



# Clearing Permit Decision Report

## 1 Application details and outcome

### 1.1. Permit application details

<b>Permit number:</b>	CPS 10049/1
<b>Permit type:</b>	Purpose permit
<b>Applicant name:</b>	Shire of Yilgarn (the Shire)
<b>Application received:</b>	18 January 2023
<b>Application area:</b>	24.9 hectares (ha) (revised) of native vegetation within a 115.38 ha clearing footprint
<b>Purpose of clearing:</b>	Road construction and sourcing of construction materials
<b>Method of clearing:</b>	Mechanical
<b>Property:</b>	Unallocated Crown Land (PIN 642857), Mount Holland Unallocated Crown Land (PINs 642971, 642974, 9658955), Skeleton Rock Reserves 24049 (PINs 962598, 965979, 965980), Skeleton Rock Jilbadji Location 46 (PINs 962597, 965976), Skeleton Rock Unallocated Crown Land (PIN 962555), Parker Range King Ingram Road Reserve (PIN 11680381), Mount Holland / Skeleton Rock Marvel Loch – Forrestania Road Reserves (PINs 11680381, 11680384, 11680385, 11680389, 11680390, 11680391, 11680392, 11680393, 11680394, 11680396, 11712460, 11712461, 11712462, 11712463), Mount Holland, Skeleton Rock, Marvel Loch and Parker Range.
<b>Location (LGA area/s):</b>	Shire of Yilgarn
<b>Localities (suburb/s):</b>	Marvel Loch, Mount Holland, Skeleton Rock, Parker Range

### 1.2. Description of clearing activities

The Shire of Yilgarn (the Shire) is undertaking an upgrade and maintenance along approximately 116 kilometre (km) of road within the Parker Range Road Reserve and Marvel Loch Forrestania Road reserve. The road will be connecting the Great Eastern Highway at Moorine Rock to the Earl Grey Lithium Project's mine site at Mount Holland. The proposed project includes realignments and sealing of Stubbs Street and Parker Range Road south of Moorine Rock and works on the newly constructed Parker Range Road diversion around the Mt Caudan minesite and a section of the Marvel Loch to Forrestania Road from the Parker Range Road intersection to the Mt Holland mine site. The realignment, widening and sealing are required due to anticipated increase in traffic because of expanded mining operations within the area. The improved road is also expected to increase tourism in the Shire (Shire of Yilgarn, 2023a).

Clearing of native vegetation distributed across either side of the road is required. The Shire has applied for three Clearing Permits associated with the project. This proposal (CPS 10049/1) is to clear native vegetation on either side of a 50 km long road at the southern-most section of the 116 km long road works. The proposal is to clear up to 24.9 ha of native vegetation scattered across a footprint of 115.38 ha within Marvel Loch-Forrestania Road reserve, from south of the Parker Range Road junction to the proposed Mt Holland mine site (see Figure 1, Section 1.5). The proposed clearing area size was originally 30.57 ha within a 119.4 ha footprint. During assessment the application area was reduced to the current extent to minimise impacts to environmental values (Covalent Lithium, 2023d).

### 1.3. Decision on application

<b>Decision:</b>	Granted
<b>Decision date:</b>	29 November 2023
<b>Decision area:</b>	24.9 ha of native vegetation within a 115.38 ha clearing footprint, as depicted in Section 1.5, below.

### 1.4. Reasons for decision

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

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix C), relevant datasets (see Appendix H.1), the findings of a flora and vegetation survey (see Appendix F), the clearing principles set out in Schedule 5 of the EP Act (see Appendix D), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration that the road project for which the proposed clearing is required will improve community safety and local economy through mining and tourism. In particular, the Delegated Officers has considered the following:

- The proposed clearing will impact seven Priority 1 (P1), three Priority 2, eleven Priority 3, two Priority 4 flora species. Sixteen flora species of interest (SOI) will also be impacted. The proportion of individuals to be removed relevant to the total population known locally and regionally is considered to be low. Therefore, the removal of some priority flora individuals within the clearing footprint is unlikely to be significant locally or regionally. The impacts on the species conservation values are also considered insignificant. Demarcating the clearing areas to avoid inadvertent clearing of native vegetation and conservation significant flora individuals nearby will assist in reducing any potential further impacts.
- The proposed clearing will remove 1.17 ha of the Plant Assemblages of the Parker Range Priority Ecological Community (PEC) (Priority 3) and 0.3 ha of the Ironcap Hills vegetation assemblages PEC (Priority 3). The clearing constitutes 0.0028 % and 0.0006% of the total known area of the PECs respectively and is considered unlikely that the clearing would change the conservation status of the PEC. To mitigate indirect impacts of clearing on the PECs nearby, weed and land management conditions are imposed on the permit.
- The proposed clearing will not remove any areas mapped as the Eucalypt Woodlands of Western Australian Wheatbelt Region (Wheatbelt Woodlands) Threatened Ecological Community (TEC). Indirect impacts on the TEC nearby can be managed by the weed and land management conditions.
- The application area and surrounds contains suitable habitats for conservation significant fauna. The proposed clearing is not considered to remove critical habitat for any conservation significant fauna recorded within the local area. Potential impacts on individuals present at the time of clearing can be minimised by conducting clearing in slow and directional manner. .

After consideration of the available information, including advice from the Department of Biodiversity, Conservation and Attractions (DBCA), as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is unlikely to lead to appreciable land degradation nor have long-term adverse impacts on the conservational value of priority flora species or the habitat values of adjacent vegetation. Potential impacts of clearing can be minimised and managed to unlikely lead to an unacceptable risk to environmental values.

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise to reduce the impacts and extent of clearing
- take hygiene steps to minimise the risk of the introduction and spread of weeds
- staged clearing to minimise wind erosion
- demarcation of clearing area
- undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity
- commence construction of drainage and road works within 3 months of authorised clearing
- dust management within the application area to suppress dust.

1.5. Site maps

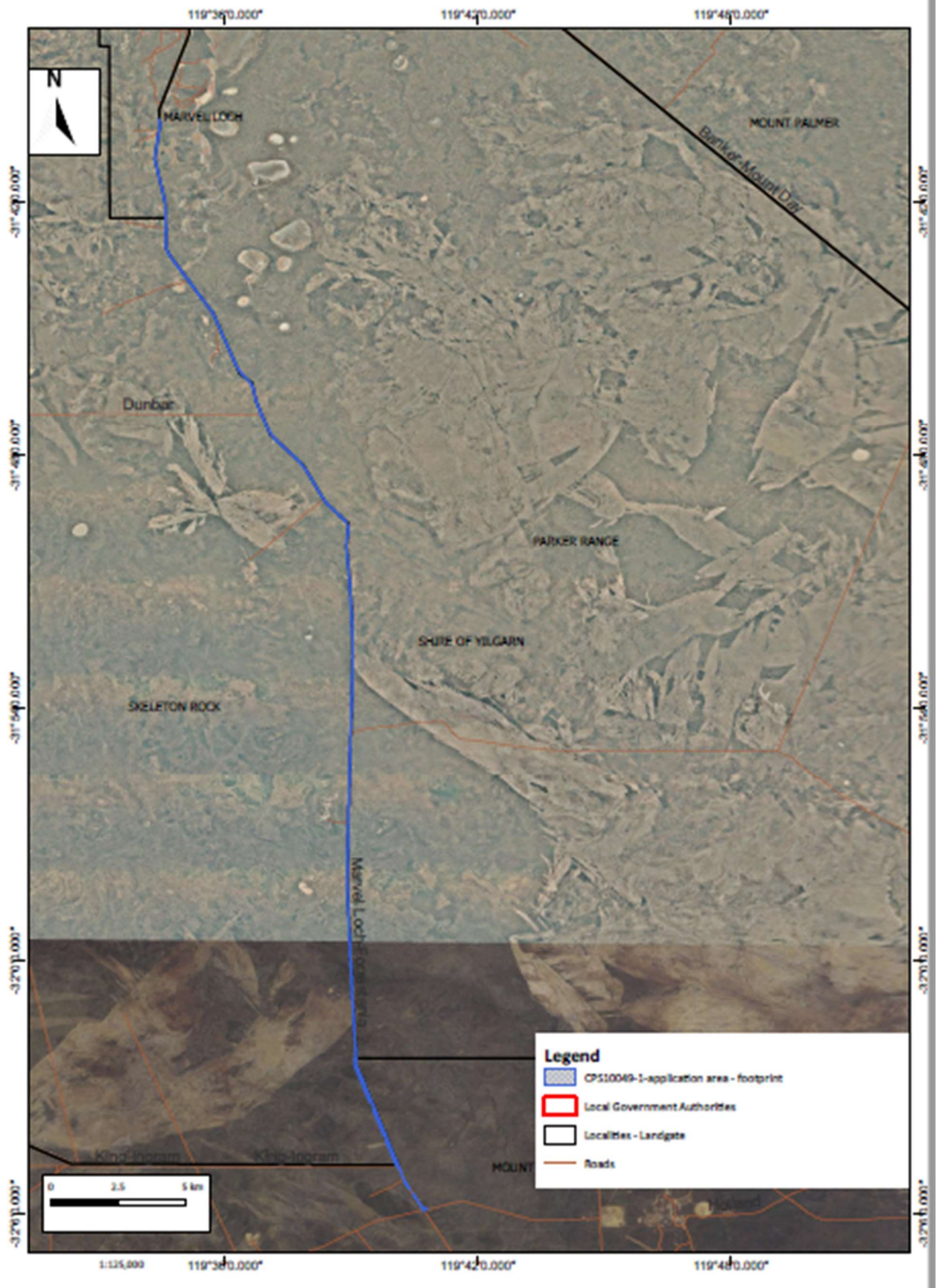


Figure 1 Map of the application area

## 2 Legislative context

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

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

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

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Rights in Water and Irrigation Act 1914* (RIWI Act)

The key guidance documents which inform this assessment are:

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

## 3 Detailed assessment of application

### 3.1. Avoidance and mitigation measures

The applicant advised that the road alignment was designed to avoid and minimise clearing and impact on environmental values. The original application was for the clearing of 30.57 ha of native vegetation within a 119.4 ha footprint and would have impacted approximately 14.98 ha of vegetation identified as the Wheatbelt Woodlands TEC, two PECs and large populations of priority flora occurring in the footprint. During assessment, upon advice from DWER, the applicant reduced the extent of the proposed clearing and clearing footprint to avoid and minimise impacts on environmental values on two occasions (Covalent Lithium, 2023b;2023d). With the current road alignment and proposed clearing area as reflected in the Permit, the applicant has avoided clearing of the Eucalypt Woodlands TEC altogether, and reduced impacts on the PECs and priority flora.

The Delegated Officer acknowledges that in addition to the search for and identification of priority and threatened flora species over the application area, the applicant has surveyed for and provided information on flora species of interests. The applicant is committed to demarcate the clearing area to avoid inadvertent clearing of native vegetation and conservation significant flora species, including flora species of interest nearby (Covalent Lithium, 2023c).

To address the potential dust disposition during clearing, the applicant has committed to apply mitigation measures including watering of the area during high dust loads and limiting vehicles speed (Covalent Lithium, 2023c).

