BML Ventures Pty Ltd

ABN: 16648071587

Clearing Permit Application Supporting Document

PHILLIPS FIND GOLD PROJECT

M16/130
M16/168

EGS Name: Newhaven Environmental Group
EGS Code: S0004971

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CONTACT DETAILS	William Lloyd – Manager; Will@bmlv.com.au 0421 047 610	
COMMODITY	Gold	
PROJECT DESCRIPTION	The Phillips Find Project is a pit cut back operation located 45 km north west of Coolgardie within the Shire of Coolgardie. The tenure includes M16/130 and M16/168 which is held by Greenstone Resources Limited, BML Ventures Pty Ltd have a Joint Venture Agreement to mine the proposed cutback at the Project. The Phillips Find tenure has been the subject of historic, and more recently, modern mining activity with the Newhaven deposit first being mined by Central Kalgoorlie Gold Mines NL in the late 1980s. In 1997 Barminco completed the mining of the Bacchus Gift and Newhaven Open Pits and in 2012 Barra Resources received approval to mine the Newminster Open Pit and backfill the Bacchus Gift Open Pit. The Project is located within the Mt Burgess Pastoral Lease and has been extensively disturbed by intermittent mining activities for over 100 years. The Phillips Find Project remained on care and maintenance from 2015 to October 2024 when mining recommenced under MP Reg Id 127189. The Phillips Find Mine Plan involves the recommencement of mining via an open pit cut method. Ore will be trucked via the unsealed Dunnsville Road to the Coolgardie North Road and into the Greenfields Mill in Coolgardie. The current LOM is 2 years, although the surrounding areas are highly prospective and represent sound exploration potential. New infrastructure is proposed that will require clearing of native vegetation and includes, extension of the existing Newhaven West waste rock landform, Newminster and Newhaven pit cutbacks, development of a 20-person temporary mine camp, construction of internal mine roads and support infrastructure for the mining operations. Sustainability opportunities arising from the proposed mining and vegetation clearing activities include remedial works associated with historic mine areas, and utilisation of any excess cleared vegetation material as a growth medium.	
THIS CLEARING PERMIT (PURPOSE) APPLICATION	This Application for a Clearing Purpose Permit is submitted for the proposed clearing of up to 20ha on M16/168 and M16/130 covering proposed Pit Cutbacks, WRL construction, minesite infrastructure expansion and roadworks (including buffers) using mechanical methods that will be staged progressively over 2 years, as the Project is developed.	
RELEVANT TENEMENTS	Phillips Find Gold Project – M16/168 and M16/130	
DISTRIBUTION	Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) Native Vegetation Assessment Branch – BML Ventures Pty Ltd - Digital Copy.	

AUTHORIZED FOR SUBMISSION	William Lloyd General Manager (BMLV)  Date: 14.02.2025

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1. INTRODUCTION

1.1 Background to Project

The Phillips Find Project includes the existing Newminster, Newhaven and Bacchus Gift Open Pits, associated waste rock landforms and mine support infrastructure, located 45km north west of Coolgardie in the Kunnanalling Mineral Field. The Project tenure is held by Greenstone Resources Limited, and a mining Joint Venture exists with BML Ventures Pty Ltd. Access is via the Coolgardie North Road and the unsealed Dunnsville Haul Road. The mine development is located within the Shire of Coolgardie.

While the Coolgardie area has a long gold mining history dating back over 100 years, recent modern pit mining on tenure commenced with the excavation of the Newhaven Open Pit in the late 1980s by Central Kalgoorlie Gold Mines NL (CKGM). In 1997, Barminco Pty Ltd purchased the Project from CKGM and completed the open pit mining of the Bacchus Gift and Newhaven deposits. Barminco then sold the Project to Barra Resources Limited in 2000. Barra Resources received approval in November 2012 to establish an open pit mining operation at the Newminster deposit with the waste being backfilled into the existing Bacchus Gift Open Pit. Stage 1 was completed in February 2013 and Stage 2 cut-back was completed in September 2015 under NOI 4078. All rehabilitation of the waste rock landforms and construction of closure bunds were completed prior to the site entering Care and Maintenance in 2015.

The current Mine Plan involves the recommencement of mining, via open pit cut back methods of the Newminster and Newhaven Open Pits, extension to the Newhaven West Waste Rock Landform, and establishment of support mining infrastructure including a 20-person camp.

Mining is recommenced in October under MP Reg Id 127189 and additional clearing will be required in April 2025.

Current Status

The Phillips Find Gold Project is an active brownfields operation, with mining recommencing in October 2024 under MP Reg Id 127189. The minesite is located on granted mining tenure in good standing within the Mt Burgess Pastoral Lease.

There are currently no Clearing Permits in force for the mine site, which has been extensively disturbed by past activities associated with timber cutting, exploration and mining. Following the addition of economic gold reserves to the Phillips Find Resource Base through an extensive drill programme, the revised Mine Plan has indicated clearing is required on M16/168 and M16/130 for expansion of mining operations, construction of a WRL, and establishment of support infrastructure including a 20-person camp.

Biophysical surveys to support the Clearing Permit application were undertaken in 2024 and reports are referenced in Appendix A. A summary of current permitting and site approvals is shown in Table 1.

The Phillips Find Gold Project location in respect to topography, access and regional infrastructure is shown on Figure 1 and the study area surveyed for this Purpose Clearing Application is shown on Figure 2.

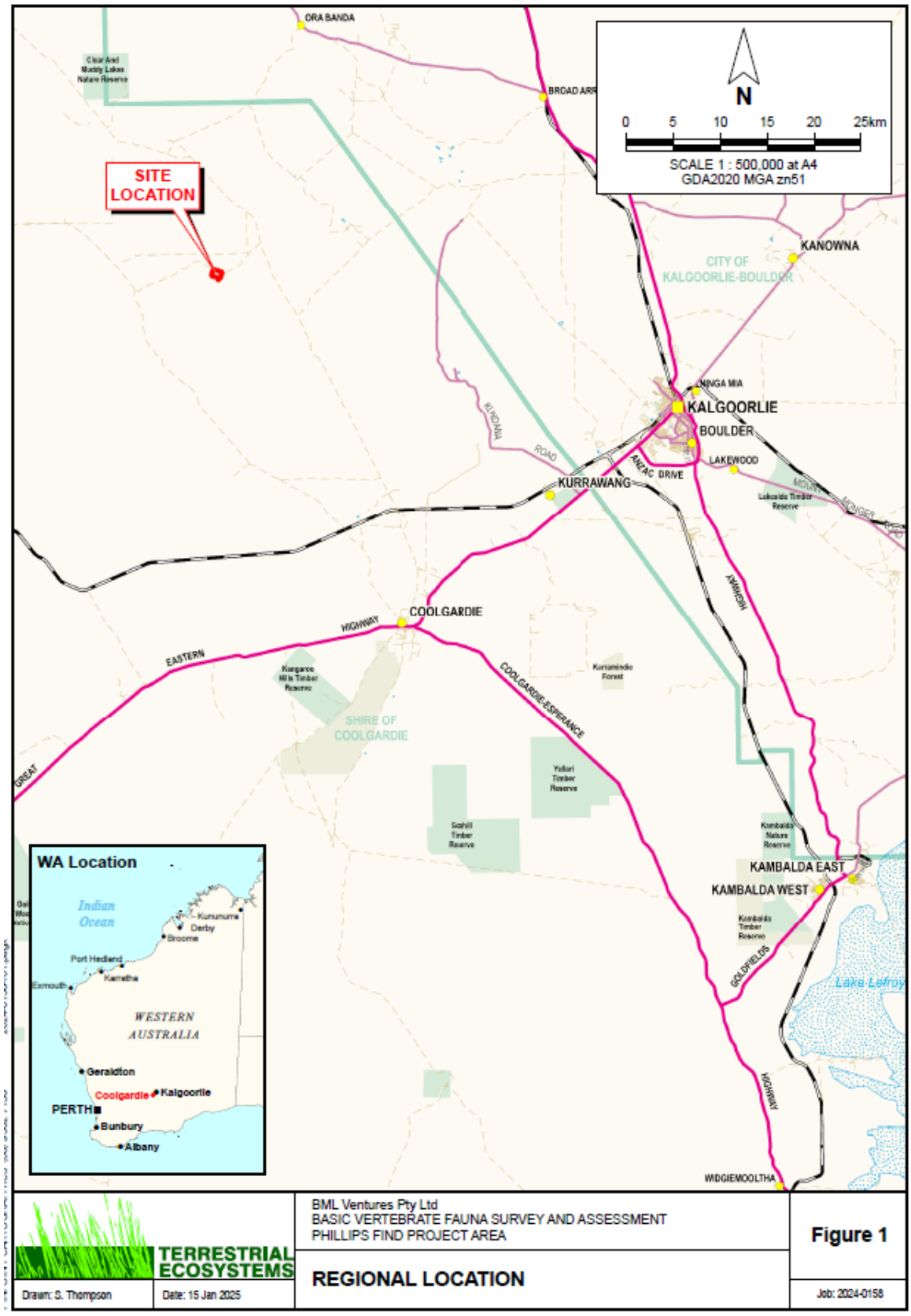

Figure 1: Phillips Find Gold Project - Regional Infrastructure and Mine Location

Figure 2: Phillips Find Gold Project: Existing Site Layout and Baseline Survey Area

Table 1: Summary of Project Permitting and Approvals

Approval Required	By Whom	Current Status
Mining Tenure	DEMIRS	Tenement Conditions associated with M16/168 and M16/130. Tenements are owned by Greenstone Resources Limited with a mining Joint Venture with BML Ventures Pty Ltd in good standing.
Development Approvals	DEMIRS	The Mining Proposal Amendment approved for this Project MP Reg Id 127189.
Impact on Threatened Species	DBCA	No threatened flora or fauna species, Threatened or Priority Ecological Communities were recorded in the site survey area (Native Vegetation Solutions, 2024 & Terrestrial Ecosystems, 2025).
Heritage	DPLH	No Registered or Other Heritage Place Aboriginal sites are recorded on the ACHIS Database for the Phillips Find tenure. No sites of heritage significance were reported following archaeological surveys undertaken by Quartermaine (2002) and ethnographic surveys undertaken in 1988 by R. O'Connor. A search of the WA Heritage Council inHerit Database (2025) and the Shire of Coolgardie Municipal Inventory (2012) did not identify any record of heritage associated with the Phillips Find mine site.
Clearing Permit (Purpose)	DEMIRS	The Phillips Find Gold Project and near mine surrounds are extensively disturbed and degraded by past mining activities. This Clearing Application for a purpose permit applies to M16/168 and M16/130 for minesite development, and construction of support infrastructure.
Pit Dewatering Groundwater Well Licence	DWER	Pit Dewatering will be conducted under a 5C Licence Application Registration # 065593 for 200,000kL / annum. No discharge of mine waters to the environment is proposed.
Local Authority Approvals	SOC	Septic Tank Installation may be required for the construction of the 20 Person Camp.

2. THIS PROPOSAL

This application for a Clearing Permit (Purpose) within M16/168 and M16/130 seeks approval for the removal of native vegetation covering up to 20ha from the 71.32ha Phillips Find Investigation Area shown on Figure 2. The vegetation mapping for proposed disturbances was completed from desktop and field surveys conducted by Native Vegetation Solutions in December 2022. The proposed clearing area disturbance is temporary, as rehabilitation will be undertaken progressively, or at the completion of the 2-year Life of Mine (LOM) on all areas except the mining void. Details of the tenure area, survey area and proposed Application Area are shown in Table 2.

Table 2: Phillips Find Gold Project – Extent of Proposed Clearing

Tenure	Tenure Area (ha)	Investigation Area (ha)	Application Area (ha)
M16/168	110.30	61.63	15.50
M16/130	9.69	9.69	4.50
Total	119.99	71.32	20.00

This programme will result in the clearing of vegetation by mechanical means, with recovered vegetation tracked rolled and stockpiled for later rehabilitation use at the completion of the Project. Topsoil and root stock will be recovered and managed in accordance with BML's Management Procedures. Clearing, if approved, is scheduled to commence in April 2025, with staged clearing undertaken as required, and spread over 2 years.

2.1 Location and Ownership

The proposed clearing is located in the Kunnanalling Mineral Field - 16 on granted M16/168 and M16/130 within the Shire of Coolgardie on Mt Burgess Pastoral Lease. The mining tenure is owned by Greenstone Resources Limited, and a Joint Venture mining agreement is in place with BML Ventures Pty Ltd who are the Proponent for this Application and is attached in Appendix D.

2.2 Proposal Description

The current Mine Planning Schedule consists of the cutback mining of the oxide and fresh rock gold resource at the Phillips Find Gold mine complex by open pit methods. The ore will be stockpiled on a mine ROM Pad then transported for offsite processing via the Dunnsville Haulroad and Coolgardie North Road by road trains for processing at the Coolgardie Greenfields Mill.

The mine and the proposed clearing is not located wholly or partially in a gazetted occupied Township, Environmentally Sensitive Area (ESA), Schedule 1 Area, Threatened Ecological Community (TEC), or on a Pre-1978 State Agreement Act Area, Pre-1899 Crown Grant Areas, Biodiversity Reserve, World Heritage Property, Soil Reference Site, Red Book Area, Bush Forever Site; or registered Heritage Site. This site does not contain or potentially impact on significant lakes or wetlands, Water Supply Catchment areas, Water Reserve or Public Drinking Water Source Areas (WQPN 25).

Existing mining disturbance, current tenure, and the Clearing Application Area (with included buffers) is shown on Figure 3.

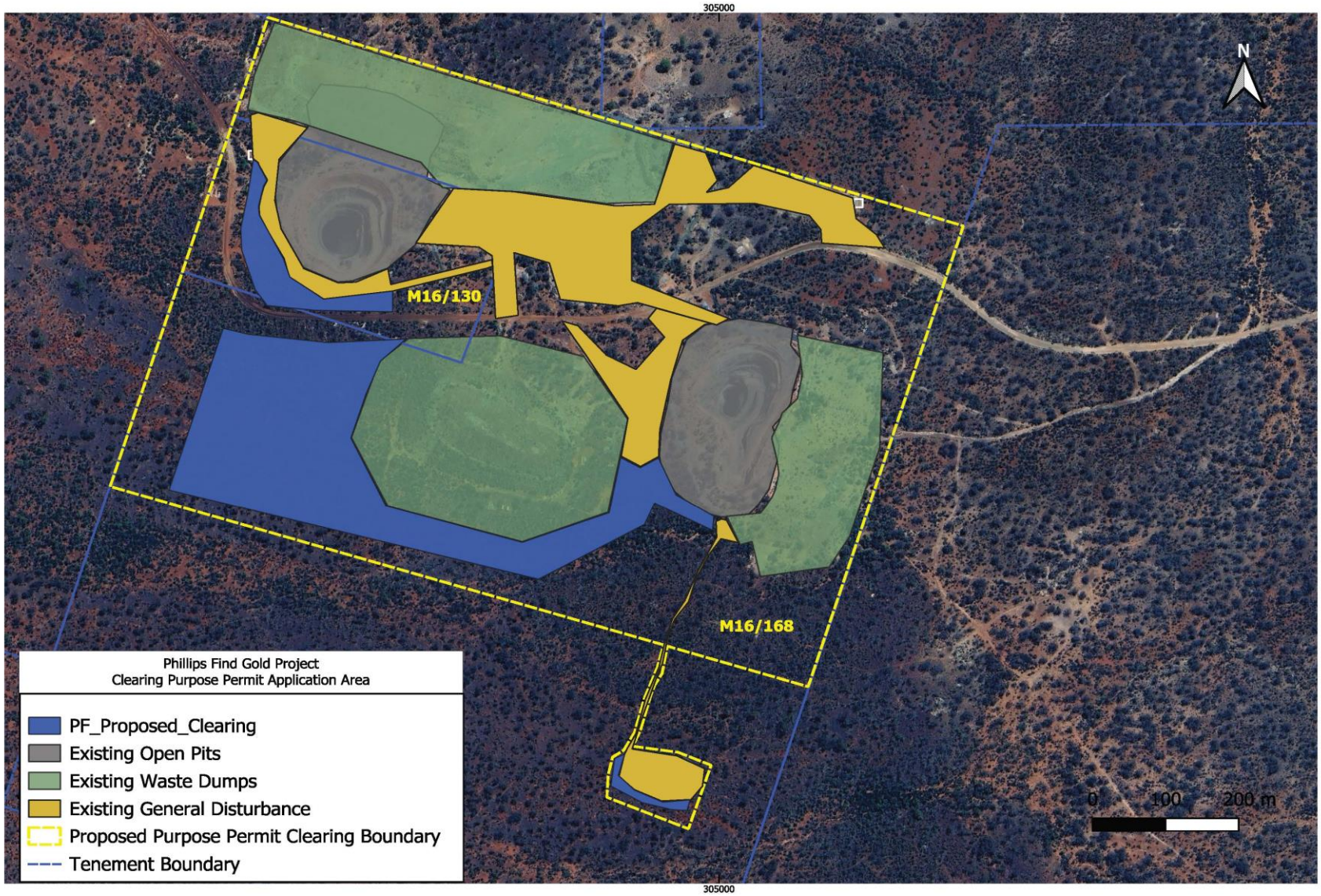

Figure 3: Phillips Find Gold Project Purpose Permit Clearing Application Area

3. EXISTING ENVIRONMENT

The Phillips Find Project, lies within the Eastern Goldfields Province of the Yilgarn Craton (Morris 1993) which comprises linear to arcuate north-west trending belts of greenstones intruded by granitoid rocks of Archaean age.

The landforms of the Coolgardie district consist predominantly of undulating plains covered by weathered in-situ soil material with the occasional breakaway. Landforms within the Project area and associated infrastructure comprise regionally north south trending low hills with short secondary west, north and south flowing ephemeral drainage lines that ultimately change direction and flow east into the White Flag Lake Salina System (WAM 1992).

