf

Environmental Protection Authority 2018, *Environmental Factor Guideline – Landforms*. Available from: https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Guideline-Landforms-29062018.pdf.

Environmental Protection Authority 2020, *Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment*, EPA, Perth, Western Australia. Available from: https://www.epa.wa.gov.au/policies-guidance/technical-guidance-terrestrial-vertebrate-fauna-surveys-environmental-impact

Environmental Protection Authority 2023, *Statement of environmental principles, factors, objectives and aims of EIA*. Available from: https://www.epa.wa.gov.au/statement-environmental-principles-factors-and-objectives

Government of Western Australia, *Environmental Protection Act 1986.* Available from: https://www.legislation.wa.gov.au/legislation/statutes.nsf/main_mrtitle_304_homepage.html

Government of Western Australia 2005, *Environmental Protection (Environmentally Sensitive Areas) Notice 2005.* Available from: https://www.legislation.wa.gov.au/legislation/prod/filestore.nsf/FileURL/mrdoc_37202.pdf/$FILE/Environmental%20Protection%20(Environmentally%20Sensitive%20Areas)%20Notice%202005%20-%20%5B00-a0-02%5D.pdf?OpenElement

Government of Western Australia 2007, *Biosecurity and Agriculture Management Act 2007*. Available from: https://www.legislation.wa.gov.au/legislation/statutes.nsf/main_mrtitle_2736_homepage.html

Government of Western Australia 2014, *WA Environmental Offsets Guidelines*. Prepared by the Environmental Protection Authority, August 2014. https://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/WA%20Environmental%20Offsets%20Guideline%20August%202014.pdf

Government of Western Australia 2016, *Biodiversity Conservation Act 2016.* Available from: https://www.legislation.wa.gov.au/legislation/prod/filestore.nsf/FileURL/mrdoc_41658.pdf/$FILE/Biodiversity%20Conservation%20Act%202016%20-%20%5B00-d0-01%5D.pdf?OpenElement

Government of Western Australia 2019, 2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019. WA Department of Biodiversity, Conservation and Attractions, Perth. Available from: https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics/resource/0fc225fa-b06b-4da4-b5ed-62a146842389

Grein, S. 1994, *Native Vegetation Handbook for the Shire of Corrigin* , Department of Primary Industries and Regional Development, Western Australia, Perth. Available from: https://library.dpird.wa.gov.au/cgi/viewcontent.cgi?article=1009&context=nat_veg

Keighery, B. 1994, *Bushland Plant Survey, A Guide to Community Survey for the Community*, Wildflower Society of WA (Inc.) Nedlands, WA.

Peel, MC, Finlayson, BL & McMahon, TA 2007, 'Updated world map of the Köppen-Geiger climate classification'., *Hydrology and Earth System Sciences*, vol. 11, pp.1633–1644.

Species and Communities Program Department of Biodiversity Conservation and Attractions 2023, *Priority Ecological Communities for Western Australia Version 35 (19 June 2023)*. Available from: https://www.dbca.wa.gov.au/wildlife-and-ecosystems/threatened-ecological-communities. [25 August 2023].

Threatened Species Scientific Committee 2015, *Approved Conservation Advice (including listing advice) for the Eucalypt Woodlands of the Western Australian Wheatbelt*, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/128-conservation-advice.pdf.

Walker, J. and Hopkins, M. 1990, ''Vegetation'' in *Australian Soil and Land Survey. Field Handbook.* , eds. R McDonald, R Isbell, J Speight, J Walker, and M Hopkins, Inkata Press, Inkata Press, Melbourne.

Western Australian Herbarium 1998, *FloraBase - the Western Australian Flora. Department of Biodiversity, Conservation and Attractions*. Available from: https://florabase.dbca.wa.gov.au/search/advanced [16 October 2023]

Western Australian Herbarium 2024, *FloraBase: Search the Herbarium Specimens*. Available from: https://florabase.dbca.wa.gov.au/search/advanced [9 January 2024].