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

### 3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix C) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values. In assessing the impacts of this clearing on environmental values, particularly priority flora, vegetation and biodiversity, DWER considered not only the impacts from this clearing application but also cumulatively in conjunction with the other clearing permit applications (CPS 10197/1 and CPS 10265/1) proposed for the project.

The assessment against the clearing principles (see **Error! Reference source not found.**) identified that the impacts of the proposed clearing present a risk to priority flora and flora species of interests, biodiversity, priority ecological community, fauna and land resources. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

### 3.2.1. Biological values – Flora, Vegetation, Priority Ecological Community and Biodiversity – Clearing Principles (c) and (a)

Flora and vegetation survey over the application area and surrounds identified that the vegetation in the area comprises of several eucalypt-dominated vegetation associations and shrublands vegetation associations (Western Botanical, 2023a, 2023b). Twelve structural groups of vegetation associations were recognised within the Study Area. These can be grouped into three super-groups: those dominated by tall eucalypts in the upper stratum (Tall eucalypt Woodlands), those dominated by mallees in the upper stratum (Mallee Shrublands); and those dominated by a wide range of other tall to low shrubs excluding eucalypts (Shrublands) (Western Botanical, 2023a, 2023b).

The majority of vegetation within CPS 10049/1 application area is in Excellent to Pristine condition (Keighery, 1994), with small, isolated and disjunct portions being subject to historical or current mining or borrow pit operations. The vegetation associations identified and corresponding predominately excellent condition is typical of the local area and region. The vegetation in the region supports a vast array of conservation significant flora species and ecological communities. Survey over the application area (footprint) identified the occurrence of eight (8) Priority1, five (5) Priority2, twelve (12) Priority 3 and two (2) Priority 4 flora species. Additionally, the survey also identified sixteen (16) flora SOI from the application area. Many of the SOIs still require further analysis to fully identify their taxonomic identities. Of the flora identified in the footprint, seven P1, three P2, eleven P3, two P4 and sixteen SOI flora species are identified within the actual area proposed to be cleared. These conservation significant flora species are also identified outside of the clearing footprint proposed for this permit and others proposed in conjunction with the proposed road works. The complete record of these flora is provided in Appendix C3. Threatened flora species were also identified during the survey, although none occur within the proposed clearing footprint and areas of actual clearing.

The application area and surrounds also support TEC and PECs, although the proposed clearing area does not contain vegetation that meets the characteristics and threshold criteria for a TEC (discussed in Section 3.2.2 below). The application area and surrounds has been identified as containing vegetation types that would provide suitable habitats for conservation significant fauna species (discussed in Section 3.2.3).

Given the above, the application area and surrounds is considered to have a high level of biodiversity. Clearing associated with this application and cumulatively in conjunction with the other two clearing permit applications for the road project may reduce the biodiversity and impact on it. The level of impacts of clearing on biodiversity will depend on the level of impact on each species, community and habitat that comprise the biodiversity, as discussed below.

The assessment of impacts of the proposed removal of the flora species is based on the significance of the removal within the local, regional and species conservation contexts. To completely assess the impact of removal of the conservation significant flora species, the Department sought advice from DBCA (2023a; 2023b). While acknowledging that several conservation significant flora species will be removed by the proposed clearing, assessment is emphasised on species that would comprise larger impacts to the population, and species that are considered less known. The extent of impact as percentage of the removed individuals to the known population for each flora species is provided in Appendix C3.

***Chorizema circinale*** (P3) is a prostrate, shrub known from 15 locations across a broad area of the Coolgardie, Esperance Plains and Mallee IBRA Bioregions (Extent of Occurrence (EOO) 45,000 km<sup>2</sup>). Quantitative estimates of the number of plants at each known population are not available but the limited information available indicates there are at least 1,000 known plants of this species in addition to the 2,353 plants recorded during surveys for the current project. The project area is within the northern extent of this species known range. The footprint of the proposed clearing contains 829 plants but none is within the areas where actual clearing will be conducted. The potential removal of the plants within the footprint account for 27.40% of the known population which is likely to result in significant local and regional impacts. However, given the broad distribution of this species it is unlikely to impact on the conservation status of this species (DBCA, 2023b). Given that no plants are identified within the areas where actual clearing will take place, demarcation of the clearing areas could further mitigate impact on this flora species.

***Gompholobium cinereum*** (P3) is a shrub known from 13 locations across a broad area of the Avon Wheatbelt, Coolgardie, Geraldton Sandplains and Yalgoo IBRA Bioregions (EOO 92,500km<sup>2</sup>). Quantitative data about the number of individuals recorded or population size of the species are not available although frequency information recorded on herbarium specimens ranges from individual plants to 10 plants at one population and "frequent" at another. Fifty-four (54) individuals are recorded within the footprint but none is recorded from the actual clearing areas. A total of 105 individuals were identified during the Western Botanical survey of the application area and vicinity, which represent a range extension to the south of this species previously known range. The application area is at the southern extent of this species known range. The individuals known within the footprint comprises 51.43% of the total known population in the area. Removal of the individuals, therefore, considered to have significant local impact but is unlikely to have a significant impact on the conservation status of this species (DBCA, 2023b). Given

the absence of individuals in the areas where actual clearing is proposed to occur, restricting clearing to the clearing area and demarcation of the area could avoid inadvertent clearing of this species and further mitigate impacts on this flora species.

***Grevillea lissopleura* (P1)** is a shrub with a restricted distribution known from six locations between Mt Palmer in the north to 60 km east of Holt Rock in the South (EOO <2,300 km<sup>2</sup>). The application area is around the centre of this species known distribution. Quantitative data on the population size of the species is not available but 1,815 plants were recorded during a survey at Mt Holland in 2019, and frequency information recorded on herbarium specimens ranges from individual or few plants to scattered and frequent. A total of 5,666 individuals have been known, of which two hundred and forty-six (246) individuals were identified during the Western Botanical survey. Seventy-four plants occur within the footprint of the proposed clearing, but none is located within the actual clearing areas. The taking of 74 individuals accounts for 0.39% of the known population. While this may not have a significant impact on the conservation status of this species, given the restricted distribution and level of exploration interest in the area, it may contribute to cumulative impacts to this species (DBCA, 2023a). Noting the absence of this species from the actual clearing area within the footprint, demarcation of the actual clearing area would avoid inadvertent clearing of individuals nearby and further mitigate impacts.

***Balaustion grandibracteatum subsp. junctura* (P2)** is a small shrub known from six locations between Parker Range south to Forrestania (EOO <4,400 km<sup>2</sup>). Quantitative data on the population size of the species is not available but approximately 200 plants were recorded during a survey at Mt Holland in 2019. A total of 75,342 individuals are known, of which 6,028 are identified during Western Botanical surveys. The clearing footprint contains 5,426 individuals (7.20% of total known population) but none is identified within the areas proposed to be cleared. The taking of individuals from the clearing footprint is unlikely to have a significant impact on the conservation status of this species. However, given the limited distribution and level of exploration interest in the area, it may contribute to cumulative impacts to this species (DBCA, 2023a). Noting that no individuals occur within the actual clearing area, further mitigation and avoidance of impact on this species can be done by demarcating the clearing area to avoid clearing of individuals nearby.

***Prostanthera nanophylla* (P3)** is a shrub known from six locations across the Kondinin, Wongan-Ballidu and Yilgarn Shire's (EOO 23,280km<sup>2</sup>). Quantitative data about the number of individuals recorded is not available for all known locations but where it is recorded numbers are generally less than 10. Western Botanical survey identified 3,174 individuals within the survey area of which 583 are located within the application area (footprint), but none is recorded from within the areas where actual clearing will take place. If all individuals within the footprint are to be cleared, it will impact 18.37% of known individuals in the area, which is likely to have a significant local and regional impact on this species as this area is within the eastern extent of this species range (DBCA, 2023a). Noting that no individuals occur within the actual clearing area, further avoidance of impact on the flora species can be achieved by demarcating the actual clearing area to avoid inadvertent clearing of individuals nearby.

***Verticordia gracilis* (P3)** is a slender shrub known from six locations across the Kondinin, Lake Grace, Merredin and Yilgarn Shire's (EOO 40,000 km<sup>2</sup>). Quantitative data on the population size of the species is not available. Western Botanical identified 33,093 individuals within the survey area of which 5,641 (16.27%) are located within the application area (footprint), and only three individuals are identified within the area proposed to be cleared. DBCA (2023a) advice suggest that it is considered that the loss of these individuals will not have an impact on the conservation status of this species.

The remainder of the priority flora species recorded within the broader clearing footprint are not proposed to be impacted by the actual clearing area. Impacts are expected to be minimal and not significant (Appendix C3).

***Cryptandra sp. ZigZag* (G. Cockerton 319)**, a flora species of interest which is considered to be a new species (DBCA, 2023a; 2023b), was identified during the survey (Western Botanical, 2023a; 2023b; 2023c). To date, a total of 783 plants have been identified from the survey area, forty (40) or 5.1% of which are within the footprint and the proposed clearing area. Removal of the 5.1% of the populations is considered unlikely to comprise a significant impact on the species and its conservation values. Noting that a survey targeting this species continue to be performed, additional individuals may be identified that the risk is likely to be further reduced.

Many of the other SOI identified by Western Botanical are considered to be well represented within the WAHERB collection but have not yet been recognised taxonomically to date (Western Botanical 2023a; 2023b; 2023c; Covalent, 2023d). Many of the SOI specimens identified to date have been observed outside of the proposed clearing area in adjacent similar vegetation types and is not likely to be significantly impacted (Appendix C3).

DBCA (2023b) notes that there are numerous specimens not fully identified during the surveys (Western Botanical, 2023a; 2023b; 2023c). Western Botanical undertook identification of the specimens using the resources of the WA

Herbarium, both the Reference and Research Collections. Western Botanical are very familiar with the local vegetation and are confident that none of these represent any known Threatened or Priority listed flora and therefore do not represent a significant concern for this clearing application (Covalent, 2023d; 2023e). DBCA (2023b) concurred with this advice and did not have any further concerns.

No Threatened flora species will be impacted by the proposed clearing, but a threatened species (*Banksia dolichostyla*) is recorded near to the application area. The threatened species have been identified and recorded in the area in abundance. To avoid impact on the species, demarcation of the actual clearing area is required.

#### **Plant Assemblages of the Parker Range PEC**

The Plant Assemblages of the Parker Range PEC (Priority 3) is mapped over the application area. The vegetation of the Parker Range system as originally described in Beard (1979) includes all the vegetation units of the range including: *Eucalyptus sheathiana* with *E. transcontinentalis* and/or *E. eremophila* woodland on sandy soils at the base of ridges and low rises; *E. longicornis* with *E. corrugata* and *E. salubris* or *E. myridena* woodland on broad flats; *E. salmonophloia* and *E. salubris* woodland on broad flats; *Allocasuarina acutivalvis* and *A. corniculata* on deeper sandy soils of lateritic ridges; *E. capillosa* subsp. *polyclada* and/or *E. loxophleba* over *Hakea pendens* thicket on skeletal soils on ridges (laterites, breakaways and massive gossanous caps); and *Callitris glaucophylla* low open woodland on massive greenstone ridges (vegetation units as described in Gibson and Lyons 1998). Survey over the application area and other proposed clearing areas has identified the occurrence of 48.90 ha of the PEC, 1.17 ha of which is within the application area and proposed to be cleared under this permit (Western Botanical, 2023a; 2023b; 2023c). According to available databases, approximately 41,725.73 hectares of the PEC occurs in the region. Removal of 1.17 ha or 0.0028 % of the total area of the PEC is considered insignificant. The clearing is unlikely to change the conservation status of the PEC (DBCA, 2023a, 2023b).