Topographic elevations in the mine tenure range west to east 458m ASL to 485m ASL. The terrain is classified as being low relief with erosional escarpments merging with low stony rises of more resistant mafic rocks, bordering areas of laterite and calcareous plain with developing playas and or salinas in the bottom lands (Black Flag System). The minesite is one of several gold mines located in these granite-greenstone terrains most of which are located on low stony rises which form on or below catchment divides and carry sheet wash areas and drainage lines with eucalypts woodlands over chenopods.

According to the Interim Biogeographic Regionalisation of Australia (IBRA), the Phillips Find Gold Project is located in the Coolgardie Bioregion (COO 03 - Eastern Goldfields sub-region). (Thackway and Cresswell 2017, DCCEEW 2024). The vegetation is described as mallee, Acacia thickets and shrub-heaths growing on red brown soils and sandplain, with dwarf shrublands of samphire adjacent to salt lakes, and surrounded by Eucalyptus woodlands.

3.1 Climate

The town of Coolgardie located 45km to the southeast of the Project, is recorded as an arid to semi-arid environment. The climate of the Project area is characterised by hot dry summers and mild winters. Maximum temperature peaks (>30^{o}C) occur between December and February. Dry weather occurs for approximately 9 to 11 months of the year, summers are hot and dry, and winters are mild and wet with unpredictable rainfall. The annual average rainfall for the Coolgardie Region is 270.7mm. Annual dam evaporation exceeds rainfall in all months of the year. Significant rainfall events from degenerating ex-tropical cyclones occur most commonly from January–March. The highest daily rainfall event recorded in a 24-hour period is 164mm. With the prevailing winds are easterly, the air has a lengthy passage overland and therefore produces little rain, however the strong winds tend to originate from the north and west. The presence of summer low pressure systems over the interior, commonly referred to as heat lows, produces intense hot, dry conditions (Pringle et. al 1998).

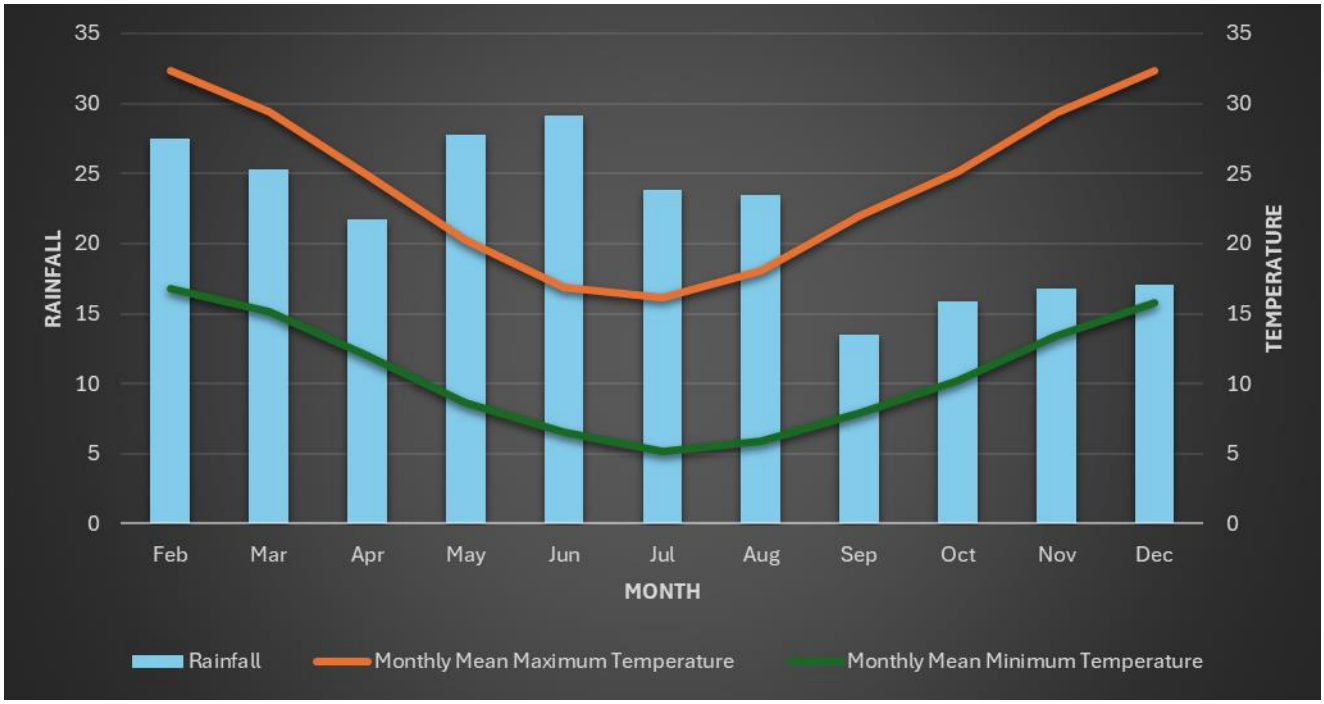

Figure 4: Mean Rainfall and Monthly Temperature for Coolgardie BOM Site 12018 (BoM 2025)

3.2 Land System and Soils

The regional landscapes in the Coolgardie district are generally undulating, with low relief and characterised by easterly drainage into saline playa lakes. These lowlands occupy broad alluvial valleys between erosional greenstone highs. The relief of outcrop areas is closely related to underlying geology with granitoids forming eroded pavements and domes, and basalts and metasedimentary rocks forming elongated, rounded hills and strike ridges.

As part of the Rangeland resource surveys, the Department of Agriculture mapped the Land Systems of Western Australia (DPIRD, 2017). The Land Systems occurring within the survey area include BB5 characterised by Rocky ranges and hills of greenstones and basic igneous rocks and Mx40 characterised by flat to undulating valley plains and pediments with some rock outcrop. The majority of the project is within the Mx40 Land System with only 6% of the northeastern section of the tenure lying within the BB5 Land System.

The landform of the Coolgardie district consists predominantly of undulating plains covered by weathered in-situ soil material with the occasional breakaway. Weathering profiles vary greatly from rocky outcrops to deep (40m) weathered material and clays. Most topsoil within the current footprint of the Project area has been removed by historic and recent mining operations. Where undisturbed soils still exist, they consist of orange to brown loamy clay, calcareous loam and pisolitic laterite (Barra, 2002). Regional soil mapping undertaken as part of the Biological Survey of the Eastern Goldfields Part 8 Kurnalpie-Kalgoorlie (WAM 1992) place the Phillips Find Mining Area on well drained concave slopes in the undulating plains and broad valleys landscape zones where soils range from alkaline red earths with local pedogenic calcrete nodules to deeper brown and grey brown calcareous earths.

3.3 Water Resources

Water resources in the Coolgardie District can be described in terms of ephemeral surface waters associated with narrow drainage tracts and limited deeper groundwaters in fractured basement rock structural positions of varying quality and salinity. According to the Geoscience Australia database (2015), there are no permanent or ephemeral inland surface waters within the Phillips Find survey area, with drainage limited to several low order, unnamed ephemeral drainage lines that only flow after significant storm events. No permanent surface water bodies are present in the tenure and no riparian vegetation is present.

Groundwater Dependent Ecosystems (GDE) includes biological assemblages of species such as wetlands or woodlands that use groundwater either opportunistically or as their primary water source. For the purposes of this report, a GDE is defined as any vegetation community that derives part of its water budget from groundwater and must be assumed to have some degree of groundwater dependency. In accordance with the BoM *Atlas of Groundwater Dependent Ecosystems* (BoM, 2024) database, there are no terrestrial GDE's within the survey area.

3.3.1 Surface Water

The Project is located within the Raeside -Ponton Catchment of the Salt Lake Basin within the Greater Plateau Drainage Division. Local topography determines that surface runoff and low order creek lines drain to the west, then east and south, via ephemeral streams and tributaries into large, low-lying flood plains with terminal salinas. Stream flow occurs only after heavy storms or after persistent low intensity rainfall. The planned pit cutbacks at the Newhaven and Newminster Open Pits lies within the local topographic high and there is limited potential for surface runoff to affect the proposed pit development.

3.3.2 Groundwater

The Project area lies within the Kalgoorlie Hydrogeological Series (SH51-9) 1:250,000 scale map sheet and is part of the Kalgoorlie Groundwater Proclamation Area (RIWI 1914). The major aquifers in the region are present in (a) palaeodrainage channels and (b) within low yielding fractured rock aquifers present in structural positions at the oxide - fresh rock interface and in fresh rock fractures. Waters are typically saline with TDS ranging from 14,000mg/L to 95,000mg/L. There is no water-level data (in the WIR database) that can be used to determine regional groundwater levels and flow patterns, although it is expected that directions of groundwater flow will generally follow the topography, with groundwater discharging to the White Flag Salt Lake system, lying to the east.

Historical mining records and recent geological data recorded during resource drilling programmes report there were no major paleo-channel aquifers encountered, with limited yield groundwater positions associated with fractured rock aquifers in the mine lithological contact environs at depths of approximately 70m, which is at the base of the proposed pit cutbacks. Pit water inflows are predicted to be limited in volume initially due to the surrounding low permeability. Water modelling for deeper section of the pit predict inflows could increase to up to 30Kl/day and will be recovered and fully utilized for dust suppression and haul road maintenance through the 5C Groundwater Licence Application #065593.

3.4 Dust and Erosion Impact Management

Land management assessments for the Land Systems highlight that Narrow Drainage Tracts and Alluvial Plain terrain units are susceptible to water erosion where perennial shrub cover is substantially reduced (Pringle et. al. 1994), or the soil mantle surface is extensively disturbed. While both of these activities will occur as part of the proposed mine establishment, sound land care management practices can substantially reduce the risks of environmental harm and can remediate impacts to drainage that have occurred as a part of past activities.

The primary objective is to minimise soil erosion and dust generation and the export of material into ephemeral drainage lines and onto verge vegetation. The following strategies will be implemented to achieve the clearing and rehabilitation objectives:

- Identify areas of major erosion hazard and avoid re-disturbance of these areas wherever possible;
- Provide environmental supervision and co-ordination of work teams during clearing and topsoil recovery;
- Schedule vegetation clearing to match development need and seasonal timing;
- Minimise ground disturbance and restrict clearing to designated areas;
- Reinstate creek, any drainage line disturbance at the completion of any earthworks programme
- Return stripped topsoil and rootstock to the original horizon to promote rapid revegetation and surface stabilisation;
- Keep topsoil stockpiles out of inappropriate areas such as watercourses and areas subject to wetting by poorer quality waters;
- Control access and prevent vehicular movements over topsoil stockpiles;
- Rehabilitate progressively where required and re-spread cleared vegetation selectively to create habitats;
- Reform access roads to similar pre-construction surface conditions, and
- Install erosion control structures along roads and areas of high erosion risk.

The following strategies will be implemented to achieve dust minimisation:

- Minimise clearing and avoid unnecessary machinery movements,
- Rehabilitate and/or stabilise disturbed surfaces as soon as possible, and
- Damp down with water of suitable quality from water trucks as necessary.

Proposed management control arrangements during clearing will keep impacts to an acceptable level.

3.5 Biodiversity, Flora, Fauna and Ecosystems

The Phillips Find Gold Project tenements lie within the Coolgardie IBRA bioregion in the Eastern Goldfields (COO3) subregion (Thackway and Creswell 2017, DCCEEW 2024). This IBRA subregion vegetation is described as mallee, *Acacia* thickets and shrub-heaths on sandplain, with dwarf shrublands of samphire adjacent to salt lakes, and surrounded by *Eucalyptus* woodlands.

3.5.1 Flora

Native Vegetation Solutions completed a flora, vegetation and fauna survey of the Phillips Find Gold Project in December 2022 and coverage is shown in Figure 2. The study area reported a total of 64 native taxa from 33 genera across 18 families. Five broad scale vegetation communities were described and mapped. With the most widespread community within the Project identified as Eucalyptus woodland dominated by *Eucalyptus griffithsii*, woodland over *Acacia acuminata* shrubland thickets.

No threatened or priority flora species were recorded and no Threatened or Priority Ecological Communities were identified within the Project survey area. The closest Environmentally Sensitive Area occurs 22km to the north west of the Project, at the Rowles Lagoon Conservation Park (DPaW 2013). The condition of the land was considered degraded within the existing mine disturbance to very good in areas to the south of the main mine disturbance.

One introduced (exotic) taxa was recorded within the survey area, *Centaurea melitensis* (Maltese Cockspur), which is not considered a Declared Plants species pursuant to Section 22 of the *Biosecurity and Agriculture Management Act (2007)* according to the Western Australian Department of Primary Industries and Regional Development website.

Current desktop and field survey evidence, suggests no floral habitat of regional significance will be permanently impacted by the proposed clearing activities.

Further flora and vegetation information is referenced in the Native Vegetation Solutions (2024) Reconnaissance Flora and Vegetation Assessment referenced in Appendix A.

3.5.2 Fauna

Terrestrial Ecosystems conducted a Basic and Targeted Fauna Survey and Assessment for the Project in December 2024 in accordance with the requirements documented in EPA *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA, 2020).

The focus of this study was to investigate the likelihood of identified Threatened and Priority listed fauna occurring in the Project area and to conduct fauna habitat mapping to identify habitat types that may be suitable for any identified Threatened and Priority listed fauna that may occur within the region.

The Phillips Find Project is located within the Yilgarn Craton, which has subdued relief and gently undulating plains with low hills and ridges of Archaean greenstone in the western section (Cowan 2002). The vegetation in the subregion is typically mallee, Acacia thickets and shrubland on the sandplains and eucalypt woodlands around salt lakes, ranges and broad valleys. The remnant vegetation condition varies from degraded to very good condition with an established lower middle and upper strata. There is evidence of mining impacts throughout the Project area.

Based on vegetation and associated landforms defined within the flora and vegetation assessment, four broad scale terrestrial fauna habitats were identified: mixed shrubland, mixed Eucalypt woodland over mixed shrubs, Salmon Gum woodland, and Goldfields Blackbutt woodland.

A desktop review identified 7 terrestrial vertebrate species of conservation significance that have the potential to occur within the Investigation Area (Terrestrial Ecosystems, 2025) with a full fauna likelihood assessment outlined in the Terrestrial Ecosystems (2025) report. Table 3 outlines the

summary of the potential for the conservation significant species to be identified within the Project area.

Table 3: Summary of the potential for conservation significant species to be found in the Phillips Find Project area

Species	Scientific Name	Common-wealth EPBC Act	DBCA Schedule / Priority	Comment and likelihood of occurrence
Malleefowl	*Leipoa occellata*	Vulnerable	Vulnerable	No mounds were present in the Project Area, and no Malleefowl or their tracks were recorded during the site assessment. Therefore, the potential impact on this species is low.
Southern Whiteface	*Aphelocephala leucopsis*	Vulnerable		It may be present in the project area. As it is a mobile species, the project's potential impact on this species is low. Removing or destroying a Southern Whiteface active nest could be considered a significant impact; therefore, if vegetation clearing is to be undertaken during the breeding season (i.e. August to September, presuming there have not been early rains, which will bring the breeding season forward), then there needs to be a check that no Southern Whiteface active nests will be impacted.
Grey Falcon	*Falco hypoleucos*	Vulnerable	Vulnerable	Unlikely to be seen in the project area, therefore the potential for impact on this species is low.
Peregrine Falcon	*Falco peregrinus*		OS	It may be seen very infrequently in the region; however, development is unlikely to impact this species.
Night Parrot	*Pezoporus occidentalis*	Endangered	Critically Endangered	Highly unlikely to be in the Project area due to a lack of suitable habitat. The potential for impacting on this species is very low
Chuditch	*Dasyurus geoffroii*	Vulnerable	Vulnerable	Unlikely to be seen in the Project area, so the potential for impact on this species is low.
Fork-tailed Swift	*Apus pacificus*	Migratory	Migratory	It may be seen very infrequently in the region; however, development is unlikely to impact this species.
Grey Wagtail	*Motacilla cinerea*	Migratory	Migratory	Highly unlikely to be seen in the project area, so the potential for impact on this species is low.
Western Rosella	*Platycercus icterotis xanthogenys*		Priority 4	Unlikely to be seen in the project area, so the potential for impact on this species is low.
Central Long-eared Bat	*Nyctophilus major tor*		Priority 3	It may be present in the project area. Given that the Project area represents a small fraction of

Species	Scientific Name	Common-wealth EPBC Act	DBCA Schedule / Priority	Comment and likelihood of occurrence
				similar habitat in the general area and it will readily move is disturbed, vegetation clearing in the project area is unlikely to significantly impact this species.
Southern Death Adder	*Acanthophis antarcticus*		Priority 3	Unlikely to be seen in the project area, so the potential for impact on this species is low.
Woma	*Aspidites ramsayi*		Priority 4	Unlikely to be in the Project area

Arid Bronze Azure Butterfly (*Ogyris subterrestris petrina).* Status - Critically Endangered. Detail on many aspects of the biology and distribution of this arid butterfly is lacking. Its preferred habitat is recorded as smooth barked Mixed *Eucalyptus salubris /E.salmonophloia* woodlands on red-brown loam soils with an open understorey (DBCA 2020). The most critical factor for habitat occupancy by the butterfly is the presence of large colonies of the host Sugar Ant (*Camponotus sp. nr terebrans*) as only large colonies can support the ABAB. Being a parasitic species, it requires large numbers of hosts. No large colonies of host ants were recorded and this indicates that ABAB are unlikely to be present.

Inland Hairstreak (*Jalmenus aridus*) – Status - Priority 1. Detail on many aspects of the biology and distribution of this arid butterfly is lacking. Their preferred habitat is summarised as open woodland with abundant mature *Senna artemisiodes ssp. fillifolia* and open areas of well drained exposed ground adjoining host plants (Eastwood et al, 2023). This habitat has been identified within the Project; however this area has been extensively disturbed by historic mine activity and no further disturbances are proposed within this habitat type. Therefore, the likelihood of this species being present within the tenure is considered to be low.