#### **Ironcap Hills vegetation assemblages PEC**

The Ironcap Hills vegetation assemblages PEC (Priority 3) is mapped in the local area. The ecological community comprises of assemblages on skeletal soils derived from banded ironstone and massive laterites on deeper soils derived from greenstone or decomposing laterites. The PEC includes species rich shrublands or mallee shrublands containing local endemics. Vegetation units includes species-rich shrublands and mallee shrubland on massive outcrops; mallee shrublands and *Allocasuarina* thickets on massive laterite; Eucalypt woodlands of *Eucalyptus urna* and *E. salubris* on colluvial flats beneath outcrops or on broad flat ridges, with understorey of *Melaleuca* spp.; species-poor mallee community dominated by *Eucalyptus calycogona* with emergent *E. salmonophloia* (or occasionally *E. longicornis*) on small colluvial flats in the ranges. According to available database, the PEC comprises an area of 48,035.77 ha. Survey over the application area has identified the occurrence of 0.3 ha of the PEC within the application area and proposed to be cleared. Removal of 0.3 ha or 0.0006% of the total PEC area is not considered significant and is unlikely to change the conservation status of the PEC (DBCA, 2023a; 2023b).

The proposed clearing may not directly impact on the PECs, however indirect impacts of clearing via the deposition of dust and dispersion of weeds into the PEC areas may reduce the conditions and habitat values of the PECs nearby. This impact can be mitigated by the implementation of appropriate weed and land management measures as discussed in Section 3.2.2 and 3.2.3.

The vegetation in the area is mapped at the association level. Three vegetation associations (VA) are mapped over the application area, which includes VA 8 whose current extent of cover is below the National Target of a minimum 30%. Being described only at the association level, the mapping of VA 8 is described broadly as vegetation that is occurring in the Wheatbelt region and comprising mostly of York gum and salmon gum etc. (*Eucalyptus loxophleba*, *E. salmonophloia*). Some of the tall eucalypt woodland type of vegetation described by the survey is likely to comprise the mapped VA 8 vegetation. It can also be inferred that the Wheatbelt Woodlands TEC mapped in the area would coincide with the VA 8 vegetation type. Given that no Wheatbelt Woodlands TEC will be affected by the clearing (discussed in Section 3.2.2), impact on the vegetation association VA 8 is unlikely to be significant. Clearing is unlikely to significantly reduce the extent of the vegetation association.

#### Conclusion:

Given the above, the proposed clearing is unlikely to significantly impact on the conservation values of conservation significant flora species and the PECs occurring within the local area. Clearing is unlikely to reduce the biodiversity of the local area or significantly impact the region. The potential impacts on the values can be mitigated by implementing management conditions to the Permit.

#### Conditions:

To address the potential impacts on the values identified above, the following conditions are imposed on the permit:

- Demarcation of clearing area to avoid inadvertent clearing of nearby native vegetation, conservation significant flora and PEC
- Implementation of weed management
- Implementation of land management including dust control

**3.2.2. Biological values –Threatened Ecological Community – Clearing Principle (d)**

As discussed in Section 3.2.1, the vegetation within and surrounding the clearing footprint contains tall eucalypt woodlands that would support the characteristic species of the Wheatbelt Woodland TEC.

The existing road alignments traverse woodlands mapped as the Wheatbelt Woodland TEC. A targeted survey by Western Botanical provided with the application (Covalent, 2023d) identified and mapped the vegetation that meets the characteristics of the Wheatbelt Woodland TEC. The survey indicates that despite being mapped as Wheatbelt Woodland TEC, not all patches of vegetation meet the key diagnostic characteristics and condition thresholds for the ecological community due to historical disturbance from previous mining activities and the road alignment. Figure 2 below depicts the vegetation identified as the Wheatbelt Woodland TEC by the survey within the context of the DBCA mapped Wheatbelt Woodland TEC.

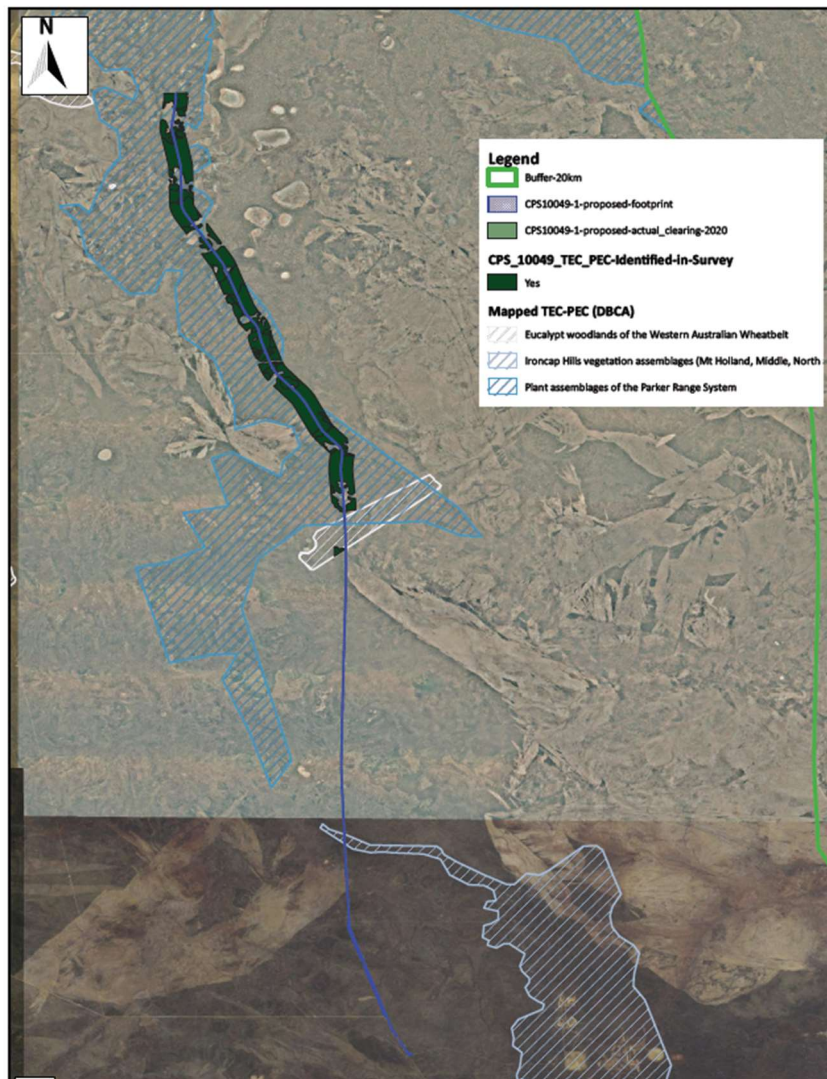


Figure 2. Vegetation identified as TEC and PEC by surveys (Western Botanical, 2023a and 2023b) within the mapped TEC and PEC



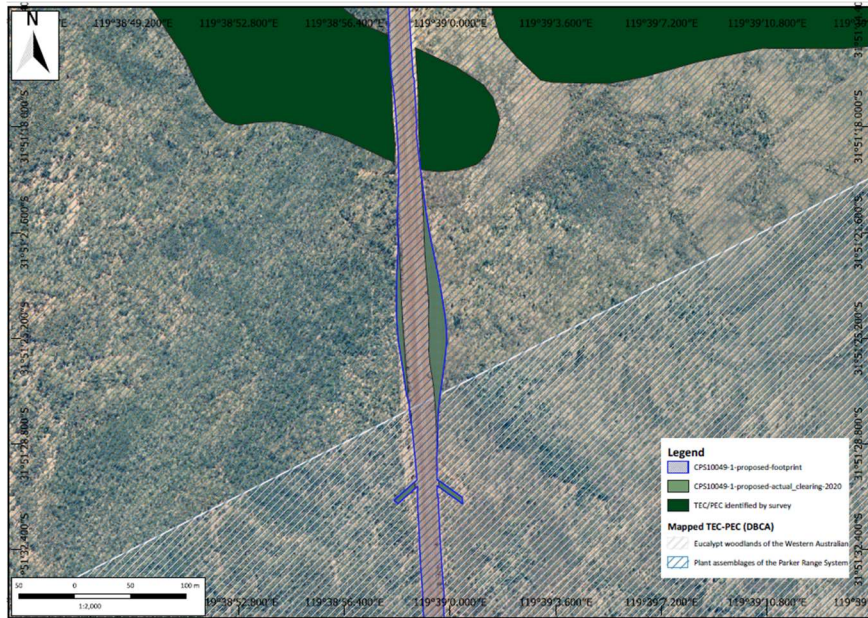


Figure 3. A section of the road alignment with proposed clearing areas outside of the identified TEC/PEC.

The original application included a large area of the Wheatbelt Woodland TEC in the proposed clearing area. During assessment, DWER advised the applicant to further reduce impacts on the vegetation, including the Wheatbelt Woodland TEC. Subsequently, the applicant has taken several avoidance, minimisation, and mitigation measures in the planning of the road alignment that the current proposed footprint does not contain any Wheatbelt Woodland TEC. Figure 3 depicts a section of the application area where proposed clearing is outside of the identified Wheatbelt Woodland TEC, despite being close to the mapped Wheatbelt Woodland TEC. As such, the proposed clearing is not going to significantly impact an occurrence of this community. However, given the proximity to the Wheatbelt Woodland TEC, clearing and the road works may have indirect impacts on the Wheatbelt Woodland TEC through the deposition of dust, and the introduction and spread of weeds which could decrease the quality and conservation values of the Wheatbelt Woodland TEC (DBCA, 2023a). To avoid and mitigate these indirect impacts on nearby Wheatbelt Woodland TEC, the applicant is committed to apply dust management, weed control and demarcation of the clearing area prior to clearing. These are required as conditions in the permit.

Conclusion:

The proposed clearing does not remove vegetation representative of the Wheatbelt Woodland TEC, however it may indirectly impact on the condition and values of the Wheatbelt Woodland TEC through the dispersion and deposition of dust and spread of weeds. Management measures are required to mitigate this potential indirect impact.

Conditions:

To mitigate the indirect impact on the Wheatbelt Woodland TEC, the following conditions are imposed on the permit:

- Dust suppression and management
- Weed management.

**3.2.3. Biological value – Fauna – Clearing Principle (b)**

Nine conservation significant fauna species have been recorded from the local area, two of which are considered historical. The most recent and frequent record is for mallee fowl. The fauna records are summarised in Appendix C4.

A basic and targeted terrestrial fauna survey along the proposed road works was conducted in March and April 2022 in support of the application (Ecoscape, 2022). The survey was to delineate fauna habitats, obtain knowledge on the likely fauna assemblage and focus on identifying the presence/absence and suitable habitat of conservation significant listed species identified during the desktop assessment. The survey identified four broad vertebrate fauna habitat types: Eucalypt Woodland, Shrubland, Regrowth and Seasonal Marsh/Wetland. Both the Eucalypt Woodland (367.77 ha) and the Shrubland (1312.62 ha) provide habitat for most species in the area and made up the largest

part of the survey area, with the Regrowth (5.76 ha) and Seasonal Marsh/Wetland (0.43 ha) being less common. These habitat types recorded during the survey are considered to be well represented outside the survey areas.

The habitat types available were identified as having the potential to support Chuditch (*Dasyurus geoffroii*), Inland Western Rosella (*Platycercus icterotis xanthogenys*), Central Long-eared Bat (*Nyctophilus major tor*), Rainbow Bee-eater (*Merops ornatus*), Western Brush Wallaby (*Notamacropus irma*) and Lake Cronin Snake (*Paroplocephalus atriceps*). Where the woodland is interspersed with Mallee, Allocasuarina and Acacia species, it may also support Malleefowl (*Leipoa ocellata*). Eucalypt woodland also provides nesting habitat for small birds where the understorey is dense. In this habitat, the reptile assemblage is likely to vary depending upon the substrate type (e.g. clay, sand etc) and the litter cover (Ecoscape, 2022).

Based on the likelihood of occurrence and the availability of habitats (Ecoscape, 2022), the assessment of potential impacts of clearing on conservation significant fauna is focused on the following fauna species.

#### Chuditch (*Dasyurus geoffroii*)

Chuditch require adequate numbers of suitable den and refuge sites (hollow logs or earth burrows) and sufficient prey biomass (large invertebrates, reptiles, and small mammals) to survive. They can travel long distances and have large home ranges (15 km<sup>2</sup> for males and 3-4 km<sup>2</sup> for females), and even at their most abundant, Chuditch are generally solitary animals for most of their life (DEC, Chuditch Recovery Plan, 2012). For this reason, they require habitats that are of a suitable size and not excessively fragmented (Ecoscape, 2022). The vegetation on either side of the road in the application area may provide suitable habitat for chuditch. Despite the availability of suitable habitat, Chuditch was not identified during the survey. The fauna species, however, had been identified in the same area in previous surveys by Ecoscape including in 2016 and 2017 (Ecoscape, 2022) that despite its current absence, it is determined to be known in the area.

While it is possible for chuditch to inhabit the tall eucalypt woodlands on either side of the road, the road alignment is unlikely to comprise significant habitat for the species. The minimal clearing of vegetation along the road is unlikely to impact on the maintenance and conservation of Chuditch.

#### Leipoa ocellata (malleefowl)

Malleefowl has been recorded in the local area in abundance. At least 240 records of malleefowl are known from within 20 km radius of the application area, most of which are concentrated in the reserve southeast of the proposed road alignment, near to the future Mt Holland minesite (Figure 4). The National Malleefowl Recovery Plan states that this fauna species is found principally in the semi-arid to arid zone in shrublands and low woodlands dominated by mallee (Frith, 1962a) and associated habitats (Malleefowl Recovery Plan, 2015) such as Broombush (*Melaleuca uncinata*) (Woinarski, 1989a; 1989b) and Scrub Pine (*Callitris verrucosa*). In Western Australia they are also found in some shrublands dominated by acacia, and occasionally in woodlands dominated by eucalypts such as Wandoo (*E. wandoo*), Marri (*Corymbia calophylla*) and Mallet (*E. astringens*) (Benshemesh, 2007). The *National Recovery Plan for Malleefowl Leipoa ocellata* notes that habitat loss has been and continues to be the major factor in the decline of malleefowl in southern Australia. Habitat fragmentation and isolation and predation are also listed as major threats to malleefowl.

The Eucalypt woodlands within the application area represent the typical habitat of the fauna species. Suitable Malleefowl habitat was found throughout the survey area, and it is highly likely that this species is widely distributed through this habitat (Ecoscape, 2022). Two malleefowl mounds were identified approximately 1 to 1.6 km west of the footprint perimeters in the most recent survey (Ecoscape, 2022). One of the mounds showed recent activity, and the other was old. The mound with recent activity was located directly adjacent to a recently cleared track. This indicates that malleefowl may use the area for breeding (indicated by the presence of mounds) and for foraging and that malleefowl can inhabit disturbed land. The high number of malleefowl records in the local area and the relatively even distribution of the records across the landscape indicate that the population is not presently restricted to certain areas. Given that suitable habitat for malleefowl is available in abundance in the area and the absence of mounds along the road reserve, the road alignment where the clearing is proposed is unlikely to comprise critical habitat for malleefowl. However, clearing may still impact on the fauna if any individuals are present at clearing. Slow and directional clearing can mitigate the potential impact on malleefowl individuals present at the time of clearing.

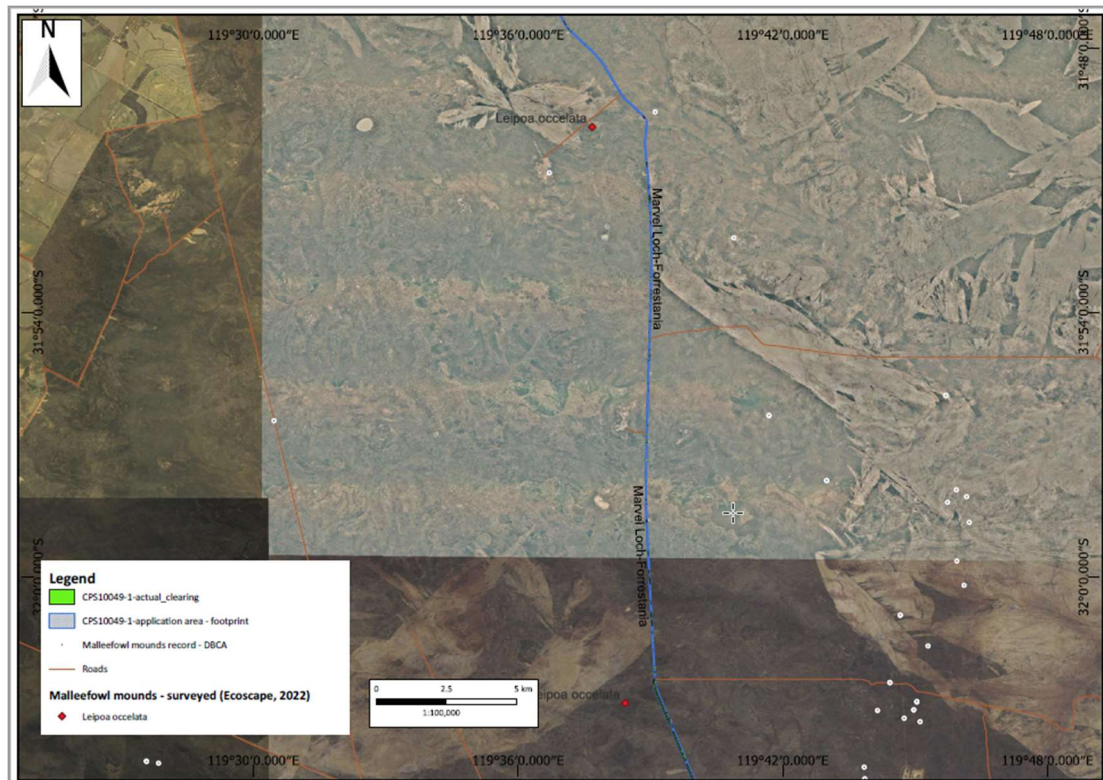


Figure 4. Record of malleefowl mounds in local area and mounds identified in survey (Ecoscope, 2022)

#### Western Brush Wallaby (*Notamacropus irma*)

Available databases shows 31 records of Western Brush Wallaby's (P4) in the local area. The optimum habitat for Western Brush Wallaby is open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets. It is also found in some areas of mallee and heathland and is uncommon in karri forest (Van Dyck & Strahan, 2008). Suitable habitat for Western Brush Wallaby is found throughout the survey area (1680.39 ha) (Ecoscope, 2022). One Western Brush Wallaby was recorded on a camera trap and multiple scats were found during the field survey. This, in addition to an estimated home range of 32.5 to 69.2 ha (Bamford, Inglis & Watson, 2009), indicates that the local area likely supports a resident population of an unknown number of individuals. The roadworks alignment, however, is unlikely to comprise critical habitat for the fauna species. Clearing of limited patches of vegetation along the road is unlikely to have significant impacts on the viability and conservation of the species. Impacts on any individual present at clearing can be avoided by conducting clearing in slow and directional manner to allow for any individual present to move to adjacent vegetation ahead of clearing.

#### Arid Bronze Azure Butterfly (ABAB) (*Ogyris subterrestris petrina*)

A targeted fauna survey was conducted to identify ABAB (Critically Endangered) and the associated sugar (*Camponotus*) ants within the application area and surrounds (Ecoscope, 2022). The sugar ant is the host species of ABAB. In order to maintain this association, the ABAB requires large colonies of the sugar ants. The preferred habitat for the ants and ABAB includes smooth-barked eucalypts, which are present in the Eucalypt woodlands surrounding the application area.

Despite being widespread, the sugar ant is uncommon and (as of 2020) only three large colonies and several small colonies are known to occur, with the ABAB occurring at two of the large colonies, which are over 50 km from the survey area. The habitat at these two large colonies is mature mixed Gimlet *Eucalypt salubris* and Salmon Gum *Eucalypt salmonophloia* woodland on red-brown loam soils, with an open understorey. The habitat where the colonies in this survey were found matches this habitat description. However, the 2022 fauna survey detected the ants at two single trees out of the 100 trees sampled along the road alignment, suggesting a low density of colonies, and that it is unlikely for ABAB to occur in the application area. Given the above, the proposed clearing of roadside vegetation is unlikely to impact on the species.

#### Central Long-eared Bat (*Nyctophilus major tor*) – P4

Central Long-eared Bat is widespread across the arid south of Australia, and although thought to have a population of substantially more than 10,000 individuals, the reliability of this estimate is low (Woinarski, Burbidge & Harrison, 2014). Although only known from 15 localities in Western Australia, it is considered locally common in the Coolgardie

Bioregion. It occurs in eucalypt woodlands with a tall shrub understorey and around granite outcrops, roosting beneath bark, in tree crevices or in the foliage of trees (DEWHA, 2010; Van Dyck & Strahan, 2008). The eucalypt woodlands surrounding the application area may comprise such habitat. The Central Long-eared Bat has been previously recorded in the Jilbadji Nature Reserve, which the proposed clearing footprint transects. The 2022 survey, however, did not identify the fauna species within the survey area despite Ecoscape's assessment that approximately 367 ha of suitable habitat for the bat occurs within the survey area. Given the vastly available suitable habitat surrounding the application area, the vegetation on the road side proposed to be cleared is unlikely to comprise critical habitat for the bats. Avoidance of clearing hollowed eucalypt trees may further mitigate any potential impact on the fauna species.