Introduced Animals. A total of 11 introduced mammals could potentially occur in the habitats of the Coolgardie Region; of most concern within the bioregion are the introduced herbivores; the European rabbit, feral goats, and donkey which have the most widespread impact on fauna habitats through grazing and trampling. Feral cats and foxes are present, and these represent a threat to ground dwelling fauna including the Chuditch.

A series of recommendations that will assist in minimising the impact on the habitats of a range of terrestrial animals during clearing and mining operations have been outlined in the Terrestrial Ecosystems 2025 report. These include:

1. An induction that outlined the management of fauna within the Project area
2. Protection of fauna and reporting of fauna deaths. Sightings of both feral and conservation significant flora should be highlighted in the Project induction
3. Minimal practical disturbance including the use of existing roads and tracks
4. Clearing of vegetation to be conducted outside the Southern Whiteface breading season of April to September.
5. If clearing occurs within the Southern Whiteface breading season, a zoologist familiar with the species will search the area for active nests prior to ground disturbance

6. If an active Southern Whiteface nest is found, a 250m buffer is implemented around the nest until the chicks have fledged
7. Management of the impact of dust to the surrounding vegetation
8. No pets permitted on site
9. All waste and rubbish should be contained in bins, placed in the landfill or removed frome site
10. Feeding of native fauna is prohibited
11. Feral pest control program is implemented if required

3.5.3 Conservation Significance

The Eastern Goldfield subregion contains 16 vegetation associations, predominately open *Eucalyptus* woodlands, that have at least 85 per cent of their total extent in the bioregion (Cowan 2001) The subregion is considered a centre of endemism for Eucalypts in the Goldfields Woodlands region, and is also noted for the diversity of *Acacia* spp. and ephemeral flora communities of the tertiary sandplain shrublands and the valley floors of woodland areas.

The significance of the biota of the Phillips Find area was assessed in three contexts – State, regional and local levels. As no TEC's or threatened taxa was recorded during the Project field surveys, the proposed extension of the mining area has no significance at a state level. Of the fauna which could occur in the area, Terrestrial Ecosystems identified 4 species of conservation significance that have the potential to occur in the Phillips Find area. The Southern Whiteface (*Aphelocephala leucopsis*), Malleefowl *(Leipoa ocellata*), Peregrine Falcon *(Falco peregrinus*) and Central Long-eared Bat (*Nyctophilus major tor)* are Scheduled species under the Western Australian *Biodiversity Conservation Act (2016).*

Of the Scheduled species identified in the desktop study, all are in urgent need of conservation attention and Action Plans involving a range of conservation activities in conjunction with targeted predator eradication are being managed by the DBCA with some success in the Region.

The presence of Schedule 1 fauna in the Phillips Find mine area, and remaining following the recommencement of mining, is considered highly unlikely, due to the lack of suitable habitat, a long history of land disturbance from mining and exploration, feral grazing, and timber cutting. In respect to Malleefowl, their physical presence was not recorded in the Phillips Find Project environs during the recent surveys (Terrestrial Ecosystems, 2025, Native Vegetation Solutions 2024). There are no matters of national environmental significance as defined by the Commonwealth *EPBC Act (1999)* or threatened species or critical habitat listed under the *BC Act (2016)* and identified within the Phillips Find survey area.

The LOM is of short duration (approximately 2 years) and the impact of the limited clearing on small, regional fauna is expected to be minimal, with the return of many terrestrial species back into disturbed areas after site decommissioning and rehabilitation. Threatening processes identified in the CALM Biodiversity Audit (Cowan 2002), include vegetation clearing and fragmentation, grazing pressure, feral animals (goats, foxes and cats), changed fire regimes, weed spread, salinity, mining and poaching birds' species.

3.6 Management of Clearing Impacts

The current proposal to expand the Phillips Find Project footprint will result in short term increase to site emissions and the disturbance footprint at the site. Operational impacts can be managed through minimisation of disturbance and clearing, adopting progressive clearing as required for Project development stages, avoiding permanent changes to drainage patterns and sheet flow zones, controlling weed spread, reducing impacts to soils and haul road verges by using best quality ground water during dust suppression, and progressive rehabilitation of disturbed areas during operations.

No assemblages of plant species identified in the Native Vegetation Solutions (2024) Survey are representative of TEC or PEC communities. The near mine drainage lines are ephemeral and do not support riparian or wetland vegetation. There is no evidence that floral or faunal habitat of regional significance will be significantly impacted by the proposed recommencement of mining operations.
A summary of findings against the 10 Clearing Principals are outlined in Table 4 with supporting information referenced in the Terrestrial Ecosystem (2025) report in Appendix A.

Table 4: Summary of Findings Against the 10 Clearing Principles

Principle Native vegetation should not be cleared if it:		Assessment	Outcome
(a)	Comprises a high level of biological diversity.	Vegetation within the Phillips survey area is considered to be of low biological diversity and is well represented outside of the survey area. There are no Threatened or Priority Ecological Communities within the survey area. The Project may however support a small population of Southern Whiteface, listed as Vulnerable under the EPBC Act. This bird is widespread in the region and will move if disturbed.	Clearing is unlikely to be at variance with this principle
(b)	Comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to WA.	The basic fauna search did not record any evidence for the presence of significant fauna or habitat within the Phillips Find survey area and there is an abundance of similar habitat in the surrounding region	Clearing is unlikely to be at variance with this principle
(c)	Includes, or is necessary for the continued existence of rare flora.	No Threatened or Priority Flora taxa, pursuant to the BC Act and the EPBC Act were identified within the Phillips Find survey area.	Clearing is unlikely to be at variance with this principle
(d)	Comprises the whole or part of or is necessary for the maintenance of a threatened ecological community (TEC).	No TEC listed under the EPBC Act or by the BC Act occur within the Phillips Find survey area. .	Clearing is not at variance with this principle
(e)	Is significant as a remnant of native vegetation in an area that has been extensively cleared	The area contains no significant remnant vegetation communities.	Clearing is unlikely to be at variance with this principle
(f)	Is growing, in, or in association with, an environment associated with a watercourse or wetland	There is no watercourse or wetland near the project area.	Clearing is unlikely to be at variance with this principle

	Principle Native vegetation should not be cleared if it:	Assessment	Outcome
(g)	Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	Clearing within the Phillips Find survey area is not considered likely to lead to land degradation issues such as salinity, water logging or acidic soils.	Clearing is unlikely to be at variance with this 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 survey area is not located within or adjacent to conservation areas, Environmentally Sensitive Areas or Nationally Important Wetlands.	Clearing is unlikely to be at variance with this 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.	There are several low order ephemeral drainage lines within the Phillips Find survey area. No impacts are considered likely to the surface or underground water in this area.	Clearing is unlikely to be at variance with this principle
(j)	Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding	Rainfall in the Eastern Goldfields subregion has an average rainfall of 200-300mm and an evaporation rate of 2400 mm. Clearing within the Phillips Find pit limited catchment area is not likely to increase the incidence or intensity of flooding within the survey area or surrounds.	Clearing is unlikely to be at variance with this principle

4. SENSITIVE ENVIRONMENTAL RECEPTORS

This section provides details of any sensitive (environmental or social) receptors potentially impacted by the proposed open pit cutback mining proposal at the Phillips Find Gold Project.

The Phillips Find deposit is situated within the Mt Burgess Pastoral Lease approximately 45km to the northwest of Coolgardie, 22km southeast of the Rowles Lagoon and Clear and Muddy Lakes gazetted conservation estate, and 20km southeast of the Credo Campground which is considered the closest receptor to the Project.

4.1 Heritage, Community and Consultation

The Phillips Find Gold Project tenure lies within Native Title Claim WAD 647/2017 registered by Marlinyu Ghoorlie (WC2017/007) (NNTT, 2024), Aboriginal heritage site investigations have been undertaken over the tenure at various stages of the Project's development, Ethnographic and Archaeological Surveys were undertaken in December 1991 with senior Aboriginal Consultants (Dobson, Macintyre, Mattner and Quartermaine 1991) and in 2002 Barra Resources completed an Archaeological Survey of the Project tenure using Quartermain Consultants. The survey concluded " a preliminary archaeological investigation for Aboriginal heritage sites was undertaken at three leases, M16/130, M16/168 and P16/1349 – MLA16/242. Jacqueline Harris carried out the archaeological study in September 1998. No archaeological sites have been registered within the Project area. The Project area holds a low potential for archaeological material because of the extensive disturbance from mining activities".

An ethnographic investigation was carried out by R. O'Connor in 1988 and concluded that "The investigation involved an examination of the existing ethnographic data base pertaining to the area of proposed development and an examination of known ethnographic site distribution. As a result of that investigation, it has been concluded it is unlikely that the development will impact any sites of Aboriginal significance."

Recent searches of the Department of Planning, Land and Heritage online Aboriginal Cultural Heritage Inquiry System (ACHIS) - Site Register for the relevant tenure – M16/168 and M16/130 have identified no Registered or lodged sites within the proposed Phillips Find mining or infrastructure areas. ACHIS Reports are referenced in Appendix B.

There are no expected impacts on areas of significance to European cultural heritage within the proposed Phillips Find mining areas. No information for the Phillips Find mine area is referenced in the Shire of Coolgardie Municipal Inventory of Heritage Places Register (2012) or the State of WA Heritage Council inHerit Database (2024).

As part of the proposed recommencement of mining at Phillips Find Gold Project, BML Ventures have completed a range of community and regulatory consultation programmes. These have included correspondence with the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS – Perth, Kalgoorlie), Mt Burgess Pastoral Lease Manager and the Shire of Coolgardie. This process will continue.

4.2 Weed Management

Several well-known weed species have shown themselves to be well adapted to colonisation of disturbed ground in the Eastern Goldfields. No declared or WONS weed species were identified during the site surveys of the proposed Phillips Find Project Development areas (Native Vegetation Solutions, 2024) although one common Goldfields environmental weeds was present in the mine environments. Operational management strategies adopted to stop weed spread include:

- Materials (i.e. soil) should not be removed from sites for reuse where weed infestations are evident without prior spraying;
- Require as a Site condition that all earthmoving equipment and vehicles are washed down prior to the initial transport to site and are soil free;
- Existing infestations in the general project area and stockpiles will be brought to the attention of the Mine Management for action;
- Undertake progressive rehabilitation of disturbed areas, (where feasible) to assist in reducing weed spread by promoting competition from local native species, and;
- Mine personnel are made aware of weed issues through the Site Induction Programme.

4.3 Land Discharge

There is a minimal risk for liquid waste such as hydrocarbons to enter the environment during land clearing and stockpiling operations. Servicing of earth moving equipment will only be permitted in designated areas.

4.4 Closure and Rehabilitation Management

The Australian and New Zealand Minerals and Energy Council and the Minerals Council of Australia have jointly produced a high-level framework for the development of Mine Closure Plans. The Western Australian Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) has published a revised Statutory Guideline for Mine Closure Plans and Mine Closure Plan Guidance – how to prepare in accordance with the Statutory Guidelines. The Phillips Find Gold Project Mine Closure Plan was approved in October Reg Id 127189. Rehabilitation of areas cleared in accordance with this Clearing Permit Application will be identified in the MCP and a rehabilitation prescription adopted in accordance with the MCP.

The MCP guidelines recommend that final mine rehabilitation and decommissioning should ensure:

- That Stakeholders have their interests considered during the mine closure process and that the process of closure occurs in an orderly cost effective and timely manner;
- That the cost of closure is adequately represented in company accounts and the community is not left with a liability;
- There is clear transparent accountability and adequate resources for the implementation of the Closure Plan.
- The establishment of a set of indicators (i.e. completion criteria) that will demonstrate the successful completion of the closure process be developed prior to plan implementation, and
- That all statutory requirements are met.

4.5 Rehabilitation Concepts

Rehabilitation is defined as the implementation of procedures resulting in the return of an area to a sustainable biological condition such that it does not require ongoing maintenance. The primary objectives for the closure and rehabilitation of the Phillips Find Gold Project are outlined below. These are:

- Ensure risks to public safety are minimised and that the community do not inherit any closure liabilities and site is returned to a condition that will support current land uses.
- Stable topographic conditions are established that will support, a self-sustaining indigenous vegetation community consistent with the Land System and final land use objectives.
- Minimise off site impacts by removing deleterious materials, controlling infiltration, erosion, sedimentation and the degradation of existing drainages.
- Employ rehabilitation methods that are technically effective and cost efficient, rely on standard and proven engineering practices that do not require ongoing maintenance to ensure performance.
- Ensure the protection and conservation during rehabilitation works of any identified elements of the cultural and conservation estate within the mining leases.

In the event of a Temporary Mine Closure, the transition from operations to Care and Maintenance status will be an orderly and managed process in accordance with the provisions of the approved Plan.

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6. DEFINITIONS

Application Area	Area of proposed project native vegetation clearing including buffers zones as listed in the application form.
Care and maintenance	All mining operations suspended, site being maintained and monitored. Resident caretaker – considered Managed Care and Maintenance.
Disturbed	Area where vegetation has been cleared and/or topsoil (surface cover) removed.
Disturbance type	A feature created during mining or exploration activity, e.g. waste dumps, haul roads, access roads, ROM, plant site, TSF, borrow pits, drill pads, stockpiles, office blocks, accommodation village, etc
Investigation Area.	Area of survey surrounding proposed development for baseline studies also called Environmental Survey Area - ESA.
Life of mine	Expected duration of mining and processing operations.
Orthophotography	Use of aerial photography to measure areas of disturbance.
Pits	All open excavations including active mineral rock, gravel, sand, clay, bauxite and salt-pan extraction areas.
Project	The total integrated mining operations in which a number of sites contribute to the overall operation to supply ore, processing facilities and disposal of waste products.
Preliminary earthworks	Reshaping, capping, water/wind erosion control, rock armouring.
Rehabilitated	Areas are safe, have demonstrated stability under representative climatic conditions, non-polluting and support a functioning, self-sustaining ecosystem comprising local native species.
Relinquished	Agreed closure criteria met, government “sign-off” achieved, all obligations under the Mining Act removed and bonds retired.
Reporting period	Twelve-month period from reporting month as specified in tenement conditions e.g. if reporting month is June, reporting period would be June – May.
Revegetation	Establishment of self-sustaining vegetation cover after earthworks have been completed.
Tenement	Land tenure granted under the *Mining Act 1978* e.g. Mining Lease Exploration Licence, Prospecting Licence, Miscellaneous Licence, General Purpose Lease.
Waste landforms	Includes all mullock and waste rock disposal areas.

7. ACRONYMS

AER	Annual Environmental Report
AMD	Acid Mine Drainage
BOM	Bureau of Meteorology
CIL	Carbon in Leach
CPA	Clearing Permit Application
DBCA	Department of Biodiversity Conservations and Attractions
DWER	Department of Energy, Water and Environmental Regulation
DEMIRS	Department of Energy Mines Industry Regulation and Safety
DOW	Department of Water now incorporated in DWER
DSR	Drill Site Rehabilitation
Ec	Electrical Conductivity
EPA	Environmental Protection Authority
ESA	Environmental Survey Area
GDE	Groundwater Depended Ecosystems
GWL	5C Groundwater Well Licence
IA	Investigation Area
LJE	Leanne James Environmental
L	Miscellaneous Lease
M	Mining Lease
mAHD	Metres above the Australian Height Datum
MCM	Managed Care and Maintenance
MOU	Memorandum of Understanding between EPA and DMP
PDA	Project Development Area
PAF	Potential Acid Forming
PIA	Project Investigation Area
ROM	Run of Mine
SOC	Shire of Coolgardie
TDS	Total Dissolved Solids
TEC	Threatened Ecological Community
WA	Western Australia
WRL	Waste Rock Landform

Units of Measurement

A	per annum
dS/m	deci Siemens per meter
ha	hectare
kL	kilolitre
m	metre
mg/L	milligrams per litre
Mt	million ton

Appendix A : Environmental Baseline Reports

- **Native Vegetation Solutions (2024) Reconnaissance Flora and Vegetation Survey of the Phillips Find Project Area. A report prepared for BML Ventures Pty Ltd**

- **Terrestrial Ecosystems (2025) Basic and Targeted Fauna Survey and Assessment – Pillips Find Project Area. A report prepared for BML Ventures Pty Ltd**

Reconnaissance Flora and Vegetation Survey of the Phillips Find Project Area- December 2024

Prepared for

BML Ventures Pty Ltd

DRAFT V1.0

December 2024

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Appendices

Figures

Tables

1 INTRODUCTION

BML Ventures Pty Ltd (ASX:BMLV) are developing a high-grade gold mine at the Phillips Find Project in Western Australia's Coolgardie Region (DCCEEW, 2024).

The project is currently under operation via an approved Mining Proposal, however BMLV are proposing to expand their current footprint to allow for additional infrastructure required for the project.

Native Vegetation Solutions (NVS) was supplied with a survey area located approximately 110 km northwest of Kalgoorlie, in the Coolgardie Region (COO) of Western Australia (Figure 1).

The total survey area received from BMLV covered approximately 71.32 ha. The survey area lies within Mining Tenements M16/130 and M16/168. Actual disturbance footprints are not yet defined; however, clearing required within the boundary of the survey area is anticipated to be less than the total survey area.

This report will encompass results of the reconnaissance flora and vegetation survey within the Phillips Find survey area.