#### Western Rosella (Inland) (*Platycercus icterotis xanthogenys*)

As its name suggests, the Inland Western Rosella (*Platycercus icterotis xanthogenys*) is an inland subspecies of the nominate Western Rosella (*Platycercus icterotis icterotis*). The nominate *icterotis* is found in high rainfall areas in the south west, whereas the inland subspecies (*xanthogenys*), listed as a Priority 4 species by the DBCA, occurs in the drier wheatbelt eucalypt and sheoak woodlands and shrubland, especially those containing Wandoo (*E. wandoo*), Salmon Gum (*E. salmonophloia*), tall mallee and Rock Sheoak (*Allocasuarina huegeliana*) (Higgins, 1999). Western Rosellas nest in a hollow limb or tree trunk, usually one metre or more deep, and breed from August to December. The Eucalypt woodlands surrounding the application area may contain suitable habitat for the bird. The targeted fauna survey over the application area, however, did not identify the presence of Western Rosella at the time of the survey. The vegetation proposed to be cleared along the application area may contain suitable habitat for Inland Rosella, however, within the context of the large woodlands surrounding it, and the widespread distribution of the bird, it is unlikely to constitute critical habitat for the bird (Ecoscape, 2022). Clearing is unlikely to impact on the habitat values of surrounding vegetation and the conservation of the Inland Western Rosella.

#### **Conclusion:**

The vegetation within the application area and surrounds may contain suitable habitat for conservation significant fauna. However, the application area does not comprise significant or critical habitat for the fauna species recorded within the local area. Clearing of patches of vegetation scattered over the large linear footprint of more than 50 km is unlikely to impact on the survival, maintenance, and conservation of the fauna species. Potential impact on any fauna individuals that may be present during clearing can be mitigated by conducting clearing in slow and directional manner to allow any fauna individual present to move to adjacent vegetation ahead of clearing. This is placed as a management condition to the Permit.

#### **Condition:**

To address the potential impacts on fauna, the following condition is imposed on the permit:

- Slow clearing in the direction of adjacent vegetation to allow fauna to escape into adjacent native vegetation ahead of the clearing activity.

### **3.2.4. Land and water resources - Clearing Principles (f) and (g)**

#### **Assessment**

The sandy and loamy soils over the application area are prone to wind and water erosion when left bare. When rainfall is sufficient, bare ground can be prone to water erosion. Runoff in the area may transport sediments to nearby vegetation including the TEC and PECs which may affect the condition and habitat values of the vegetation. Indiscriminate flows of runoff may also exacerbate the spread of weeds. Although the long and narrow configuration of the road may limit the risk of land degradation due to erosion, the cumulative impacts of the entire 116 km long roadworks can be significant. Land management measures including the use of surface drainage can mitigate the potential impacts of clearing due to water erosion. The applicant is committed to construct surface drainage along the road alignment to address the risk of water erosion.

Noting the arid climate of the region and the loose sandy and loamy soils at bare ground, the application area may have a high dust load. Dust is known to accumulate on plants, particularly near to the source, and may affect the plant health and the nearby vegetation, even if temporarily. Considering the cumulative extent of clearing and road works associated with this clearing permit application and two others, the dust load can be significant that clearing can increase the risks of dust deposition and land degradation. This may be exacerbated by the longer time required to clear. Limiting the exposure time of cleared area to wind and application of appropriate land management measures during and post clearing can mitigate this impact and avoid any appreciable and long-term land

degradation. The applicant is committed to watering the cleared area to suppress dust. Sealing of the road will also reduce dust load in the long term.

### Conclusion

Given the above, the proposed clearing is considered unlikely to result in appreciable and long-term land degradation and dust deposition provided appropriate land management measures are applied.

### Conditions:

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

- Construction of road side drainage no later than three months after authorised clearing
- Commencement of road works no later than three months after authorised clearing
- Regularly suppress dust through dust management activities

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

Most of the application area lies within road reserves and unallocated crown land vested to the Shire of Yilgarn. The Shire of Yilgarn has provided authorisation for the proposed clearing on the lands.

The Shire, as the applicant, appointed Covalent Lithium as an authorised representative for the clearing permit application (Shire of Yilgarn, 2023b).

The application area is within the Westonia Groundwater Area proclaimed under the RIWI Act. The proposed clearing and road works, however, is unlikely to intercept the ground water nor require abstraction of water. Licences under the RIWI Act is not required.

The application area intersects properties that formerly registered as mining tenement since 1988. In May 2007 it was reported as suspected contaminated site under the *Contaminated Sites Act 2003*. The suspected contamination was described as a former workshop and workshop waste including hydrocarbon-impacted materials buried in a waste rock landform. No supporting information or evidence of the possible contamination was provided and insufficient information is available to confirm the location of possible contamination. The Contaminated Sites branch of DWER advised that despite the unconfirmed report of contamination, a management plan is recommended for the proposed clearance works in the event of occurrences of hydrocarbon-impacted soils of unexpected finds of buried waste (DWER-Contaminated Sites, 2023).

The DWER notified representatives of the claimant of the native title (Marlinyu Ghoorlie and Karratjibbin People Claimant Groups) of the clearing application. On 9 June 2023, the representative of Karratjibbin People Claimant Group responded to the notification by requesting that if a heritage survey was to be performed, the traditional owner of the land be appointed for the survey (Karratjibbin People Claimant Group, 2023). Representative of the applicant, however, had already commissioned Terra Rosa Consulting to perform a heritage survey over the application area in 2022, whose report was provided during assessment.

The heritage survey was undertaken between 11 and 15 October with the endorsement of the Marlinyu Ghoorlie Traditional Owners. It was undertaken by six Marlinyu Ghoorlie representatives and two heritage consultants from Terra Rosa. Two Covalent representatives were also present during this time to support the survey team. Sites of heritage value were identified by the survey. The survey provided advice and direction for the operation of the mine on heritage sites avoidance, which were mostly relevant to the mining operation itself, rather than the existing road. The traditional owners also advised Covalent that all Mallee Fowl nests identified within the survey areas are to be avoided during the course of the proposed works. Any Mallee Fowl nests identified during these works must be provided with a 20 m buffer of protection. No malleefowl mounds are within the proposed clearing area for CPS 10049/1.

It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972 (WA)* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

**End**

## Appendix A. Additional information provided by applicant

During assessment, DWER requested the applicant to provide further information on three occasions (DWER 20232, DWER 2023 b, DWER 2023 c). The information provided is summarised below:

DWER request for information and comments	Summary of comments provided by the applicant	Consideration of comment
Clarification on impacts to the Wheatbelt Woodlands TEC was required. The original application indicated that the proposed clearing would remove 14.98 ha of TEC. This impact was considered significant and would require an offset (DWER, 2023a, dated 10 July 2023).	Further avoidance and minimisation measures were exercised to minimise impact including on the TEC. The extent of TEC to be impacted by the proposed clearing was 3.89 ha. (Covalent, 2023 dated 8 August 2023).	DWER considered that impact on 3.89 ha of TEC remained significant. Further avoidance and minimisation were required. Offset was also required due to the impact on the TEC. Further information on the matter was requested as follow up.
Additional avoid, minimise and mitigation measures are required. Further surveys to determine impacts to "species of interest", TEC and PECs (DWER 2023b, dated 4 September 2023).	<p>Engineering design was further changed to reduce impacts, however further reduction was not possible. Applicant is committed to demarcate the clearing area prior to clearing to avoid impacts on nearby vegetation and threatened flora species.</p> <p>Information on species of interests and impacts on the TEC and PECs was provided. Quadrat locations, data points and shapefiles relevant to conservation significant flora were also provided.</p> <p>Additional targeted survey is underway to provide further information on identity of the species of interests.</p>	<p>DWER recognised further avoidance, minimisation and mitigation measures taken by the applicant.</p> <p>Data provided for impacts on conservation significant flora species, including that of species of interest are provided to DBCA and incorporated in the assessment. However, given the impact on the TEC, DWER required an offset be provided, unless the impact on the TEC can be avoided.</p>
An offset to counterbalance impact on the TEC is requested. Further clarification on impacts on the PEC is requested.	The applicant revised the proposed clearing area and footprint. The revision has resulted in the reduction in the clearing area and footprint. The revised clearing footprint has now avoided clearing of the TEC altogether that offset is no longer required. Impacts on the conservation significant flora has also been reduced.	<p>DWER acknowledged the revision and applicant's measures taken to reduce and avoid impacts. DWER concurred with the applicant that offset is no longer required.</p> <p>The revised application area was re-advertised for 7 days on 16 November 2023.</p>

## Appendix B. Details of public submissions

Summary of comments	Consideration of comment
The proposed route and site for construction materials must be surveyed for threatened flora and fungi. Impacts on threatened flora species must be avoided. Realignment of the road must be done to avoid impact on threatened flora species.	Surveys for threatened and priority flora were carried out (Western Botanical, 2023a; 2023b; 2023c). Targeted survey was also carried out to identify and assess impacts on threatened and priority flora species. A complete realignment of the road is not

Summary of comments	Consideration of comment
	possible as it may result in larger impacts to conservation significant species. However, the applicant had implemented further avoidance and mitigation efforts that reduced the extent of proposed clearing and footprint to minimise impacts on ecological communities and known conservation significant flora species. The application area does not contain any Threatened flora species, as discussed in Section 3.1. Demarcation of clearing area is required as a condition on the Permit to avoid inadvertent removal of vegetation including threatened and priority flora.

## Appendix C. Site characteristics

The information provided below describes the key characteristics of the area proposed to be cleared and is based on the best information available to DWER at the time of this assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix D.