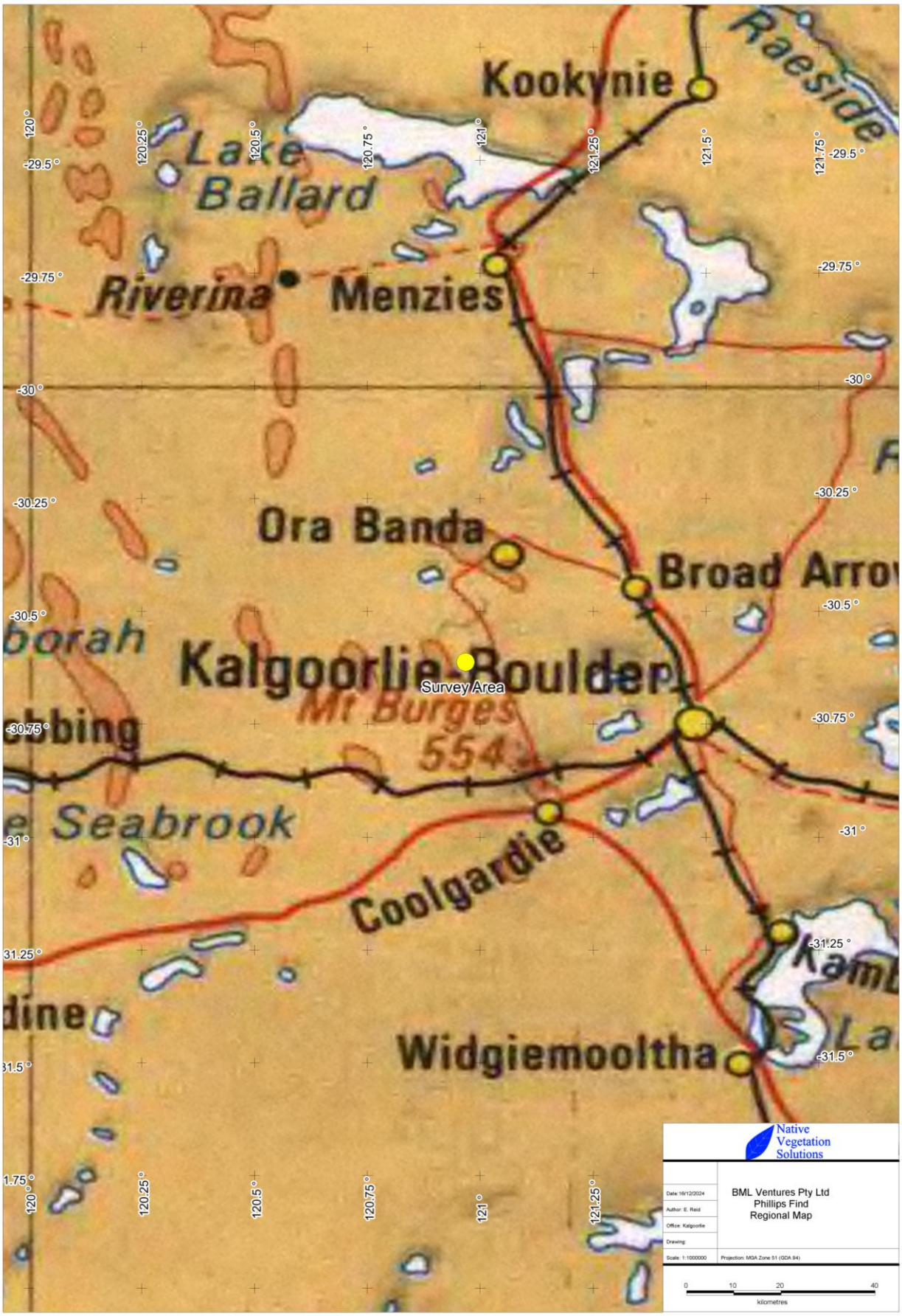

Figure 1: Regional map of survey location

1.1 Purpose and Scope

The objective of this report is to document the results of the flora and vegetation component of a reconnaissance assessment conducted in accordance with:

- *Environmental Factor Guideline- Flora and Vegetation* (EPA, 2016); and
- *Technical Guidance- Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016a).

A reconnaissance assessment has two components:

1). Desktop study which includes a literature review and a search of the relevant databases;
2). Reconnaissance survey of the survey area to verify the desktop survey, to define vegetation units present in the area, search for species of conservation significance and to determine potential sensitivity to impact.

As part of the reporting for the reconnaissance assessment, NVS has conducted a flora and vegetation survey which includes broad-scale vegetation mapping and vegetation condition mapping of the survey area.

The scope of work for the reconnaissance flora and vegetation survey was to:

- conduct a desktop study that includes a literature review and search of the relevant databases;
- describe the vegetation associations in the survey area;
- prepare an inventory of species occurring in the survey area;
- identify any vegetation communities or flora species of conservation significance;
- map broad-scale vegetation groups found within the survey area, including vegetation condition; and
- provide recommendations, including the management of perceived impacts to flora and vegetation within the survey area.

1.2 Statutory Framework and Guidance

This assessment took into account relevant sections of Commonwealth and State legislation and guidelines:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Environmental Protection Act 1986* (EP Act)
- *Biodiversity Conservation Act 2016* (BC Act)
- *Biosecurity and Agriculture Management Act 2007* (BAM Act)

The Minister for the Environment publishes lists of flora species in need of special protection because they are considered rare, likely to become extinct, or are presumed extinct. The current listings were published in the Government Gazette on 30 April 2024 (Lawn, 2024) and were taken into account.

As well as those listed above, the assessment took into account relevant sections of:

- EPA (2023) *Statement of environmental principles, factors, objectives and aims of EIA*;
- EPA (2016) *Environmental Factor Guideline: Flora and Vegetation;* and
- EPA (2016a) *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment*, known as *Flora and Vegetation Technical Guidance*

1.2.1 Western Australian *Biodiversity Conservation Act 2016*

The Western Australian *Biodiversity Conservation Act 2016* (BC Act) provides for the conservation, protection and ecologically sustainable use of biodiversity and biodiversity components in Western Australia. The BC Act replaced the *Wildlife Conservation Act 1950*.

Threatened species (both flora and fauna) that meet the categories listed within the Act are highly protected and require authorisation by the Ministerial to take or disturb. These are known as Threatened Flora and Threatened Fauna. The conservation categories of Critically Endangered, Endangered and Vulnerable have been aligned with those detailed in the EPBC Act, as below.

Flora and fauna species may be listed as being of special conservation interest if they have a naturally low population, restricted natural range, are subject to or recovering from a significant population decline or reduction of range or are of special interest, and the Minister considers that taking may result in depletion of the species. Migratory species and those subject to international agreement are also listed under the BC Act. These are known as specially protected species in the BC Act.

Threatened Ecological Communities (TECs) are also protected under BC Act and are categorised using the same criteria as threatened species.

1.2.2 Environmental Protection Act 1986

The *EP Act 1986* was created to provide for an Environmental Protection Authority (the EPA) that has the responsibility for:

- prevention, control and abatement of pollution and environmental harm
- conservation, preservation, protection, enhancement and management of the environment
- matters incidental to or connected with the above.

The EPA is responsible for providing the guidance and policy under which environmental assessments are conducted. It conducts environmental impact assessments (based on the information included in environmental assessments and provided by the proponent), initiates measures to protect the environment and provides advice to the Minister responsible for environmental matters.

1.2.3 Environment Protection and Biodiversity Conservation Act 1999

At a Commonwealth level, Threatened taxa are protected under the EPBC Act, which lists species and ecological communities that are considered Critically Endangered, Endangered, Vulnerable, Conservation Dependent, Extinct, or Extinct in the Wild (Section 6 below).

1.2.4 Flora

1.2.4.1 Threatened and Priority Flora

Conservation significant flora species are those that are listed as TF (Threatened Flora) and (within Western Australia) as PF (Priority Flora). TF species are listed as threatened by the Western Australian Department of Biodiversity Conservation and Attractions (DBCA) and protected under the provisions of the BC Act. Some State-listed TF are provided with additional protection as they are also listed under the Commonwealth EPBC Act. Species can also be listed under the EPBC Act without being listed under the BC Act.

Flora are listed as PF where populations are geographically restricted or threatened by local processes, or where there is insufficient information to formally assign them to TF categories. Whilst PF are not specifically listed in the BC Act, some may qualify as being of special conservation interest and these may require a greater level of protection than unlisted species. Generally though, PF have no statutory protection. They are generally considered in environmental impact assessments under the state approval processes by Department of Mines, Industry Regulation and Safety (DEMIRS) under the *Mining Act 1978* and DBCA under the EP Act. Under this approval process measures are usually taken to protect and avoid PF.

There are seven categories covering State-listed TF and PF species (DBCA, 2023) which are defined in Section 7 below. PF for Western Australia are regularly reviewed by DBCA whenever new information becomes available, with species status altered or removed from the list (Lawn, 2024) when data indicates that they no longer meet the requirements outlined in Section 7 below.

1.2.4.2 Other Significant Flora

According to the Flora and Vegetation Technical Guidance (EPA 2016a) other than being listed as Threatened or Priority Flora, a species can be considered as significant if it is considered to be:

- locally endemic or association with a restricted habitat type (e.g., surface water or groundwater dependent ecosystems)
- a new species or has anomalous features that indicate a potential new species
- at the extremes of range, recently discovered range extensions (generally considered greater than 100 km or in a different bioregion), or isolated outliers of the main range
- unusual species, including restricted subspecies, varieties or naturally occurring hybrids and
- relictual status, being representative of taxonomic groups that no longer occur widely in the broader landscape.

1.2.5 Ecological Communities and Vegetation

1.2.5.1 Threatened and Priority Ecological Communities

Nationally Listed Threatened Ecological Communities

An ecological community is a naturally occurring group of plants, animals and other organisms interacting in a unique habitat. The complex range of interactions between the component species provides an important level of biological diversity in addition to genetics and species. At Commonwealth level, Threatened Flora and TECs are protected under the Commonwealth EPBC Act. An ecological community may be categorised into one of the three subcategories:

- Critically Endangered, if it is facing an extremely high risk of extinction in the wild in the immediate future
- Endangered, if it is not critically endangered and is facing a very high risk of extinction in the wild in the near future and
- Vulnerable, if it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future.

State Listed Threatened Ecological Communities

The Western Australian DBCA also maintains a list of TECs, protected under the BC Act, which are further categorised into three subcategories much like those of the EPBC Act.

State Listed Priority Ecological Communities

DBCA maintains a list of Priority Ecological Communities (PECs). PECs include potential TECs that do not meet survey criteria, or that are not adequately defined.

1.2.5.2 Other Significant Vegetation

According to the Flora and Vegetation Technical Guidance (EPA 2016a), other than being listed as a TEC or PEC, vegetation can be considered as significant if it is considered to have:

- restricted distribution
- a degree of historical impact from threatening processes
- a role as a refuge; and/or
- provides an important function required to maintain ecological integrity of a significant ecosystem.

1.2.5.3 Declared Pest Plants

The Western Australian Organism List (WAOL) details organisms listed as Declared Pests under the BAM Act). Under the BAM Act, Declared Pests are listed as one of the three categories, or exempt:

- C1 (exclusion), that applies to pests not established in Western Australia; control measures are to be taken to prevent their entry and establishment

- C2 (eradication), that applies to pests that are present in Western Australia but in low numbers or in limited areas where eradication is still a possibility
- C3 (management), that applies to established pests where it is not feasible or desirable to manage them in order to limit their damage; or
- Exempt (no category).

2. EXISTING ENVIRONMENT

2.1 Geology and Vegetation

The survey area lies in the Coolgardie (COO) bioregion, more specifically the Eastern Goldfields (COO03) subregion. The Eastern Goldfields subregion covers over 5 million hectares and lies on the Yilgarn Craton's 'Eastern Goldfields Terrains'. The relief is subdued and comprises of gently undulating plains interrupted in the west with low hills and ridges of Archaean greenstones and in the east by a horst of Proterozoic basic granulite. The underlying geology is of gneisses and granites eroded into a flat plane covered with tertiary soils and with scattered exposures of bedrock. Calcareous earths are the dominant soil group and cover much of the plains and greenstone areas. A series of large playa lakes in the western half are the remnants of an ancient major drainage line (CALM, 2002).

The vegetation is of Mallees, *Acacia* thickets and shrubheaths on sandplains. Diverse *Eucalyptus* woodlands occur around salt lakes, on ranges, and in valleys. Salt lakes support dwarf shrublands of samphire. Woodlands and *Dodonaea* shrublands occur on basic graninulites of the Fraser Range (CALM, 2002).

2.2 Climate

The climate of the Coolgardie Region is classified as Arid to semi-arid with 200-300 mm of rainfall, sometimes in summer but usually in winter (CALM, 2002). The nearest official meteorological weather station with the most complete and up to date temperature information is Coolgardie (station number 012018), which is located approximately 43.2 km southeast of the survey area.

2.2.1 Temperature

Mean annual minimum temperature at Coolgardie is 11.2°C and mean annual maximum temperature is 25.0°C (BOM, 2024). The coldest temperatures are attained in July (mean minimum temperature 5.2°C), the hottest is January (mean maximum temperature 33.3°C) and diurnal temperature variations are relatively consistent throughout the year (Figure 2).

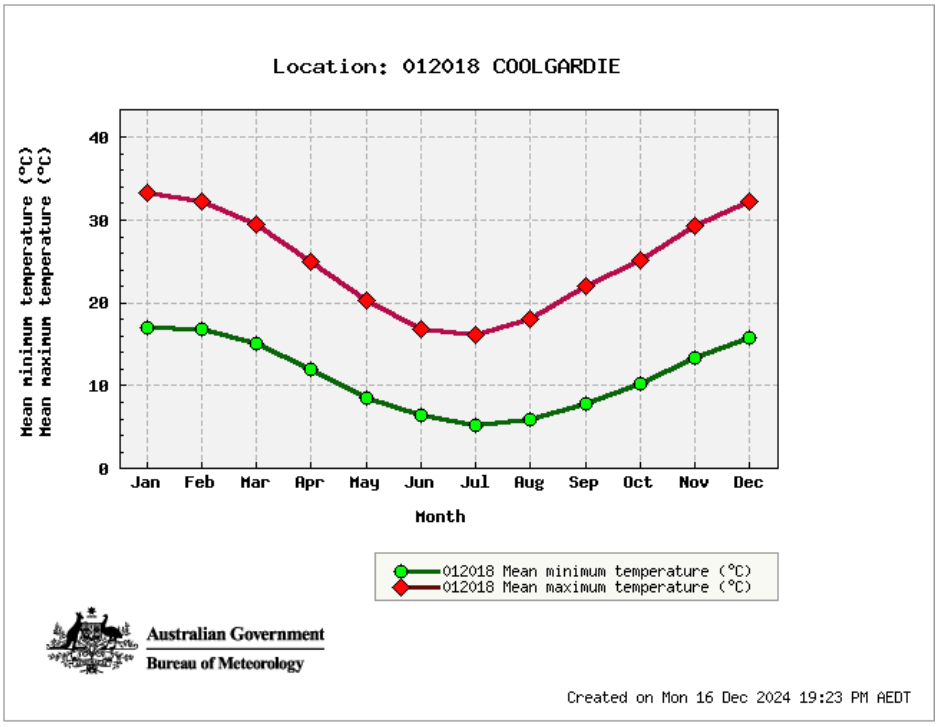

Figure 2: Mean temperature ranges for Coolgardie weather station

2.2.2 Rainfall

The annual average rainfall at Leinster Aero is 265.6 mm, which falls (>1 mm) on an average of 34 rain-days (BOM, 2024). Larger rainfall events occur from January to August (Figure 3). Prior to the survey in 2024, rainfall in June and November exceeded monthly averages while rainfall for all other months remained below monthly averages (BOM, 2024).

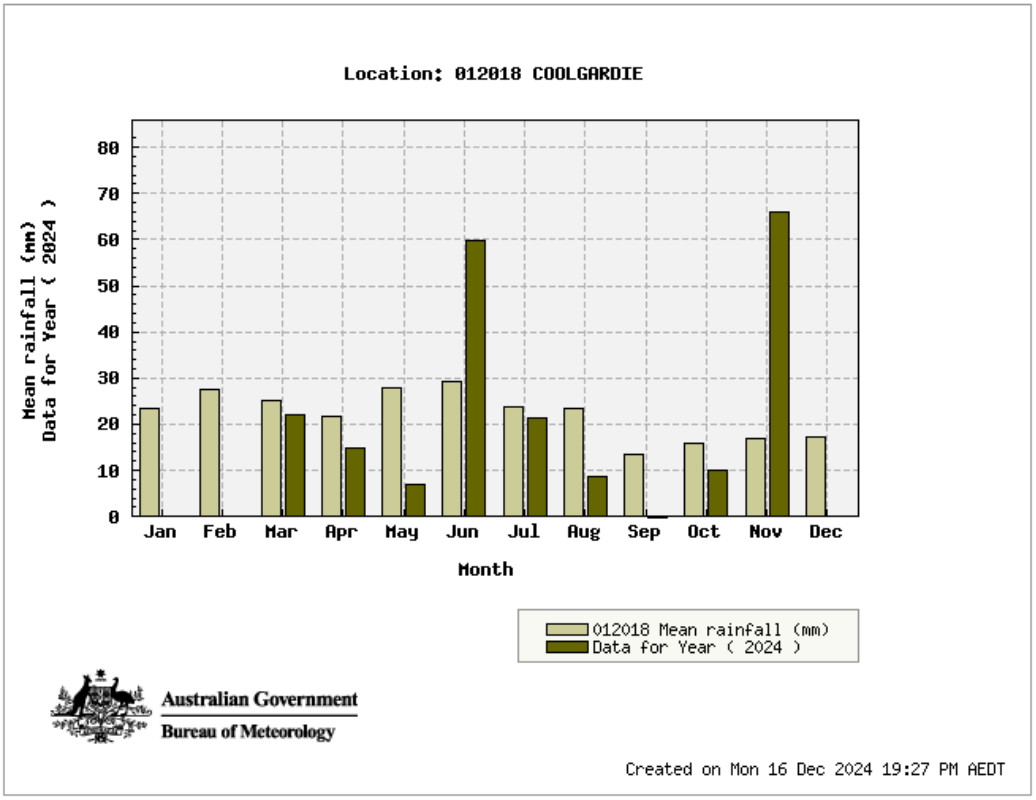

Figure 3: Monthly and mean rainfall for Coolgardie weather station

3. ASSESSMENT METHODOLOGY

3.1 Personnel and Reporting

The following personnel were involved in the Reconnaissance flora and vegetation survey:

- Mr Eren Reid (*BSc- Biological Science),* Principal Botanist, Native Vegetation Solutions, undertook the survey, vegetation mapping, data collation, field identification of flora, preparation and review of the report. Mr Eren Reid has over 20 years' experience in botanical surveys throughout the Murchison Region and over a variety of environments across Western Australia.
- Ms Adele Thomasz (*BSc*- Conservation and Wildlife Biology), Native Vegetation Solutions, data collation and preparation of the report. Adele Thomasz has over 5 years' experience working in the conservation sector and three years specifically working on botanical survey reporting; and

3.2 Preliminary Desktop Study

A preliminary assessment of the survey area and its potential constraints was undertaken by reviewing relevant government agency managed databases (Sections 3.2.1 to 3.2.5, and Appendices 1 & 2) and consulting with government agencies where necessary. The following sections provide a summary of desktop searches undertaken for the project.

3.2.1 *Environment Protection and Biodiversity Conservation Act* Protected Matters

The *EPBC Act* Protected Matters Search tool was utilised to provide results for matters of National Environmental Significance within the survey area using the survey area as the search criteria with a 10 km buffer (DCCEEW, 2024).

3.2.2 Threatened Flora and Communities

The Threatened and Priority Flora Database managed by the Department of Biodiversity, Conservation and Attractions (DBCA) was searched for threatened and priority flora within a 20km radial area of the survey area (DBCA, 2022a).

The TEC and PEC database was searched to determine the presence of PECs or TECs (DBCA, 2022), with Geographic Information System (GIS) data supplied for assessment, within a 20 km radial area of the survey area.

3.2.3 Environmentally Sensitive Areas (ESAs) and Conservation Reserves

The Department of Water and Environmental Regulation (DWER, 2024) Clearing Permit System Map Viewer was used to determine the location of any ESAs and Conservation Reserves.

3.2.4 Vegetation Type, Extent and Status

Vegetation extent and status data was sourced from the Department of Agriculture and Food (DAFWA) report and its associated GIS file (Shepherd *et al*, 2002). This data comprises Beard's Pre-European vegetation groups.

DBCA's Statewide Vegetation Statistics (DBCA, 2019) was also referenced for the current extent of Beard's Vegetation Groups. The purpose of examining this information is to determine if the survey area lies within any vegetation groups defined by Beard that may have been subjected to widescale clearing for European settlement. The national objectives and targets for biodiversity conservation recognise that the retention of 30% or more of the pre-clearing extent of a Beard vegetation association is necessary if Australia's biological diversity is to be protected.

3.2.5 Wetlands

The potential of wetlands within the project area was determined by examining DWER's Clearing Permit System Map Viewer (DWER, 2024).

3.2.6 Dieback

Under normal circumstances Dieback is only considered a potential issue for any project if the project area lies within the Southwest Land Division and the mean annual rainfall of the area is greater than 400 mm. There is no record of *Phytophthora cinnamomi* (Dieback*)* establishing in natural ecosystems in regions receiving <400mm rainfall per annum (CALM, 2003).

However, as indicated within the more recent Dieback guidelines (DBCA, 2020), other species of *Phytophthora* may persist east of the 400mm isohyet in unusually wet conditions. It is therefore recommended to conduct a risk assessment as per these guidelines.

3.3 Site Investigation

A site visit of the survey area was carried out by Botanist Eren Reid from Native Vegetation Solutions on the 7th of December 2022 to examine the flora and vegetation groups contained within the survey area. A total of 5 hours was spent on site traversing the survey area, by Yamaha Viking All Terrain Vehicle (ATV) and on foot.

The survey was conducted in accordance with relevant Environmental Protection Authority's (EPA's) Statements and Technical Guidance (Section 1.1).

The EPA uses the Interim Biogeographic Regionalisation of Australia (IBRA) as the largest unit for Environmental Impact Assessment (EIA) decision making in relation to the conservation of biodiversity. Given the scale and nature of the proposed disturbance as well as the existing disturbance, and that the survey area is located within the Murchison (MUR) IBRA region, a reconnaissance flora and vegetation survey was deemed adequate.

3.3.1 Licenses

A Scientific License was not required for the field work as no samples were collected for identification. All taxa were able to be identified in the field.

3.3.2 Field Methods

Prior to the field work, the aerial photography was examined and representative sample sites for relevés were chosen to provide coverage over all potential vegetation types.

In the field, 20m x 20m relevé sites were established at these sites, taking into account representation of surrounding vegetation and vegetation boundaries. Relevé sites are represented in Appendix 3.

Each relevé site was captured on a TwoNav Aventura GPS at ±4m accuracy, using Universal Transverse Mercator location on GDA94 datum. Digital photographs were taken of each representative vegetation group present in the survey area.

Data collected at each relevé included:

- Photograph of representative vegetation group:
- GPS Location;
- Species Present;

- Population Count/Estimate of Conservation Significant Flora (if present);
- Disturbance Level; and
- Vegetation Condition

The vegetation structure was assessed using the method developed by Muir (1977). Definitions of the vegetation structure are presented in Appendix 2.

The condition of each relevé was assessed using the method developed by Keighery (1994). Definitions of the condition scale are presented in Appendix 2.

Vegetation groups were mapped using the methods listed in Section 3.3.4 below.

Opportunistic recording of plant taxa and vegetation group mapping was also utilised in the survey area between relevé sampling points, via wandering traverses. Smaller singular relevé sites were also utilised as opportunistic sample sites to record taxa and assist in mapping vegetation groups.

All relevé sample sites and GPS tracks are included in Appendix 3.

3.3.3 Post-Field Methods

Taxa were identified with the use of information published on Florabase (WAHERB, 2024). Threatened flora range extensions and new locations were submitted to the Western Australian Herbarium (WAHERB) as per the EPA Technical Guidelines (EPA 2016a).

Species information was transferred into Microsoft Excel® worksheets representing presence/absence of species per vegetation group.

3.3.4 Mapping

Vegetation mapping was produced via GPS recorded information in the field, cross-referenced with vegetation descriptions made in the field, overlaid on aerial imagery of the survey area. The GPS utilised (TwoNav Aventura GPS) displayed aerial imagery, hence real-time mapping of vegetation groups was available during field work.

Vegetation Health Condition was assessed in the field with reference to Keighery (1994).

GPS tracks and waypoints recorded during field work are presented in Appendix 3.

3.3.5 IBSA Data Package

The Environmental Protection Authority (EPA), Department of Water and Environmental Regulation (DWER) and Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) require Index of Biodiversity Surveys for Assessments (IBSA) Data Packages to be submitted to support assessment and compliance under the *Environmental Protection Act 1986.*

An IBSA data package is a single file in .zip format, containing:

- one survey report in .pdf format;
- one plain-text survey report in .txt format; and
- a set of electronic data files, comprising:
    - one survey details spatial dataset in shapefile (.shp, etc.) or MapInfo (.tab, etc.) format; and

- one or more survey data spatial datasets, as required, in shapefile (.shp, etc.) or MapInfo (.tab, etc.) format.

The IBSA Data package for this survey will be submitted via the DWER IBSA Submission Portal.

3.4 Nomenclature And Taxonomy

Nomenclature follows that used by the WAHERB.

The WAHERB has updated its sequence and arrangement of collections to conform to the systematic sequence of the Angiosperm Phylogeny Group (APGIII), with the result that many Families and Genera have been moved or renamed. This report attempts to follow those changes in relation to species recorded during this survey.

3.5 Limitations

Table 1 lists potential limitations that may have affected the survey.

Table 1: List of potential survey limitations

Potential Limitations	Constraint (Y/N)	Comment
Competency and experience of the consultants undertaking the survey	N	Experienced and competent personnel conducted the survey. Eren Reid (*BSc*) has over 20 years' experience in botanical surveys throughout the Murchison Region and over a variety of environments across Western Australia.
Scope	N	The Scope of work was adequately defined. Vascular flora species were the focus of the survey and were thoroughly sampled.
Proportion of flora identified during survey	N	As the survey was planned to target species of conservation significance and flora within a defined survey area, a complete census of the species present was attempted (Approx. 95%). Sufficient identifications were made to allow vegetation descriptions to be made.
Sources of information	N	Threatened and Priority Flora GIS information was available from DBCA.
Proportion of the task achieved	N	All tasks completed.
Timing/Season	N	The reconnaissance flora and vegetation survey was conducted in December 2022. Flowering annual species were present within the survey area, suggesting recent above average rainfall in September and October 2022 was sufficient for the period of survey. The most recent rainfall received in the area was on 25th November 2022.
Disturbance in survey area	N	Minor disturbance (historical mining access tracks and exploration) was observed within the survey area, however, did not compromise the results of the survey as these areas were avoided whilst collecting data.
Intensity of survey effort	N	The survey intensity is considered to have been sufficient for a reconnaissance survey according to EPA (2016) guidelines. Areas most likely to contain threatened and priority species were targeted. Vegetation mapping sites were selected to provide adequate coverage of the survey area.
Resources	N	Resources, in terms of time, equipment, support and personnel were adequate to undertake and complete the reconnaissance survey.
Access problems	N	All the areas in need of survey were easily accessible from existing tracks, or by foot.
Availability of contextual information on the region	N	Contextual information regarding vegetation and flora of the Coolgardie bioregion is readily available. Adequate information was able to be accessed from available databases.

4. RESULTS

4.1 Preliminary Desktop Assessment

4.1.1 EPBC Act Protected Matters

Results of the EPBC Protected Matters search tool are included in Appendix 1.

The EPBC Protected Matters report indicated one TF, *Gastrolobium graniticum* (T), or possible habitat could occur within the survey area. This species is restricted to granite outcrops. No granite outcrops were recorded in the survey area.

The EPBC Protected Matters report indicated no TECs or Commonwealth Reserves within the survey area.

The search results indicated that one State and Territory Reserve, Credo NRS, occurs within 10km of the survey area. The location is shown in Map 3 of Appendix 4

4.1.2 Threatened Flora and Communities

The DBCA database searches revealed a potential for no Threatened or Priority Flora species to occur within a 20km radius of the survey area (DBCA, 2024a).

The PEC/TEC search (DBCA, 2024) revealed that no TECs or PECs fall within the survey area.

4.1.3 Environmentally Sensitive Areas and Conservation Reserves

The survey area does not intersect with any ESA's or Conservation Reserves (DWER, 2024).

4.1.4 Land Systems

As part of the Rangeland resource surveys, the Department of Agriculture mapped the Land Systems of Western Australia (DPIRD, 2017). The Land Systems occurring within the survey area are listed in Table 2 below and displayed in Appendix 3.

Table 2: Land Systems occurring within the survey area (DPIRD, 2017)

Land System	Description	Extent of Survey Area (ha)	% Of Survey Area (%)
BB5	Rocky ranges and hills of greenstones-basic igneous rocks	4.26	5.97%
Mx40	Flat to undulating valley plains and pediments; some rock outcrop.	67.06	94.03%

4.1.5 Vegetation Type, Extent and Status

One vegetation unit defined by Beard (1990) was identified as part of the desktop assessment. The vegetation unit identifies the Pre-European extent of vegetation, as mapped by Beard (1990). The national objectives and targets for biodiversity conservation recognise that the retention of 30% or more of the pre-clearing extent of Beard's vegetation associations is necessary if Australia's biological diversity is to be protected.

Information relating to known Beard (1990) vegetation units within the survey area has been summarised in Table 3, Table 4 and Table 5 below. This information has been compiled through both desktop assessments and the site visit.

The extent of the Beard vegetation units within the survey area at all scales is less than 1% of the total area at each scale (Table 3). The Beard vegetation units are above the 30% threshold at a State, bioregional and subregional scale.

Table 3: Extent of Beard Associations within the survey area

Beard Vegetation Association	Extent within survey area (ha)	% of survey area (%)	By Association WA	By IBRA Region *(COO)*	By IBRA Sub-region *(COO03)*	By Shire *(Shire of Leonora)*
468	10.87	15.24	<1%	<1%	<1%	<1%
936	60.45	84.76	<1%	<1%	<1%	<1%

Table 4: Summary of information regarding Pre-European and current vegetation extent of Vegetation Association 468 within the survey area

Factor	Value				
Beard Vegetation Association*	468				
Vegetation Association Description*	Medium woodland; salmon gum & goldfields blackbutt				
Pre-European Extent (ha)	Scale				
	By Association (WA)	By Association (WA)	By IBRA Region (COO)	By IBRA Sub-region (COO03)	By Shire (Shire of Coolgardie)
	476,113	592,022	583,358	482,362	149,487
% Pre-European Extent Remaining	100.00%	98.63%	98.63%	98.34%	99.43%
Surrounding Land Use***	Mining, Exploration, Pastoral Lease				
Weed prevalence***	Low				

* Source: Shepherd *et al.* (2002) Appendix 2
**Source: DBCA, (2019)
***Source: Field Assessment

Table 5: Summary of information regarding Pre-European and current vegetation extent of Vegetation Association 936 within the survey area

Factor	Value				
Beard Vegetation Association*	936				
Vegetation Association Description*	Medium woodland; salmon gum				
Pre-European Extent (ha)	Scale				
	By Association (WA)	By Association (WA)	By IBRA Region (COO)	By IBRA Sub-region (COO03)	By Shire (Shire of Coolgardie)
	924,675	698,752	586,792	310,898	359,113
% Pre-European Extent Remaining	96.46%	96.84%	99.58%	99.22%	99.32%
Surrounding Land Use***	Mining, Exploration, Pastoral Lease				
Weed prevalence***	Low				

* Source: Shepherd *et al.* (2002) Appendix 2
**Source: DBCA, (2019)
*****Source: Field Assessment**

4.1.6 Wetlands

The DWER Clearing Permit System Map Viewer revealed no waterbodies within the survey area (DWER, 2024).

4.1.7 Dieback

The survey area lies south of the 26th parallel, however receives average annual rainfall of 265.6 mm. There is no record of *Phytophthora cinnamomi* establishing in natural ecosystems in regions receiving less than 400mm rainfall per annum (CALM, 2003).

However, as indicated within the more recent Dieback guidelines (DBCA, 2020), other species of *Phytophthora* may persist east of the 400mm isohyet in unusually wet conditions. It is therefore recommended to conduct a risk assessment as per these guidelines.

Additionally, all measures should be taken to prevent any possible soil contamination (including seeds of non-native species *etc*.) which poses a risk in the survey area during seasonally favourable conditions.

4.2 Field Assessment

4.2.1 Threatened Flora

No Priority Flora or Threatened Flora were recorded in the survey area.

4.2.2 Vegetation Type, Extent and Status

A total of 18 Families, 33 Genera and 64 Species were recorded within the survey area. Five major vegetation groups were recorded in the survey area and range from Completely Degraded to Very Good condition (using the scale of Keighery 1994, see Appendix 2). Existing disturbance within the survey area is comprised of historic exploration and mining activities, and access roads.

No unique or restricted vegetation communities were identified, and all vegetation types/communities are common, widespread and well represented in the Eastern Eastern Goldfields subregion.

The summary of vegetation groups contained within the survey area is summarised in Table 6 below. Maps of the survey area can be seen in Appendix 3.

Table 6: Vegetation Group Summary

Vegetation Group	Veg Group Code	Families	Genera	Species	Area (ha)	Percentage of survey area (%)
Eucalyptus salmonophloia and Eucalyptus ravida woodland	A	12	18	29	6.614	9.27%
Eucalyptus griffithsii over Acacia acuminata thicket	B	12	15	22	15.534	21.78%
Mixed Eucalyptus over mixed sclerophyll shrubland on undulating hills	C	12	16	22	2.71	3.80%
Acacia quadrimarginea shrubland	D	11	17	22	2.34	3.28%
Eucalyptus lesouefii woodland	E	5	7	11	3.601	5.05%
Existing Disturbance		N/A	N/A	N/A	40.52	56.82%
	Total	18*	33*	64*	71.32#	100.00#

Note: * Within total survey area (not sum of column)
Sum of column

The vegetation groups within the survey area are described in more detail below.

4.2.2.1 Eucalyptus salmonophloia and *Eucalyptus ravida* woodland (A)

This Woodland (Muir, 1977) consisted of 12 Families, 18 Genera and 29 Species. The vegetation group was approximately 6.61 ha which makes up 9.27% of the survey area.

Figure 4: Vegetation Group A within the survey area

4.2.2.2 *Eucalyptus griffithsii* over *Acacia acuminata* thicket (B)

This Thicket (Muir, 1977) consisted of 12 Families, 15 Genera and 22 Species. The vegetation group was approximately 15.53 ha which makes up 21.78% of the survey area.

Figure 5: Vegetation Group B within the survey area

4.2.2.3 Mixed *Eucalyptus* over mixed sclerophyll shrubland on undulating hills (C)

This Low Forrest B (Muir, 1977) consisted of 12 Families, 16 Genera and 22 Species. The vegetation group was approximately 2.71 ha which makes up 3.80% of the survey area.

Figure 6: Vegetation Group C within the survey area

4.2.2.4 *Acacia quadrimarginea* shrubland (D)

This Scrub (Muir, 1977) consisted of 11 Families,17 Genera and 22 Species. The vegetation group was approximately 2.34 ha which makes up 3.28% of the survey area.

Figure 7: Vegetation Group D within the survey area

4.2.2.5 *Eucalyptus lesouefii* woodland (E)

This Low Woodland A (Muir, 1977) consisted of 5 Families, 7 Genera and 11 Species. The vegetation group was approximately 3.60 ha which makes up 5.05% of the survey area.