### C.1. Site characteristics

Characteristic	Details
Local context	The areas proposed to be cleared are located within the Parker Range road reserve and Marvel Loch-Forrestania Road reserve within the Shire of Yilgarn, which falls within the Avon Wheatbelt and Coolgardie IBRA regions of Western Australia. The proposed clearing area is surrounded by remnant vegetation.
Ecological linkage	The areas proposed to be cleared may contribute towards fauna dispersal within the landscape, however there are no formal linkages mapped across the proposed clearing area.
Conservation areas	The application area is immediately adjacent to the Wockallary Nature Reserve. The Frog Rock Nature Reserve is located 5.7 kilometres south west of the application area.
Vegetation description	<p>The Detailed flora and vegetation survey (Western Botanical, 2023) indicates the vegetation within the proposed clearing area and surrounds consists of fifty-one eucalypt-dominated Vegetation Associations and twenty-six Shrubland Vegetation Associations. The survey descriptions are available in Appendix F.</p> <p>This is consistent with the broad Beard mapped vegetation associations (VA):</p> <ul style="list-style-type: none"> <li>• VA 1413 – Wattle, casuarina and teatree <i>Acacia-Allocasuarina-Melaleuca</i> alliance.</li> <li>• VA 8 – Wheatbelt; York gum, salmon gum etc. <i>Eucalyptus loxophleba</i>, <i>E. salmonophloia</i>.</li> <li>• VA1068 – Goldfields; gimlet, redwood etc. <i>E. salubris</i>, <i>E. oleosa</i>. Riverine; rivergum <i>E. camaldulensis</i>;</li> </ul> <p>The mapped vegetation associations retain approximately 98, 14 and 50 per cent of the original extent respectively (Government of Western Australia, 2019).</p>
Vegetation condition	<p>A flora and vegetation survey (Western Botanical, 2023) indicates the vegetation within the proposed clearing area is mostly in Excellent to Pristine condition (Keighery, 1994).</p> <p>The full Keighery (1994) condition rating scale is provided in Appendix E. Survey descriptions and mapping are available in Appendix F.</p>
Climate and landform	The local climate is characterised by the mean annual rainfall of 342 mm which falls between May and September (BoM, 2023). January is the hottest month with a mean maximum temperature of 33.8°C and minimum of 15.6°C. July is the coldest month

Characteristic	Details
	<p>with a mean maximum of 16.5°C and minimum of 4.7°C (BoM 2023). The application area has an arid-steppe climate with relatively warm summers (Class BSk).</p> <p>The landforms of the application area and surrounds are characteristic of the Merredin sub-region of the Avon Wheatbelt and the Southern Cross subregion of the western Coolgardie biogeographic regions, with broad extensive loamy plains, sandplains, low rounded lateritic gravelly hills and non-saline depression and drainage lines.</p>
Soil description	The soils in the region are sandy and loamy characteristic of the Merredin sub-region of the Avon Wheatbelt and the Southern Cross subregion of the western Coolgardie biogeographic regions.
Land degradation risk	Moderate to high risk of wind erosion, portion has a moderate to high risk of waterlogging, high risk of subsurface acidification, low risk water erosion and phosphorus export and salinity risk.
Waterbodies	The application area intersects several nonperennial minor tributaries of the Yilgarn River.
Hydrogeography	<p>The application area is located within the Avon River Basin in the Swan Avon/Yilgarn hydrographic catchment.</p> <p>The application area is located within the Westonia Groundwater Area proclaimed under the RIWI Act.</p>
Flora	Survey over the application area identified eight (8) Priority1 flora species, five (5) Priority2, twelve (12) Priority 3 and two (2) Priority 4 flora species. No Threatened flora species is impacted by the proposed clearing. Additionally, the survey also identified sixteen (16) flora species of interest from the application area. The complete record of these flora is provided in Appendix C3.
Ecological communities	<p>The proposed clearing area does not intersect any TECs. It intersects two PECs, namely:</p> <ul style="list-style-type: none"> <li>Plant assemblages of the Parker Range System PEC, and</li> <li>Ironcap Hills vegetation assemblages PEC.</li> </ul>
Fauna	Nine conservation significant fauna species are recorded from the local area (20 km radius of the application area), with the mallee fowl records being the largest number. The survey identified the vegetation around the application area as suitable habitat for conservation significant fauna species. However, it is not identified as critical habitat.

## C.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Avon Wheatbelt	9,517,109.95	1,761,187.42	18.51	174,980.68	1.84
Coolgardie	12,912,204.35	12,648,491.39	97.96	2,114,349.37	16.37
Beard vegetation association					
VA 1413 Wattle, casuarina and teatree (acacia-allocauarina-melaleuca alliance).	1,061,212.28	1,042,553.77	98.24	192,883.70	18.18
VA8	356,571.81	50,340.31	14.12	4,353.66	1.22



	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
Wheatbelt; York gum, salmon gum etc. ( <i>Eucalyptus loxophleba</i> , <i>E. salmonophloia</i> .)					
VA1068 gimlet, redwood etc. <i>E. salubris</i> , <i>E. oleosa</i> . Riverine; rivergum <i>E. camaldulensis</i>	74,875.46	37,249.16	49.75	2,607.07	3.48
Local area (calculation - delete if not required)					
20km radius	131,942.16	131,163.53	99.41	-	-

\*Government of Western Australia (2019a)

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

### C.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix H.1), and biological survey information (Western Botanical, 2023a, 2023b, 2023c, Covalent 2023e), impacts to the following conservation significant flora identified from within the application area and surround are considered. Cumulative analysis is included in the analysis table by including data associated with other proposed clearing associated with the road project.

Species name	Conservation Status	Count within application area / footprint (CPS 10049/1)	Count within actual clearing area (CPS 10049/1)	Count outside of any proposed clearing associated with the project	Count in other application areas (CPS 10265/1 & CPS 10197/1)	Count of all individuals to be removed for the project	Total count of known individuals- Regional population (region)	Impact of 10049/1 (% of total)	Cumulative impact of all clearing areas (% of total)
<i>Acacia asepala</i>	P2	98	0	25,004	82	180	25,184	0.00	0.71
<i>Apectospermum</i> aff. <i>spinescens</i> (smooth bark) (D. Lievens 164)	SOI	3	3	218	1	4	222	1.35	1.80
<i>Balaustion grandibracteatum</i> subsp. <i>junctura</i>	P2	5,426	0	69,916	0	5,426	75,342	0	7.20
<i>Banksia dolichostyla</i>	T	0	0	26,346	0	0	26,346	0	0
<i>Boronia ternata</i> var. <i>promiscua</i>	P3	345	0	48,907	5	350	49,257	0.00	0.71
<i>Brachyloma stenolobum</i>	P1	10	0	6,715	0	10	6,725	0.00	0.15
<i>Chamelaucium</i> sp. King Ingram Rd (G. Grigg 035)	SOI	107	3	91	0	107	198	1.52	54.04
<i>Chamelaucium</i> sp. Parker Range (B.H. Smith 1255)	P1	653	0	36,253	5	658	36,911	0.00	1.78
<i>Chorizema circinale</i>	P3	829	0	2,196	0	829	3,025	0.00	27.40
<i>Cooperookia</i> sp. Mt Holland (G. Cockerton 381)	SOI	2,197	2,197	2,203	0	2,197	4,400	49.93	49.93
<i>Cryptandra</i> sp. Zigzag (G. Cockerton-319)	SOI	40	40	743	0	40	783	5.11	5.11
<i>Dampiera orchardii</i>	P2	286	0	18,205	0	286	18,491	0.00	1.55
<i>Eucalyptus</i> aff. <i>salubris</i> pruinose branchlet form (G.	SOI	103	9	1,553	5	108	1,661	0.54	6.50

Species name	Conservation Status	Count within application area / footprint (CPS 10049/1)	Count within actual clearing area (CPS 10049/1)	Count outside of any proposed clearing associated with the project	Count in other application areas (CPS 10265/1 & CPS 10197/1)	Count of all individuals to be removed for the project	Total count of known individuals- Regional population (region)	Impact of 10049/1 (% of total)	Cumulative impact of all clearing areas (% of total)
Cockerton & J. Warden WB40196)									
<i>Eucalyptus exigua</i>	P3	1	0	250	12	13	263	0.00	4.94
<i>Eucalyptus</i> sp. Dunbar Road (D. Nicolle & M. French DN 5466)	P1	38	0	2,804	6	44	2,848	0.00	1.54
<i>Eutaxia lasiocalyx</i>	P2	42	0	185,116	5	47	185,163	0.00	0.03
<i>Eutaxia</i> sp. North Ironcap (P. Armstrong PA 06/898)	P1	18	0	11,519	0	18	11,537	0.00	0.16
<i>Gompholobium cinereum</i>	P3	54	0	51	0	54	105	0.00	51.43
<i>Grevillea comosa</i> ms (P.M. Olde 91/14, 7 Sep 1991)	SOI	246	143	18,141	99	345	18,486	0.77	1.87
<i>Grevillea lissopleura</i>	P1	74	0	5,592	0	74	5,666	0.00	1.31
<i>Grevillea neodissecta</i>	P4	150	0	11,262	10	160	11,422	0.00	1.40
<i>Hakea pendens</i>	P3	200	0	10,578	23	223	10,801	0.00	2.06
<i>Hibbertia</i> sp. Forrestania (H. lateritica ms, K.R. Thiele)	SOI	3	0	1,436	0	3	1,439	0.00	0.21
<i>Melaleuca</i> aff. <i>spicigera</i> (G. Cockerton-638, 765)	SOI	3	3	929	0	3	932	0.32	0.32
<i>Melaleuca ochroma</i>	P2	15	0	612	0	15	627	0.00	2.39
<i>Microcorys elatoides</i>	P1	3,071	0	241,066	0	3,071	244,137	0.00	1.26
<i>Microcorys</i> sp. Forrestania (V. English 2004)	P4	4	0	215,564	1	5	215,569	0.00	0.00
<i>Phebalium</i> aff. <i>laevogatum</i> (L. Shelton 492)	SOI	44	24	3,199	0	44	3,243	0.74	1.36
<i>Phebalium</i> aff. <i>microphyllum</i> tuberculate stems (L. Shelton 486)	SOI	323	323	389	0	323	712	45.37	45.37
<i>Phebalium</i> aff. sp. Yerilgee Sandplain	SOI	1,103	1076	19,986	0	1,103	21,089	5.10	5.23
<i>Phebalium drummondii</i>	P3	20	0	5,197	0	20	5,217	0.00	0.38
<i>Phebalium megaphyllum</i>	SOI	3	2	712	0	3	715	0.28	0.42
<i>Phebalium</i> sp. British Hill (G. Cockerton, S. Cockerton, J. Warden WB41040)	SOI	157	136	6,555	0	157	6,712	2.03	2.34
<i>Phebalium</i> sp. Parker Range Rd (broad leaved variant)	SOI	4	2	1,662	0	4	1,666	0.12	0.24
<i>Phebalium</i> sp. Parker Range Road (G. Cockerton & B. Loudon WB40838)	SOI	179	4	6,726	12	191	6,917	0.06	2.76
<i>Phebalium</i> sp. Parkers Range intermediate	SOI	3	3	1	0	3	4	75.00	75.00
<i>Phebalium</i> sp. tuberculate (G. Cockerton 394)	SOI	424	391	10,168	8	432	10,600	3.69	4.08
<i>Prostanthera nanophylla</i>	P3	583	0	2,591	0	583	3,174	0.00	18.37
<i>Rinzia medifila</i>	P1	33	0	32,564	1,430	1,463	34,027	0.00	4.30
<i>Rinzia torquata</i>	P3	12	0	6,239	0	12	6,251	0.00	0.19
<i>Seringia adenogyna</i>	P3	8	0	7,409	0	8	7,417	0.00	0.11
<i>Thryptomene</i> sp. Hyden (B.J. Lepschi & L.A. Craven 4477)	P1	13,776	0	477,194	0	13,776	490,970	0.00	2.81
<i>Verticordia gracilis</i>	P3	5,641	0	29,019	1	5,642	34,661	0.00	16.28

Species name	Conservation Status	Count within application area / footprint (CPS 10049/1)	Count within actual clearing area (CPS 10049/1)	Count outside of any proposed clearing associated with the project	Count in other application areas (CPS 10265/1 & CPS 10197/1)	Count of all individuals to be removed for the project	Total count of known individuals- Regional population (region)	Impact of 10049/1 (% of total)	Cumulative impact of all clearing areas (% of total)
<i>Verticordia mitodes</i>	P3	127	0	3,049	52	179	3,228	0.00	5.55
<i>Verticordia stenopetala</i>	P3	4,519	0	44,656	353	4,872	49,528	0.00	9.84

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority ; SOI : Species of interest

#### C.4. Fauna analysis table

Available data bases provide the record of the occurrences of the following fauna species within the local area.

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Aganippe castellum</i> (tree-stem trapdoor spider)	P4	N	Y	10.69	5	NA
<i>Dasyurus geoffroyi</i> (chuditch, western quoll)	VU	Y	Y	0.24	241	Y
<i>Falco peregrinus</i> (peregrine falcon)	OS	Y	Y	6.49	10	Y
<i>Leipoa ocellata</i> (malleefowl)	VU	Y	Y	0.44	204	Y
<i>Macrotis lagotis</i> (bilby, dalgyte, ninu)	VU	Y	Y	12.51	1	Y
<i>Notamacropus irma</i> (western brush wallaby)	P4	Y	Y	0.01	31	Y
<i>Paroplocephalus atriceps</i> (Lake Cronin snake)	P3	Y	Y	0.03	2	Y
<i>Phascogale calura</i> (red-tailed phascogale, kenngoor)	CD	Y	Y	14.76	1	Y
<i>Platycercus icterotis xanthogenys</i> (western rosella (inland))	P4	Y	Y	0.58	35	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority, NA: Not applicable

#### C.5. Ecological community analysis table

The ecological communities mapped as occurring within the local area (20 km radius of the application area) are summarised below.

Community name	Conservation status		Suitable habitat at features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	No. of known records (total)	Areas (ha)			Impact (% of total area)	
	WA	Cwth						Known records (total)	Within clearing area (CPS 10049/1)	In other application areas (CPS 10197/1 and CPS 10265)	Clearing under CPS 10049	Cumulative impact of all clearing areas
Eucalypt woodlands of the Western Australian Wheatbelt	P3	CR	Y	Y	Y	0	102	NA	0	0	0	0
Ironcap Hills vegetation assemblages (Mt Holland, Middle, North and South Ironcap Hills, Digger Rock and Hatter Hill) (greenstone ranges)	P3	NA	Y	Y	Y	0	2	48,035.77	0.3	0	0.0006	0.0006
Plant assemblages of the Parker Range System	P3	NA	Y	Y	Y	0	3	41,725.73	1.17	2.04	0.0028	0.0077

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority, NA: Not applicable

## Appendix D. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
<b>Environmental value: biological values</b>		
<p><u>Principle (a):</u> "Native vegetation should not be cleared if it comprises a high level of biodiversity."</p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared contains locally and regionally significant flora, vegetation representative of two PECs, and potential habitat for conservation significant fauna, however impacts are not likely to be significant.</p>	May be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<p><u>Principle (b):</u> "Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."</p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared may contain suitable habitat for conservation significant fauna. However, it is not considered to contain critical habitat for conservation significant fauna. No fauna species of conservation significance were identified during the biological survey over the application area.</p>	May be at variance	Yes <i>Refer to Section 3.2.3, above.</i>

Assessment against the clearing principles	Variance level	Is further consideration required?
<p><u>Principle (c):</u> <i>“Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared does not contain threatened flora species..</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (d):</u> <i>“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.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared does not contain a TEC.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<b>Environmental value: significant remnant vegetation and conservation areas</b>		
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u></p> <p>The extent of the mapped native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. However, one of the mapped vegetation associations is mapped as having a remaining extent below 20 per cent and are therefore not consistent with these national objectives.</p>	May be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (h):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.”</i></p> <p><u>Assessment:</u></p> <p>The application area is immediately adjacent to the Wockallarry Nature Reserve. <i>Weed and dust management measures will minimise indirect impacts to the adjacent reserve.</i></p>	Not likely to be at variance	No
<b>Environmental value: land and water resources</b>		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u></p> <p>The clearing footprint intersects several minor non-perennial tributaries to the Yilgarn River. The vegetation proposed to be cleared, however, is not associated with water courses or wetlands. The proposed clearing is unlikely to impact on- or off-site hydrology and water quality.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.4, above.</i>
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u></p> <p>Being comprised of sandy soils, the soils in the application area are susceptible to wind and water erosion. The proposed clearing may increase the risks unless appropriate mitigation is applied.</p>	May be at variance	Yes <i>Refer to Section 3.2.4, above.</i>
<p><u>Principle (i):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.”</i></p> <p><u>Assessment:</u></p>	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
The application area is within the Westonia Groundwater Area proclaimed under the RIWI Act. The proposed clearing and road works, however, is unlikely to intercept the ground water level, therefore it is unlikely to impact ground water quality. Surface water drainage impacts are being managed during construction of the road, therefore impacts to surface water is expected to be minimal.		
<p><u>Principle (j)</u>: "Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."</p> <p><u>Assessment</u>:</p> <p>The mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding.</p>	Not likely to be at variance	No

## Appendix E. Vegetation condition rating scale

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

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

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

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

## Appendix F. Biological survey information excerpts (Western Botanical, 2023a, 2023b)

The applicant commissioned consultants to perform biological and heritage surveys in support of the road works proposal and associated clearing permit applications including this application. The surveys covered the entire alignment of the proposed road works and beyond. The surveys are as follows:

- Detailed Flora and Vegetation Survey (Western Botanical, 2023a; 2023b; 2023c) Assessment and Gap Analysis
- Terrestrial Vertebrate Fauna Survey (Ecosacpe, 2022)
- Archaeological and Ethnographic (Terra Rosa, 2022)

### Flora and vegetation survey (Western Botanical, 2023a; 2023b; 2023c)

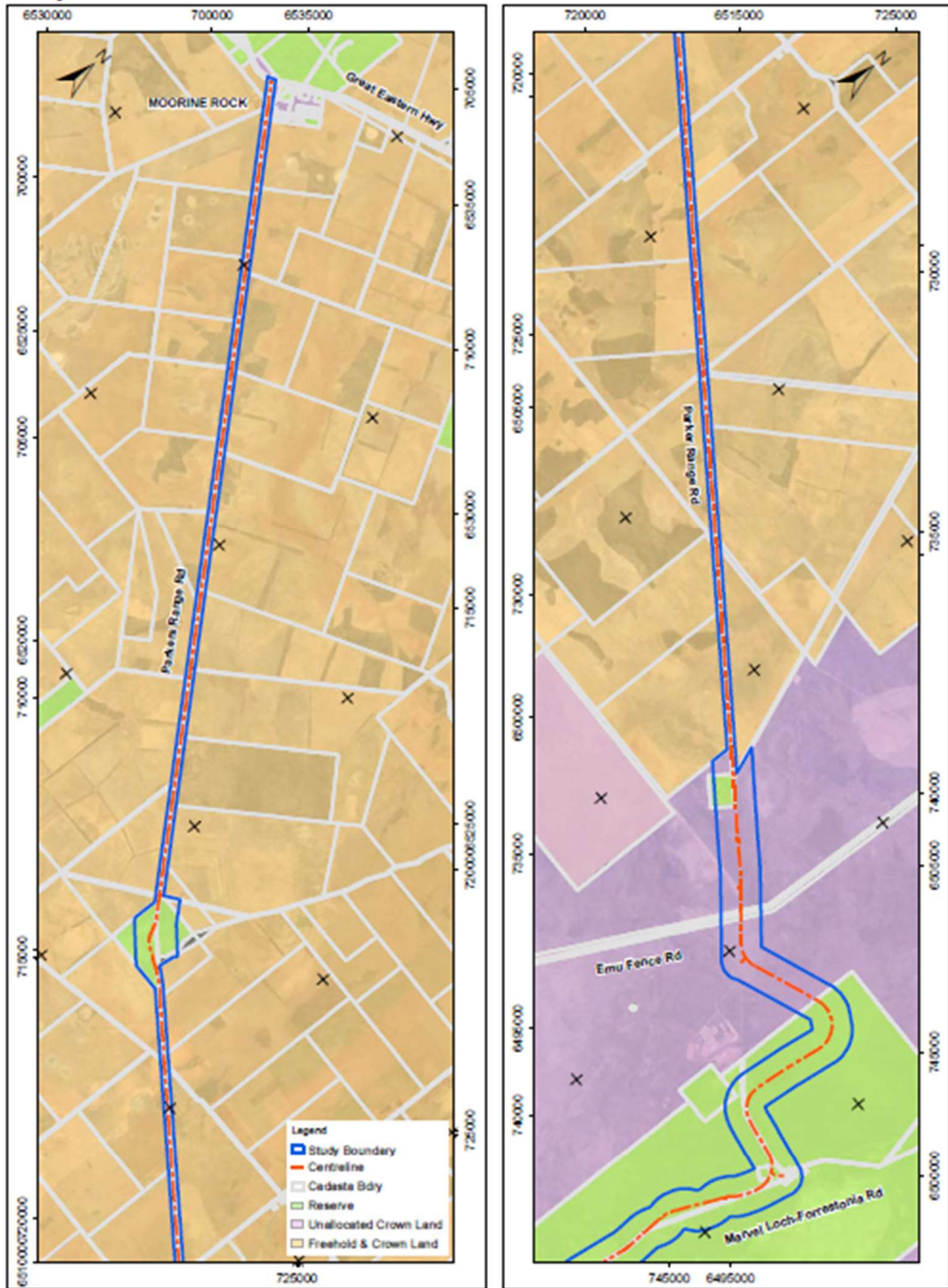
The applicant, through Covalent Lithium, commissioned Western Botanical to perform a detailed survey and assessment of the flora and vegetation in the application area and around the road alignment of the proposed roadworks. The Study Area for the Desktop Assessment was approximately 115 km in length and 10,914 ha in size. In the area adjacent to freehold land (cleared agricultural area) the Study Area is 200 m wide extending to a 1 km wide alignment in areas of native vegetation south of approximate chainage 4 km. Map of the survey area is depicted in Figure 5. The study area was divided into two regions differing in survey intensity.

Methods employed for the survey and assessment included vegetation mapping, vegetation condition, species profiling for vegetation association using 139 quadrats (20x20m and 50x50 m), targeted survey for significant species, targeted survey timing ranging between mid-Spring to late-Spring and early Summer depending on species, collection of specimen to be recognised in the field and identified using the WA Herbarium's Research Collection and reference to third party specialist taxonomist.

Multiple field surveys on a fortnightly basis were undertaken to assess the alignment in its entirety. Survey Effort to 21 February 2023 has included:

- (i) To date, 24 weeks of field survey with between 4 and 6 personnel per trip have been implemented over a period of 16 months, a total of approximately 840 man-days, consisting of:
  - (a) Fifteen x seven-day field trips (each consisting of 2 days travel and 5 days on-ground survey) with between 4 to 6 personnel commenced 29th November 2021 and continued until 23rd August 2023 on a fortnightly basis. One field trip was not undertaken to allow specimen identification and processing early in the assessment.
  - (b) A further nine x seven-day surveys field trip of the road alignment were re-commenced 26th September 2022 and continued to 21st February 2023.
- (ii) Surveys were redirected to other areas (potential borrow pits) from 29th August to 18th September 2022, reported separately by Western Botanical.

Results of the survey and assessment are used in the assessment of the application, as presented in the preceding sections of this report.