Figure 8: Vegetation Group E within the survey area

4.2.2.7 Existing Disturbance

Existing disturbance within the survey area consisted of historic exploration and mining clearing and access roads and was approximately 40.52 ha which makes up 56.82% of the survey area.

No picture was recorded for this disturbance

4.2.3 Weeds

One weed species was recorded within the survey area, *Centaurea melitensis** (Maltese Cockspur). This species is not considered a Declared Pest under the BAM Act (DPIRD, 2024).

4.2.4 Vegetation Condition

Evidence of historic exploration, mining and access tracks was observed during the field assessment.

Overall, the condition of the vegetation was determined to range from “Completely Degraded” to “Very Good” with most of the area falling into the “Good” Category. Areas which were affected by historic exploration and clearing were deemed in “Completely Degraded” condition. A map of the vegetation condition within the survey is depicted in Appendix 3.

5. DISCUSSION

The field assessment established that the condition of the vegetation in the proposed disturbance area ranged from “Completely Degraded” to “Very Good” with most of the area falling into the “Good” Category. Areas which were affected by historic exploration were deemed in “Completely Degraded” condition. No areas of vegetation were assessed to be in “Pristine” condition.

One weed species was recorded within the survey area, *Centaurea melitensis** (Maltese Cockspur). This species is not considered a Declared Pest under the BAM Act (DPIRD, 2024).

No Priority or Threatened Flora were recorded in the survey area.

No TECs or PECs were recorded in the survey area.

No unique or restricted vegetation communities were identified, and all vegetation types/communities are common, widespread and well represented in the Eastern Murchison subregion.

Any proposed disturbance/clearing of vegetation will result in a loss of some flora and vegetation. However, given the size of the area and the extent of the Beard (1990) vegetation association elsewhere, the impact on the vegetation and its component flora will not affect the conservation values of either, or create fragmentation or patches of remnant vegetation.

The following recommendations arise from the reconnaissance flora survey:

- Weed control measures should be implemented during and following earthworks; and
- Dust control measures should be implemented during earthworks.

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7. GLOSSARY

Acronyms:

BOM	Bureau of Meteorology, Australian Government
BSc	Bachelor of Science
CALM	Department of Conservation and Land Management (now DBCA)
CPS	Clearing Permit System (DWER)
DBCA	Department of Biodiversity, Conservation and Attractions, Western Australia
DCCEEW	Department of Climate Control, Energy, the Environment and Water, Australian Government
DEMIRS	Department of Energy, Mines, Industry Regulation and Safety, Western Australia
DPAW	Department of Parks and Wildlife, Western Australia (now DBCA)
DPIRD	Department of Primary Industries and Regional Development, Western Australia
DRF	Declared Rare Flora (now classed as Threatened Flora)
DWER	Department of Water and Environmental Regulation, Western Australia
EPA	Environmental Protection Authority, Western Australia
EP Act	Environmental Protection Act 1986, Western Australia
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth Act)
ESA	Environmentally Sensitive Area
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia, DCCEEW
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
km	Kilometres
m	Metres
COO	Coolgardie Bioregion (IBRA)
COO03	Eastern Goldfields Subregion (IBRA)
NVS	Native Vegetation Solutions
PEC	Priority Ecological Community, Western Australia
PF	Priority Flora
Ramsar	A wetland site designated of international importance under the Ramsar Convention (UNESCO)
TEC	Threatened Ecological Community
TF	Threatened Flora
UNESCO	United Nations Educational, Scientific and Cultural Organization
WA	Western Australia
WAHERB	Western Australian Herbarium (DBCA)
WAOL	Western Australian Organism List (DPIRD)

Definitions:

DBCA (2023) Conservation Codes for Western Australian Flora and Fauna. Department of Biodiversity, Conservation and Attractions, Western Australia, August 2023: -

T Threatened species:

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR Critically endangered species

Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN Endangered species

Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines".

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU Vulnerable species

Threatened species considered to be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines".

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct species:

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

EX Extinct species

Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW Extinct in the wild species

Species that "is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI Migratory species

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD Species of special conservation interest (conservation dependent fauna)

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS Other specially protected species

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018.*

P Priority Species

Priority is not a listing category under the BC Act. The Priority Flora and Fauna lists are maintained by the department and are published on the department's website.

All fauna and flora are protected in WA following the provisions in Part 10 of the BC Act. The protection applies even when a species is not listed as threatened or specially protected, and regardless of land tenure (State managed land (Crown land), private land, or Commonwealth land).

Species that may possibly be threatened species that do not meet the criteria for listing under the BC Act because of insufficient survey or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of prioritisation for survey and evaluation of conservation status so that consideration can be given to potential listing as threatened.

Species that are adequately known, meet criteria for near threatened, or are rare but not threatened, or that have been recently removed from the threatened species list or conservation dependent or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of priority status is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

Priority 1: Poorly-known species

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

Priority 2: Poorly-known species

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

Priority 3: Poorly-known species

Species that are known from several locations and the species does not appear to be under imminent threat or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. These species need further survey.

Priority 4: Rare, Near Threatened and other species in need of monitoring

a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.
b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as a conservation dependent specially protected species.
c) Species that have been removed from the list of threatened species or lists of conservation dependent or other specially protected species, during the past five years for reasons other than taxonomy.
d) Other species in need of monitoring.

Appendix 1: Relevant Government Database Search Results

Australian Government
Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 16-Dec-2024

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	8
Listed Migratory Species:	6

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	9
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	1
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Species			[Resource Information]
Status of Conservation Dependent and Extinct are not MNES under the EPBC Act. Number is the current name ID.			
Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area	In feature area
PLANT			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gastrolobium graniticum			
Granite Poison [14872]	Endangered	Species or species habitat may occur within area	In buffer area only

Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea			
Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Credo	NRS Addition - Gazettal in Progress	WA	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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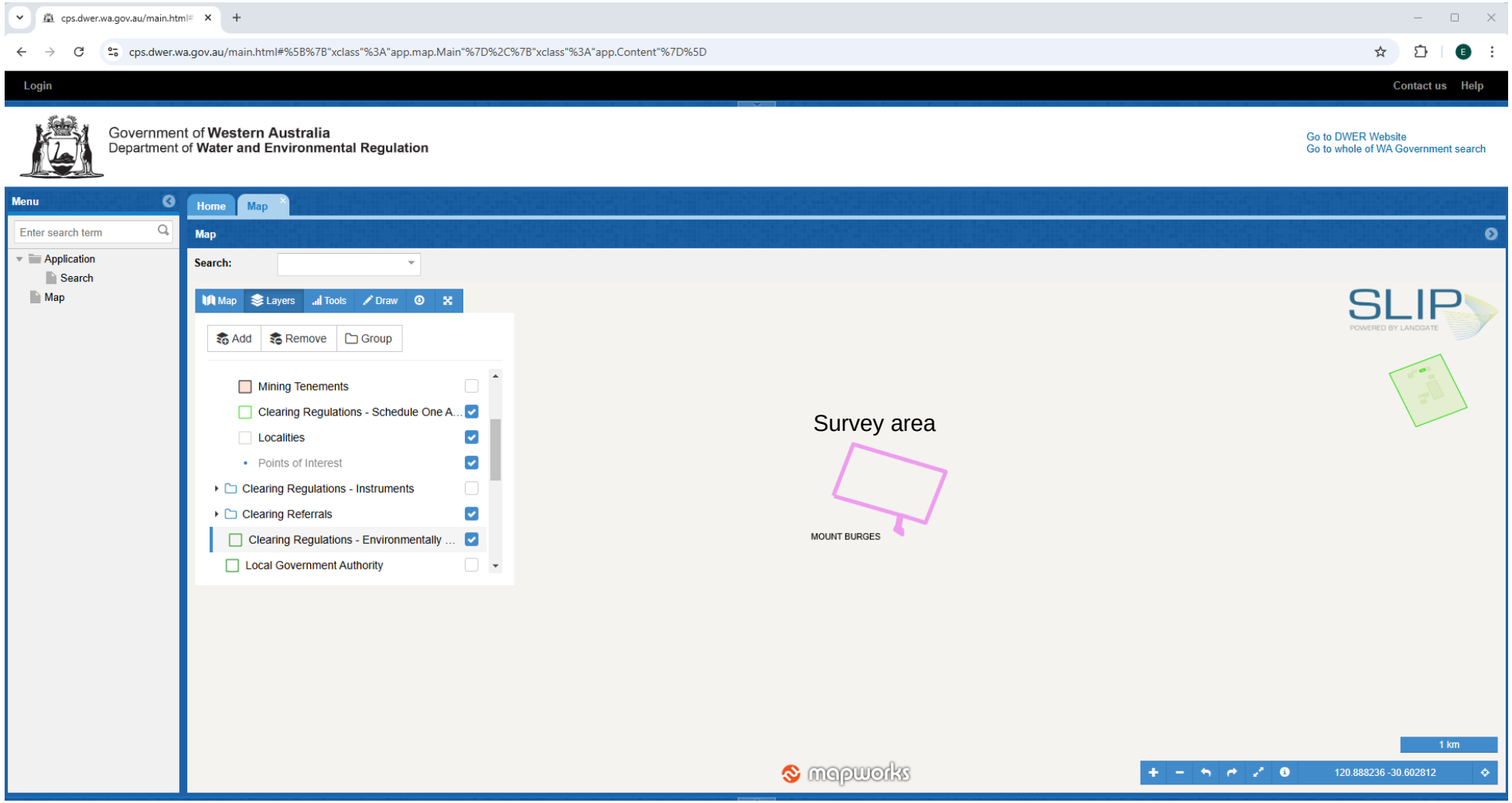
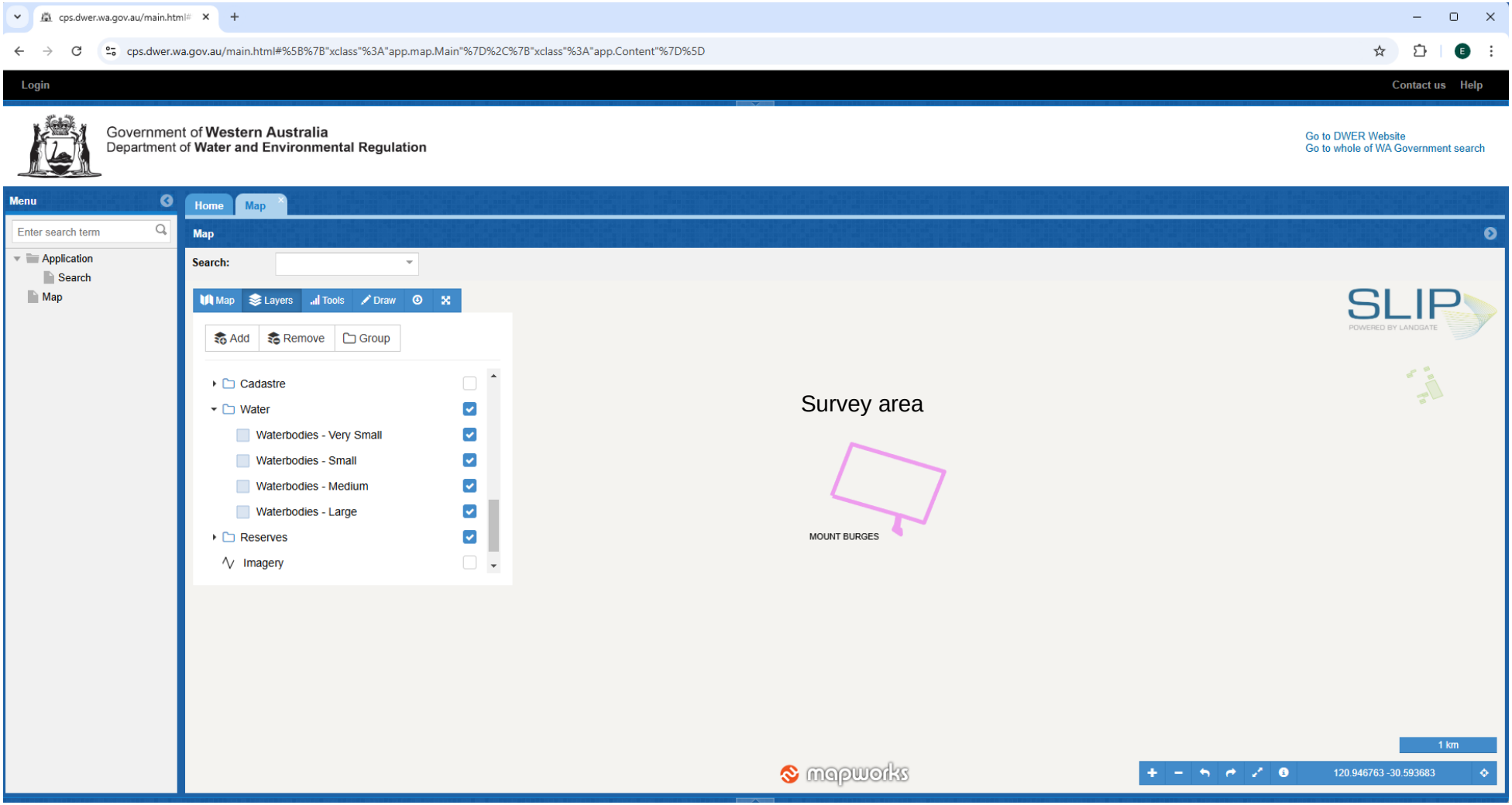


DWER's Clearing Permit System Map Viewer showing no ESA's (dark green shaded areas) within the survey area (DWER, 2024)



DWER Clearing Permit System Map Viewer showing no waterbodies within the survey area (DWER, 2024)

Appendix 2: Vegetation Definitions

Vegetation Condition Definitions (Keighery, 1994)

Pristine (1). Pristine or nearly so, no obvious signs of disturbance.

Excellent (2). Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.

Very Good (3). Vegetation structure altered, obvious signs of disturbance.
For example, disturbance to vegetation structure caused by repeating fires, the presence of some more aggressive weeds, dieback, logging and grazing.

Good (4). Vegetation structure significantly altered by very obvious signs of multiple disturbance.
Retains basic vegetation structure or ability to regenerate it.
For example, disturbance to vegetation structure caused by frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.

Degraded (5). 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 grazing.

Completely Degraded (6). 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 compromising weed or crop species with isolated trees or shrubs.

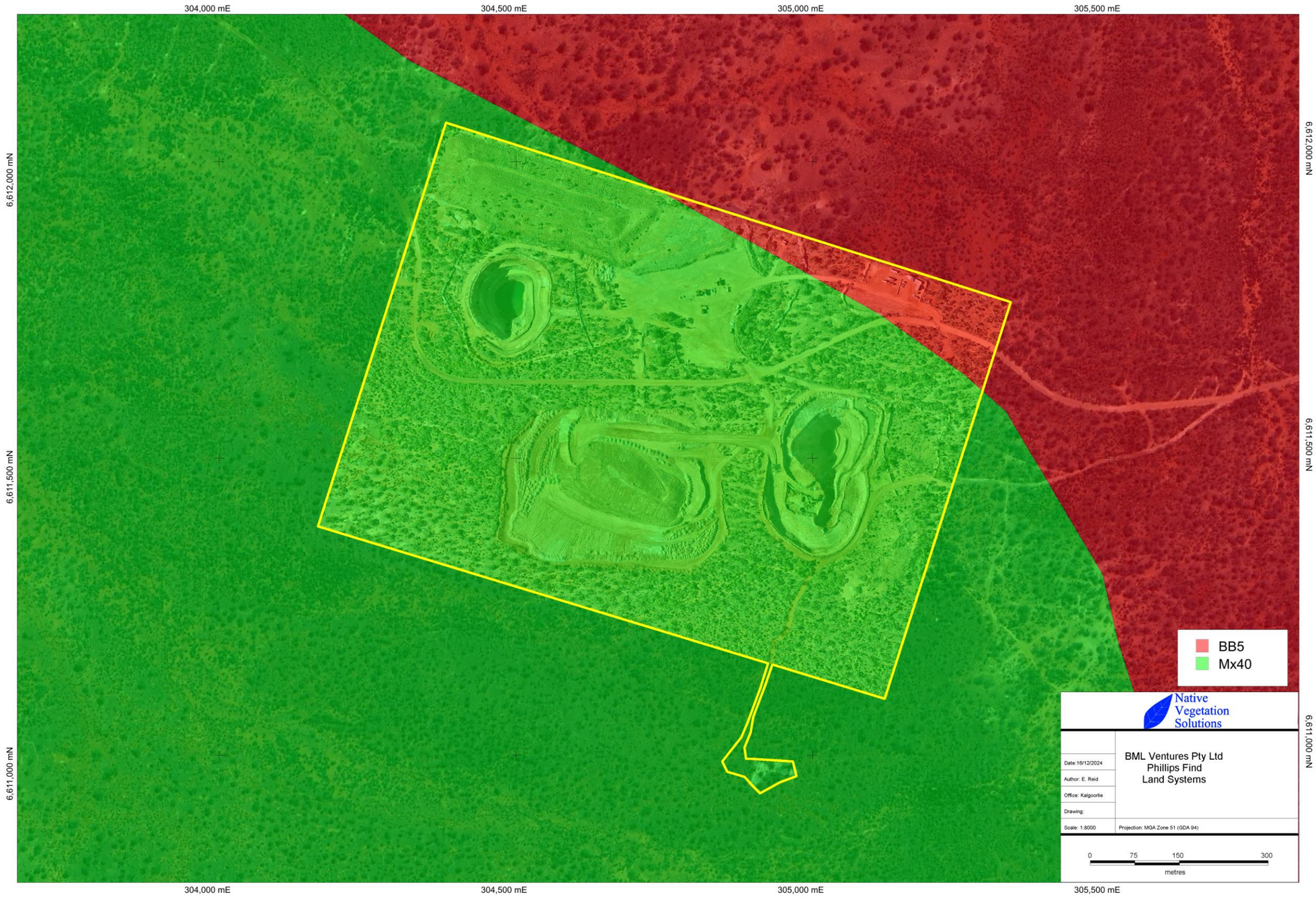
Vegetation Structure Definitions (Muir, 1977)

Life Form/Height Class	Canopy Cover			
	Dense 70-100% d	Mid-Dense 30-70% c	Sparse 10-30% i	Very Sparse 2-10% r
T Trees>30m	Dense Tall Forest	Tall Forest	Tall Woodland	Open Tall Woodland
M Trees 15-30m	Dense Forest	Forest	Woodland	Open Woodlnd
LA Trees 5-15m	Dense Low Forest A	Low Forest A	Low Woodland A	Open Low Woodland A
LB Trees<5m	Dense Low Forest B	Low Forest B	Low Woodland B	Open Low Woodland B
KT Mallee tree form	Dense Tree Mallee	Tree Mallee	Open Tree Mallee	Very Open Tree Mallee
KS Mallee shrub form	Dense Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub Mallee
S Shrubs>2m	Dense Thicket	Thicket	Scrub	Open Scrub
SA Shrubs 1.5-2.0m	Dense Heath A	Heath A	Low Scrub A	Open Low Scrub A
SB Shrubs 1.0-1.5m	Dense Heath B	Heath B	Low Scrub B	Open Low Scrub B
SC Shrubs 0.5-1.0m	Dense Low Heath C	Low Heath C	Dwarf Scrub C	Open Dwarf Scrub C
SD Shrubs 0.0-0.5m	Dense Low Heath D	Low Heath D	Dwarf Scrub D	Open Dwarf Scrub D
P Mat plants	Dense Mat Plants	Mat Plants	Open Mat Plants	Very Open Mat Plants
H Hummock Grass	Dense Hummock Grass	Mid-Dense Hummock Grass	Hummock Grass	Open Hummock Grass
GT Bunch grass >0.5m	Dense Tall Grass	Tall Grass	Open Tall Grass	Very Open Tall Grass
GL Bunch grass <0.5m	Dense Low Grass	Low Grass	Open Low Grass	Very Open Low Grass
J Herbaceous spp.	Dense Herbs	Herbs	Open Herbs	Very Open Herbs
VT Sedges >0.5m	Dense Tall Sedges	Tall Sedges	Open Tall Sedges	Very Open Tall Sedges
VL Sedges <0.5m	Dense Low Sedges	Low Sedges	Open Low Sedges	Very Open Low Sedges
X Ferns	Dense Ferns	Ferns	Open Ferns	Very Open Ferns
Mosses, liverwort	Dense Mosses	Mosses	Open Mosses	Very Open Mosses

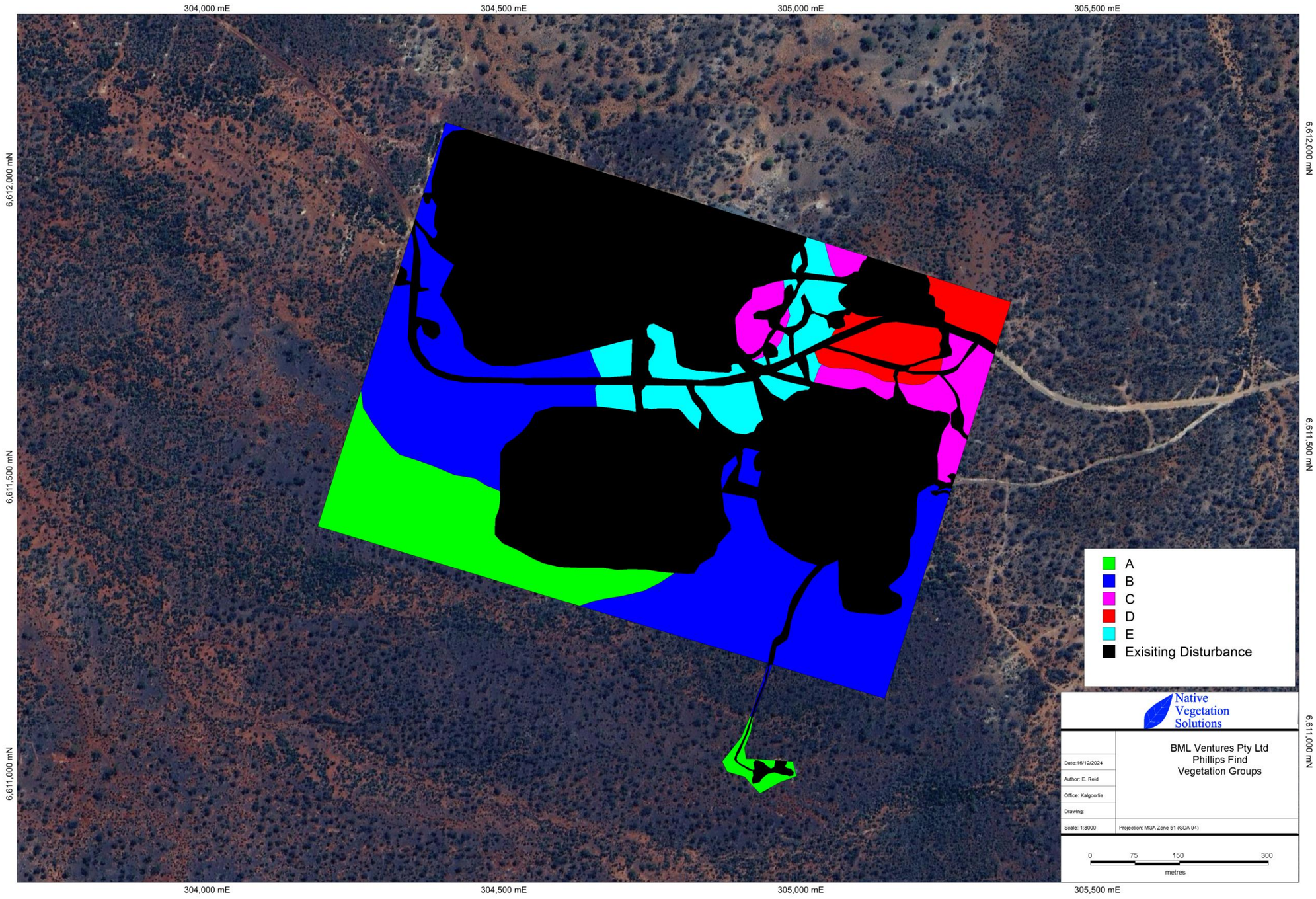
Appendix 3: Vegetation Mapping

Map 1: Survey Area

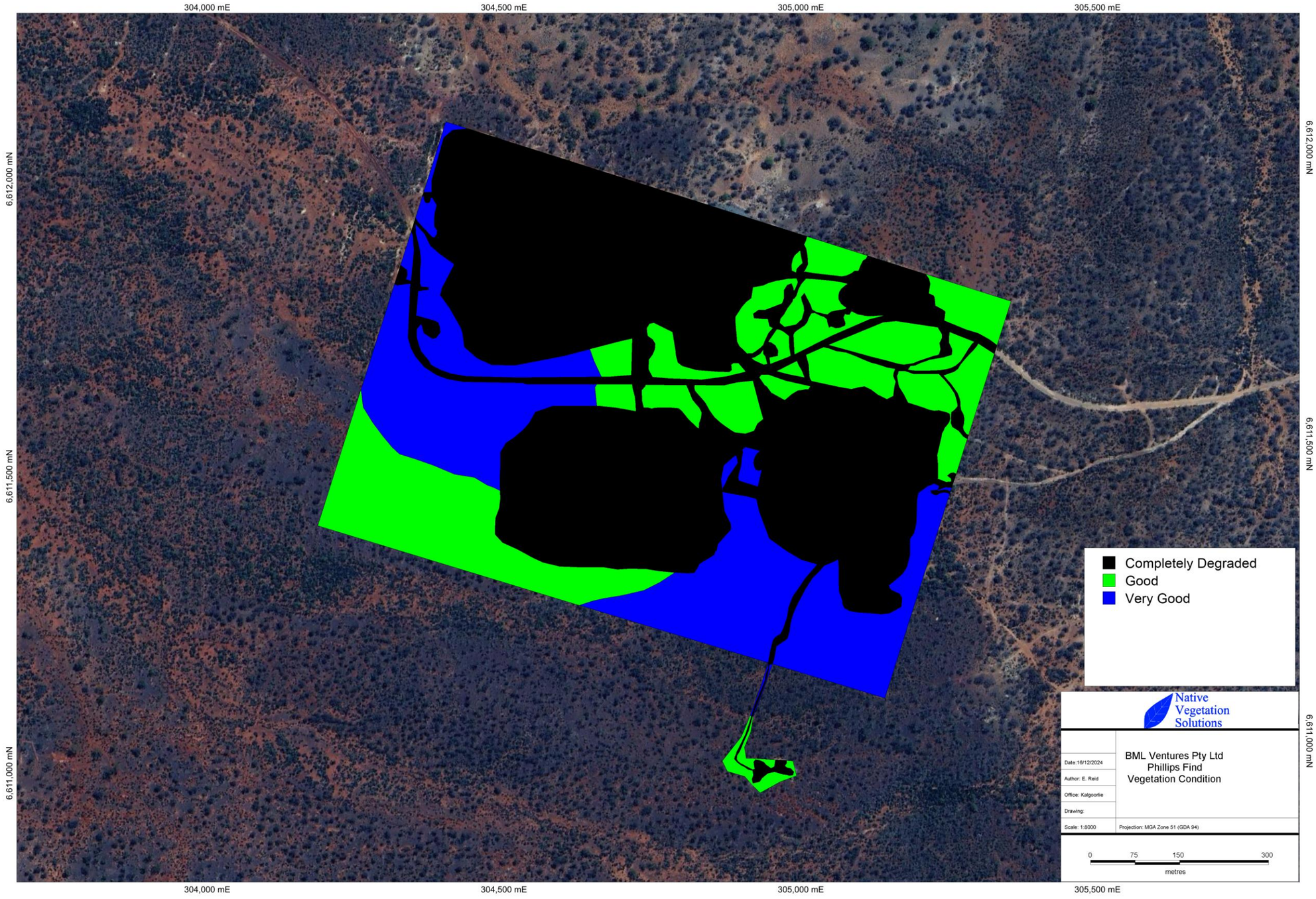
Map 2: NVS GP Data



Map 3: Land Systems



Map 4: Vegetation Groups



Map 5: Vegetation Condition

Appendix 4: Species List

Species List per Vegetation Group

Family	Genus	Taxon	A, P, NN	A	B	C	D	E
Fabaceae	*Acacia*	*Acacia acanthoclada* subsp. *acanthoclada*	P	*		*		*
Fabaceae	*Acacia*	*Acacia acuminata*	P		*			
Fabaceae	*Acacia*	*Acacia erinacea*	P	*		*		*
Fabaceae	*Acacia*	*Acacia quadrimarginea*	P			*	*	
Fabaceae	*Acacia*	*Acacia tetragonophylla*	P		*		*	
Apocynaceae	*Alyxia*	*Alyxia buxifolia*	P			*		
Chenopodiaceae	*Atriplex*	*Atriplex bunburyana*	P				*	
Chenopodiaceae	*Atriplex*	*Atriplex nummularia* subsp. *spathulata*	P	*		*		*
Chenopodiaceae	*Atriplex*	*Atriplex vesicaria*	P				*	*
Poaceae	*Austrostipa*	*Austrostipa elegantissima*	P	*			*	
Poaceae	*Austrostipa*	*Austrostipa nitida*	P	*			*	
Euphorbiaceae	*Beyeria*	*Beyeria sulcata var. sulcata*	P		*	*		
Asteraceae	*Centaurea*	*Centaurea melitensis**	A,NN			*		
Asteraceae	*Chrysocephalum*	*Chrysocephalum puteale*	A				*	
Boryaceae	*Daviesia*	*Daviesia aphylla*	P	*				
Sapindaceae	*Dodonaea*	*Dodonaea lobulata*	P		*	*	*	
Sapindaceae	*Dodonaea*	*Dodonaea microzyga var. acrolobata*	P	*	*			
Chenopodiaceae	*Enchylaena*	*Enchylaena tomentosa var. tomentosa*	P					*
Scrophulariaceae	*Eremophila*	*Eremophila alternifolia*	P				*	
Scrophulariaceae	*Eremophila*	*Eremophila dempsteri*	P	*		*		
Scrophulariaceae	*Eremophila*	*Eremophila georgei*	P		*		*	
Scrophulariaceae	*Eremophila*	*Eremophila granitica*	P		*			
Scrophulariaceae	*Eremophila*	*Eremophila oldfieldii* subsp. *angustifolia*	P	*	*	*		
Scrophulariaceae	*Eremophila*	*Eremophila oppositifolia* subsp. *angustifolia*	P	*				
Scrophulariaceae	*Eremophila*	*Eremophila scoparia*	P	*				*
Myrtaceae	*Eucalyptus*	*Eucalyptus griffithsii*	P		*	*		
Myrtaceae	*Eucalyptus*	*Eucalyptus lesouefii*	P			*		*
Myrtaceae	*Eucalyptus*	*Eucalyptus loxophleba* subsp. *lissophloia*	P			*		
Myrtaceae	*Eucalyptus*	*Eucalyptus oldfieldii*	P					*
Myrtaceae	*Eucalyptus*	*Eucalyptus oleosa* subsp. *oleosa*	P		*			
Myrtaceae	*Eucalyptus*	*Eucalyptus ravida*	P	*				
Myrtaceae	*Eucalyptus*	*Eucalyptus salmonophloia*	P	*				
Santalaceae	*Exocarpos*	*Exocarpos aphyllus*	P	*		*		
Goodeniaceae	*Goodenia*	*Goodenia mimuloides*	A		*		*	
Proteaceae	*Grevillea*	*Grevillea acuaria*	P	*	*			
Proteaceae	*Hakea*	*Hakea recurva* subsp. *recurva*	P		*			
Apocynaceae	*Leichhardtia*	*Leichhardtia australis*	P		*	*		
Chenopodiaceae	*Maireana*	*Maireana georgei*	P				*	
Chenopodiaceae	*Maireana*	*Maireana pentatropis*	P					*
Chenopodiaceae	*Maireana*	*Maireana triptera*	P	*				
Poaceae	*Monachather*	*Monachather paradoxus*	P				*	
Asteraceae	*Olearia*	*Olearia muelleri*	P	*	*	*		
Asteraceae	*Olearia*	*Olearia pimeleoides*	P		*			
Proteaceae	*Phebalium*	*Phebalium filifolium*	P		*			
Rutaceae	*Philotheca*	*Philotheca brucei* subsp. *brucei*	P		*			
Lamiaceae	*Prostanthera*	*Prostanthera althoferi* subsp. *althoferi*	P		*		*	
Lamiaceae	*Prostanthera*	*Prostanthera grylloana*	P		*			
Amaranthaceae	*Ptilotus*	*Ptilotus aervoides*	A	*				
Amaranthaceae	*Ptilotus*	*Ptilotus exaltatus*	A	*				*
Amaranthaceae	*Ptilotus*	*Ptilotus obovatus*	P	*		*	*	*
Chenopodiaceae	*Rhagodia*	*Rhagodia drummondii*	P	*				
Santalaceae	*Santalum*	*Santalum acuminatum*	P	*		*		
Santalaceae	*Santalum*	*Santalum spicatum*	P	*		*		
Goodeniaceae	*Scaevola*	*Scaevola spinescens*	P	*		*	*	
Chenopodiaceae	*Sclerolaena*	*Sclerolaena cuneata*	P	*				
Chenopodiaceae	*Sclerolaena*	*Sclerolaena densiflora*	P				*	
Chenopodiaceae	*Sclerolaena*	*Sclerolaena diacantha*	P	*			*	
Fabaceae	*Senna*	*Senna artemisioides* subsp. *artemisioides*	P				*	
Fabaceae	*Senna*	*Senna artemisioides* subsp. *filifolia*	P	*	*	*		
Fabaceae	*Senna*	*Senna cardiosperma*	P	*				
Malvaceae	*Sida*	*Sida calyxhymenia*	P				*	
Solanaceae	*Solanum*	*Solanum lasiophyllum*	P		*	*	*	
Asteraceae	*Streptoglossa*	*Streptoglossa liatroides*	A	*				
Asteraceae	*Vittadinia*	*Vittadinia eremaea*	A				*	

Basic and Targeted Fauna Survey and Assessment

Phillips Find Project Area

Prepared for: BML Ventures Pty Ltd

Version 1. January, 2025

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EXECUTIVE SUMMARY

Native Vegetation Solutions, on behalf of BML Ventures Pty Ltd, requested a Basic and Targeted fauna assessment for a section of the Phillips Find project area to enable further vegetation clearing and expansion of the mining operations. The project area (~70.7ha) is approximately 40km north-northwest of Coolgardie in Western Australia.

The assessed project area includes an active mining area with two pits, waste dumps, an administration area, haul roads and a camp. A previously mined area in the northern section is partially rehabilitated. There are four broad fauna habitats in the project area: mixed shrubland, mixed Eucalypt woodland over mixed shrubs, Salmon Gum woodland, and Goldfields Blackbutt woodland.

No Malleefowl, their tracks or recent breeding mounds were recorded in the project area. The Southern Whiteface (listed as Vulnerable) has been recorded in similar habitats nearby so that it could be present in the project area. This small bush bird is widespread in the Midwest and Goldfields and readily moves if disturbed. However, removing or destroying a Southern Whiteface active nest could be considered a significant impact; therefore, if vegetation clearing is to be undertaken during the breeding season (i.e. August to September, presuming there have not been early rains, which will bring the breeding season forward), then there needs to be a check that no Southern Whiteface active nests will be impacted.

Peregrine Falcon and Central Long-eared Bat may be in the project area. Both species will readily move if disturbed and are unlikely to be significantly impacted by vegetation clearing.