Drawn: CAD Resources (08 9246 3242), Date: Mar 2023, CAD Ref: a2765\_MR\_MTH\_31\_02\_01, Rev: A  
Scale 1:125,000, A4, Projection MGAS4 zone 50  
Source: Roads\_MRWA, Cadasta: Landgate



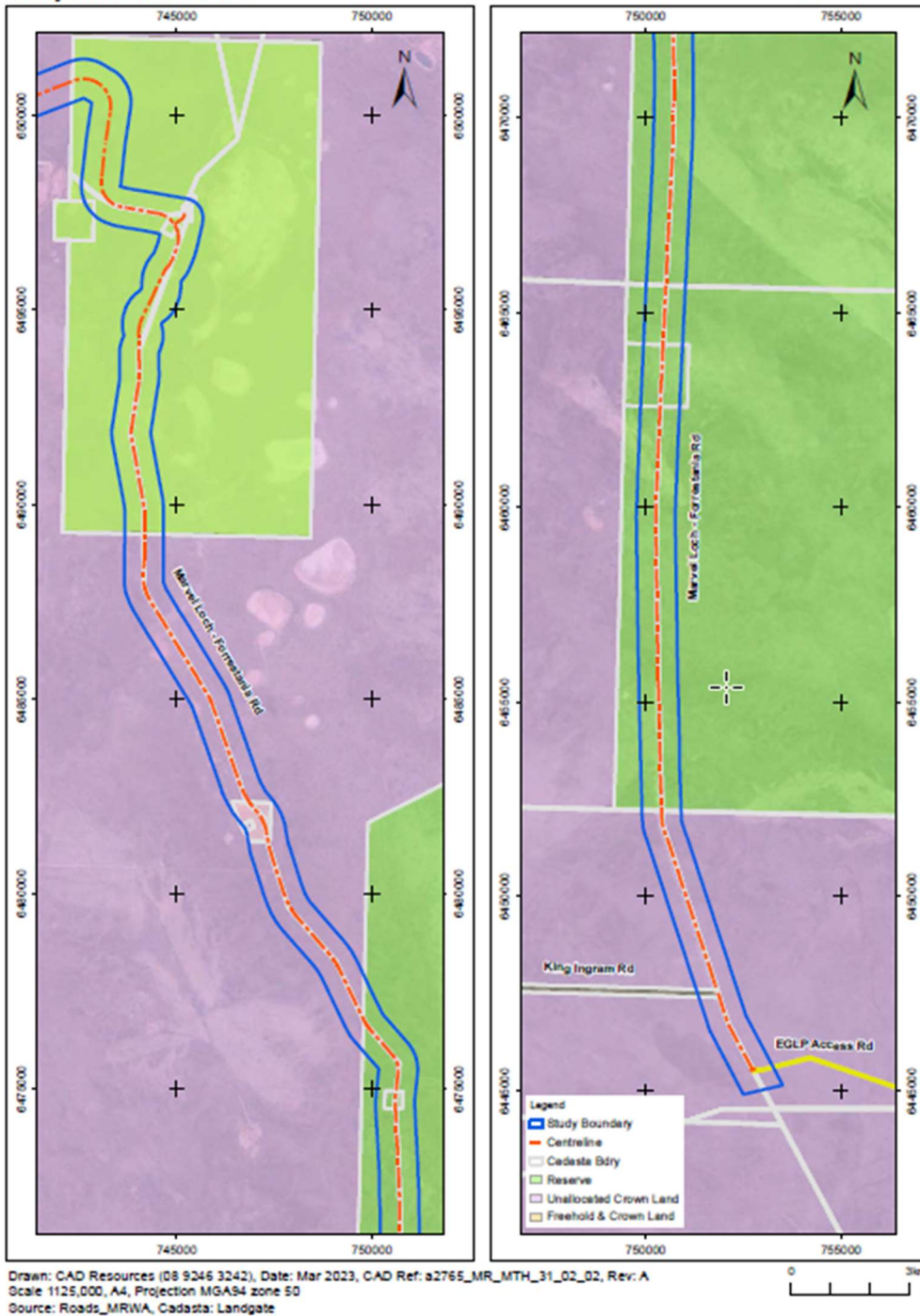


Figure 5. The flora survey area (Western Botanical, 2023a, 2023b, and 2023c)

Terrestrial Fauna Survey (Ecoscape, 2022):

The applicant commissioned Ecoscape to carry out a survey and assessment of terrestrial fauna over the application area and the road works alignment. The survey was undertaken by Ecoscape from the 28th of March to the 5th of April 2022. The purpose of the survey was to delineate fauna habitats, obtain knowledge on the likely fauna assemblage and focus on identifying the presence/absence and suitable habitat of conservation significant listed species identified during the desktop assessment. This will allow for a better understanding of the local fauna's

potential sensitivity to impacts resulting from the road installation. The outcomes of the survey and other information (e.g. desktop aspects) will be used to inform the environmental assessment and approvals process.

The key outcomes from the field survey identified:

- 136 Habitat assessments were conducted identifying four broad vertebrate fauna habitat types: Eucalypt Woodland, Shrubland, Regrowth and Seasonal Marsh/Wetland. Representative photographs of the habitats are presented in Figure 7. Both the Eucalypt Woodland (367.77 ha) and the Shrubland (1312.62 ha) provide habitat for most species in the area and made up the largest part of the survey area, with the Regrowth (5.76 ha) and Seasonal Marsh/Wetland (0.43 ha) being less common. These habitat types recorded during the survey are considered to be well represented outside the survey areas.
- Sixty-four vertebrate and one invertebrate fauna species were recorded during the survey, consisting of:
  - Twenty-two mammals (seven introduced)
  - Thirty-six birds
  - Six reptiles
  - One invertebrate.

The conservation significant vertebrate fauna species recorded by the field survey were:

- Malleefowl *Leipoa ocellata* (EPBC-VU, BC-VU), listed as a 'Threatened' fauna taxon at the conservation level of 'Vulnerable' under both Commonwealth and State legislation
- Western Brush Wallaby *Notamacropus irma* (DBCA-P4), classified as 'Priority 4' by DBCA.
- Central Long-eared Bat *Nyctophilus major tor* (DBCA-P4), classified as 'Priority 4' by DBCA. Ambiguous call recorded, this has been added on a precautionary basis

The targeted Malleefowl mound searches identified two previously unrecorded Malleefowl nest mounds, one of which was active.

In accordance with guidelines for the critically endangered Arid Bronze Azure Butterfly (*Ogyris subterrestris petrina*) (ABAB), a targeted survey was conducted to determine the presence/absence of the sugar ant species (*Camponotus* sp. nr. *terebrans*) on which its larvae parasitise. Sugar ants were detected at two single trees out of the 100 trees sampled. Densities of sugar ant colonies found during this survey are low, however, it is a requirement that the presence of the sugar ant colonies be reported to DBCA.

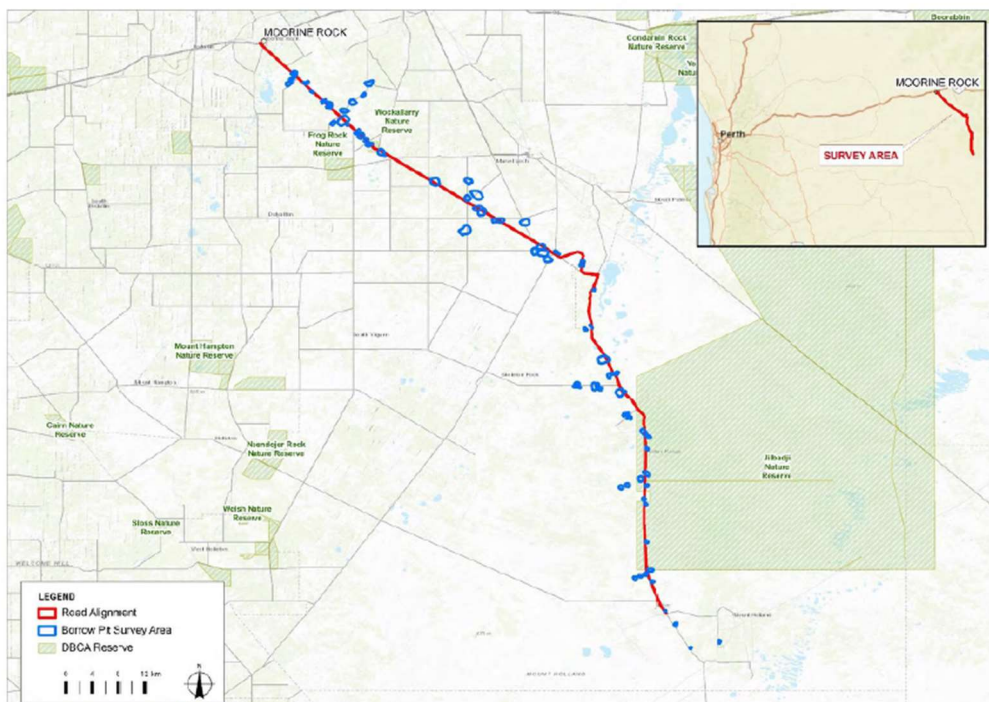


Figure 6. Terrestrial vertebrate fauna survey area and locations (Ecoscape, 2022)





Habitat type	Description	Photograph
Eucalypt woodland	<p>Open Eucalypt woodland consisting of mixed compositions of Eucalypt species. Occurring within this habitat type are Salmon Gum, Mallee, Mallet, Gimlet, Red Morrel and Wandoo. Occurring mostly over low shrubs on clay, clayey sand and sandy clay soils; minimal understory; 30-50% litter cover; high frequency of fallen logs.</p> <p>Disturbance: Low to high.</p> <p>Fire Age: &gt;10 yrs.</p> <p>Extent: 367.77ha, 11.7%</p>	
Shrubland	<p>Closed to dense shrublands of mixed species (<i>Allocasuarina</i>, <i>Hakea</i>, <i>Acacia</i>, and/or <i>Melaleuca</i>) on clay, clayey sand, sand or sandy clay soils; gravel; 50-95% litter cover.</p> <p>Disturbance: Low to high.</p> <p>Fire Age: 5-10 yrs.</p> <p>Extent: 1312.62ha, 41.77%</p>	
Regrowth	<p>Vegetation regrowth in previously cleared areas such as old borrow pits. Comprising of open shrubland of mixed species (<i>Allocasuarina</i>, <i>Hakea</i>, <i>Acacia</i>, and/or <i>Melaleuca</i>) on clayey sand or sandy clay soils; gravel; 10% litter cover.</p> <p>Disturbance: Low to high.</p> <p>Fire Age: &gt;10 yrs.</p> <p>Extent: 5.76ha, 0.18%</p>	
Seasonal Marsh	<p>Seasonal inundated marsh with Samphire and low <i>Melaleuca</i> shrub; clay soils; quartz; 5% litter cover.</p> <p>Disturbance: Low.</p> <p>Fire Age: &gt;10 yrs.</p> <p>Extent: 0.43ha, 0.01%</p>	

Figure 7. Habitat types identified during the terrestrial vertebrate fauna survey (Ecoscape, 2022)

## Appendix H. Sources of information

### H.1. GIS databases

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

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

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

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