It is recommended that:

- areas to be cleared of vegetation between August and September, and earlier if there have been substantial autumn rains, should be checked for active Southern Whiteface nests;
- an area of 250m around any active Southern Whiteface nest should not be cleared until the chicks have fledged;
- an induction program for all staff includes a component on managing fauna;
- information on protecting fauna and reporting deaths and sightings of Malleefowl and other conservation-significant species should be incorporated into the induction program;
- the impact of dust on adjacent vegetation and fauna habitat is managed against appropriate KPIs and following the site processes and procedures;
- pets are not permitted on the project;
- all waste and rubbish be contained in bins and regularly removed from the project or placed in landfill and suitably covered to exclude access to predator species;
- feeding of native fauna is prohibited; and
- a feral pest control program is implemented in cooperation with the neighbouring mining operations and pastoralists.

1. INTRODUCTION

1.1 BACKGROUND

Native Vegetation Solutions, on behalf of BML Ventures Pty Ltd, requested a Basic and Targeted fauna assessment of a section of the Phillips Find project area to enable further vegetation clearing and expansion of the mining operations. The project area (~70.7ha) is located approximately 40km north-northwest of Coolgardie in Western Australia (Figure 1).

The project area includes an active mining area with two pits, waste dumps, an administration area, haul roads and a camp (Figure 2). A previously mined area in the northern section is partially rehabilitated.

1.2 PROJECT OBJECTIVES AND SCOPE OF WORKS

Terrestrial Ecosystems undertook a Basic fauna risk assessment and targeted survey for Malleefowl mounds. The methodology broadly follows that described in the Environmental Protection Authority (EPA; 2020) *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment*.

The objectives of this assessment were to:

- indicate the vertebrate fauna assemblage (reptiles, amphibians, mammals and birds) in and near the project area so that potential impacts on the fauna and fauna assemblage might be adequately assessed;
- locate and record recently active Malleefowl mounds;
- describe and map the major vertebrate fauna habitats present in the project area;
- list the vertebrate fauna species potentially present in the project area;
- discuss potential impacts on species listed as threatened under State and Commonwealth legislation; and
- recommend management strategies to mitigate potential impacts on the vertebrate fauna.

To achieve these objectives, Terrestrial Ecosystems:

- reviewed Terrestrial Ecosystems' database [includes Atlas of Living Australia] to identify potential vertebrate fauna within the area;
- searched the Commonwealth Government's database of fauna of national environmental significance to identify species potentially occurring within the area that are protected under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* or international migratory bird agreements (JAMBA/CAMBA);
- undertook a site reconnaissance survey and a targeted search for active and recently active Malleefowl mounds;
- reviewed previous fauna surveys conducted near the project area in similar habitat types; and
- discussed the likelihood of *EPBC Act 1999* and *Biodiversity Conservation (BC) Act 2016* listed species being present in the project area.

2. EXISTING ENVIRONMENT

2.1 LOCATION OF PROJECT AREA

The project area is in the Eastern Goldfields (COO3) Interim Biogeographic Regionalisation of Australia (IBRA) subregion within the Coolgardie Biogeographic region. This subregion lies on the Yilgarn Craton, which has subdued relief and gently undulating plains with low hills and ridges of Archaean greenstone in the western section (Cowan 2002). The vegetation in the subregion is typically mallee, Acacia thickets and shrubland on the sandplains and eucalypt woodlands around salt lakes, ranges and broad valleys. The surrounds of salt lakes support a variety of chenopods.

2.2 LAND USE HISTORY

The dominant land uses in the IBRA subregion are unallocated Crown land and reserves, grazing on native vegetation pastures and mining.

2.3 CLIMATE

The project area is characterised as warm Mediterranean. Kalgoorlie, which is ~50km east of the project area, has an annual rainfall of ~265mm, although this varies considerably yearly. The highest mean maximum and minimum temperatures in Kalgoorlie are from December to February (Bureau of Meteorology 2025). July has the lowest mean daily maximum and minimum temperatures (Chart 1). Summer rainfall occurs between January and March, and winter rainfall between May and August due to low-pressure cells moving in an easterly direction and summer thunderstorms.

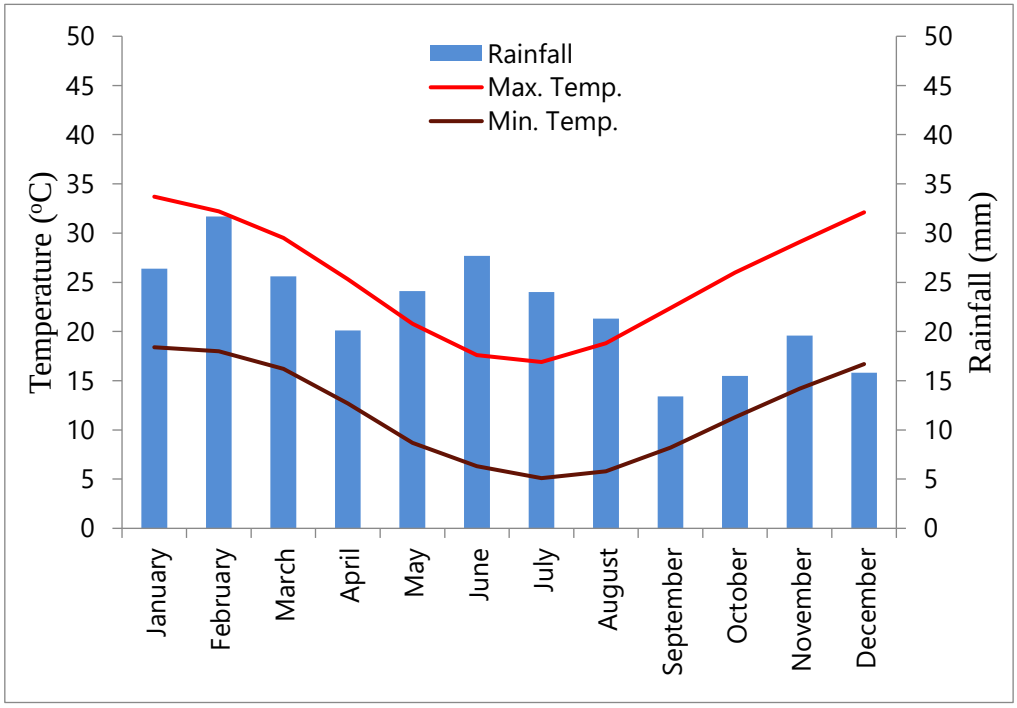

Chart 1. Climatic averages for Kalgoorlie airport

2.4 REGIONAL BIOLOGICAL FAUNA CONTEXT OF THE PROJECT AREA

The frogs, reptiles, mammals and birds near the project area have been surveyed for other environmental assessments and research purposes and are therefore known. Fauna surveys and assessments undertaken in the vicinity of the project area or within the project area that have been reviewed for this assessment include:

- ATA Environmental (2006a) *Fauna assessment proposed clearing around Black Flag*. Unpublished report for Placer Dome Australia Pty Ltd., Perth.
- ATA Environmental (2006b) *Fauna assessment proposed clearing around the Grants Patch Mine Site*. Unpublished report for Placer Dome Australia Pty Ltd., Perth.
- ATA Environmental (2006c) *Fauna Assessment Proposed Clearing at the Janet Ivy Site. Unpublished report for Placer Dome Australia Pty Ltd*. Perth.
- ATA Environmental (2006d) *Fauna assessment proposed clearing around the Moonbeam Mine Site*. Unpublished report for Placer Dome Australia Pty Ltd., Perth.
- ATA Environmental (2006e) *Fauna assessment proposed clearing around the Natal Mine Site*. Unpublished report for Placer Dome Australia Pty Ltd., Perth.
- ATA Environmental (2006f) *Fauna assessment proposed clearing around the Ora Banda Mine Site*. Unpublished report for Placer Dome Australia Pty Ltd, Perth.
- ATA Environmental (2006g) *Fauna assessment proposed clearing around the Rose West Site*. Unpublished report for Placer Dome Australia Pty Ltd., Perth.
- ATA Environmental (2006h) *Malleefowl assessment for clearing application at Janet Ivy Site.* Unpublished report for Placer Dome Australia Pty Ltd. Perth.
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- Barrett, G. (1991) *A Biological Survey of Victoria Rock Nature Reserve*, Unpublished report for the Goldfields Naturalist Club, Perth.
- Bell, D.T., Bell, R.C. and Loneragan, W.A. (2007) Winter bird assemblages across an arid gradient in south-west Western Australia, *Journal of the Royal Society of Western Australia*, 90, 219-227.
- Botanic Consulting (2023a) *Kangaroo Hills Project Reconnaissance Flora/Vegetation Survey and Basic Fauna Assessment*. Unpublished report for Future Battery Minerals Ltd, Perth.
- Botanica Consulting (2020) *Reconnaissance Flora/Vegetation & Fauna Survey Mulgarrie Project*. Unpublished report for Norton Gold Fields Pty Ltd, Perth
- Botanica Consulting (2021) *Flora and Fauna Assessment of the Strategic Water Management Project Stage 1 (SWMP1)*. Unpublished report for Norton Gold Fields Pty Ltd, Perth.
- Botanica Consulting (2023b) *Paddington Project Annual Malleefowl Monitoring*. Unpublished report for Norton Goldfields Pty Ltd, Perth.
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- Eco Logical Australia, (2016) *Biological Assessment - Binduli Expansion Project. Level 1 vertebrate fauna and Short-range Endemic invertebrate survey*, Unpublished report for Norton Gold Fields Limited, Perth.
- GHD (2008) *Bullabulling Gold Project Fauna Survey of Eileen and Bacchus Pits*, Unpublished report for Jervois Mining, Perth.
- Harewood, G. (2014) *Malleefowl (*Leipoa ocellata*) Assessment Bullabulling Gold Project*, Unpublished report for Botanica Consulting on behalf of Bullabulling Gold Ltd/Significant Environmental Services, Perth.
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- Keighery, B.J., McKenzie, N.L. and Hall, B. (1995) The Biological Survey of the Eastern Goldfields of Western Australia. Part 11. Boorabbin-Southern Cross Study Area, *Records of the Western Australian Museum*, Supplement No. 49.

- McKenzie, N.L. and Hall, B. (1992) The Biological Survey of the Eastern Goldfields of Western Australia. Part 8. Kurnalpi-Kalgoorlie Study Area, *Records of the Western Australian Museum*, Supplement No. 41.
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- Ninox Wildlife Consulting (1995) *Vertebrate Fauna Studies Kambalda Area (1993) Widgiemooltha Area (1994)*, Unpublished report for Western Mining Corporation, Perth.
- Ninox Wildlife Consulting (1999) *Fauna Survey for the White Foil Gold Project*, Unpublished report for Mines and Resources Australia Pty Ltd, Perth.
- Ninox Wildlife Consulting (2002) *A Vertebrate Fauna Assessment of the Proposed White Foil Haul Road Route near Kalgoorlie, Western Australia*, Unpublished report for Mines and Resources Pty Ltd, Perth.
- Phoenix Environmental Services (2014) *Level 2 Flora and Vegetation Survey and Level1 fauna Survey for the Bullabulling Gold Project*, Unpublished report for Bullabulling Gold Ltd, Perth.
- Risbey (2000) *An assessment of the populations of feral cats and foxes in the Ora Banda region for Cawse Nickel Operations, Western Australia*. Kalgoorlie.
- RPS (2012) *Spring Level 2 Flora and Vegetation Survey and Level1 Fauna Assessment Bullabulling Gold Project*, Unpublished report for Bullabulling Gold Ltd, Perth.
- Shepherdson Environmental Services (2001a) *Fauna of the Black Cat and Panther Leases, M16/34 and M16/365 (P16/1675)*. Unpublished report for Kinver Mining NL.
- Shepherdson Environmental Services (2001b) Fauna of the proposed Golden Cities to Paddington Haul Road and surrounding area. Perth.
- Terrestrial Ecosystems (2010) *Level 1 Fauna Risk Assessment for La Mancha Resources White Foil Gold Deposit Project Area*. Perth.
- Terrestrial Ecosystems (2013) *Level 1 Vertebrate Fauna Risk Assessment for the Borefields Road at Coolgardie, V2*. Perth.
- Terrestrial Ecosystems (2016) *Level 1 Vertebrate Fauna Risk Assessment for the Mungari Tailing Storage Facility Cell 3 (TSF3)*. Perth.
- Terrestrial Ecosystems (2017) *Level 1 Vertebrate Fauna Risk Assessment for the Jaurdi Hills Mining Area*. Perth.
- Terrestrial Ecosystems (2018a) *Annual Malleefowl Survey - Enterprise, Mulgarrie and north of Federal*. Perth.
- Terrestrial Ecosystems (2018b) *Annual Malleefowl Survey - Enterprise, Carbine and Golden Cities*. Perth.
- Terrestrial Ecosystems (2018c) *Level 1 Fauna Risk Assessment and the results of a Malleefowl search for the Golden Cites project area*. Perth.
- Terrestrial Ecosystems (2018d) *Level 1 Vertebrate Fauna Risk Assessment for Lot 500 Great Eastern Highway*, Kalgoorlie. Perth.
- Terrestrial Ecosystems (2021) *Basic and targeted vertebrate fauna reconnaissance survey and risk assessment for the Bullabulling Heap Leach Project*, Unpublished report for Bullabulling Operations Pty Ltd, Perth.
- Terrestrial Ecosystems (2024) *Annual Malleefowl Monitoring Survey (November 2023) for Paddington Operations*, Kalgoorlie. Unpublished report for Paddington Gold Pty Ltd, Perth.
- Thompson, S. (2004) *Mine site rehabilitation index using reptile assemblage as a bio-indicator*, PhD Thesis, Edith Cowan University, Perth Ora Banda Thompson PHD and other data, Perth and additional data collected after submission of the thesis.

The Thompson (2004) fauna survey data is the most comprehensive vertebrate fauna survey in this region. The McKenzie et al. (1992) data are part of a series of regional surveys undertaken by the Western Australian Museum, the Western Australian Wildlife Centre, the National Parks Authority and the Western Australian Herbarium. This 1992 survey focussed on the Kurnalpi – Kalgoorlie area and includes fauna habitats present in the project area. Surveys by Bamford et al. (1990) and Chapman et al. (1991) are for reserves in this part of the Goldfields, and there are two surveys for the White Foil gold mine (Ninox Wildlife Consulting 1999, 2002) which is southeast of the project area. The other reports listed above are Level 1 assessments and targeted Malleefowl surveys, and essentially report data from the available government databases and a few of the fauna survey reports for the general area.

Data in the Atlas of Living Australia and Western Australian Museum have also been added to the information contained in Appendix B, and the compilation of the species lists for the project area.

2.5 FAUNA SPECIES AT RISK

Cowan (2002), in a now-dated report, indicated that multiple vertebrate fauna species were at risk in the subregion [i.e. Malleefowl (*Leipoa ocellata*), Carpet Python (*Morelia imbricata*), Peregrine Falcon (*Falco peregrinus*), Chuditch (*Dasyurus geoffroyi*) and Freckled Duck (*Stictonetta naevosa*). Since then, the Night Parrot (*Pezoporus occidentalis*) and the Southern Whiteface (*Aphelocephala leucopsis*) have been added to the list of species of conservation significance potentially in the project area.

3. METHODOLOGY

3.1 DATABASE SEARCHES

A review of the *EPBC Act 1999* online list of threatened species was undertaken to identify species of conservation interest to the Commonwealth Government under the *EPBC Act* (Appendix A). In addition, a desktop search of the Terrestrial Ecosystems' fauna survey database was used to develop an appreciation of the vertebrate fauna assemblages in relevant sections of the bioregion near the project area.

Other more general texts were also used to provide supplementary information on vertebrate fauna in the bioregion, including Tyler et al. (2000) for frogs; Storr et al. (1983, 1990, 1999, 2002) and Thompson and Thompson (2006) for reptiles; Johnstone and Storr (1998, 2004) for birds; and Van Dyck and Strahan (2008) for mammals.

Collectively, these sources of information were used to create lists of species that were expected to utilise the project area and broader bioregion. It should be noted that these lists will include species that have been recorded in the general region but are possibly vagrants, and they will not generally be found in the project area due to a lack of suitable habitat (e.g. water and shore birds). Vagrants can be recorded almost anywhere. Many records are historical, and the species are no longer in the local area (e.g. Bilby). Many bird, mammal, reptile, and amphibian species have specific habitat requirements that may be present in the general area but not in the project area. Also, the ecology of many of these species is often poorly understood. It can sometimes be difficult to indicate species whose specific habitat requirements are absent in the project area. Therefore, many species will be included in the lists produced from database searches but will not be present in the actual project area.

There are errors in most databases, including Atlas of Living Australia and the Western Australian Museum (WAM) collection. These errors occur because of a misidentification of individuals, taxonomic name changes, and incorrect coordinates entering the database. Terrestrial Ecosystems could not verify the primary records, so it has used the information provided. Readers should appreciate that species lists, and fauna surveys reported in the appendices may include these errors.

3.2 RECONNAISSANCE SURVEY

The project area was searched on foot, and UTV to search for species of conservation significance on 12 December 2024. The reconnaissance survey was also used to record fauna habitat types in the project area.

3.3 FAUNA HABITAT ASSESSMENT

The fauna habitat assessment was undertaken for the project area. This field assessment had two foci:

- assess fauna habitat types and their condition; and
- assess the possible presence of and record evidence of species of conservation significance so that mitigation and management strategies might be implemented to reduce potential impacts.

The fauna habitat assessors stopped at multiple locations within the project area and recorded a suite of factors about the fauna habitat and its condition. This information included a description of the habitat structure, habitat condition, landform, soils and vegetation and time since the last fire (Table 1):

Table 1. Variables assessed during the rapid habitat assessment

Observer's Name:	
Coordinates of the location as UTM (GDA94):	
Fire history – options	
☐ > 5 years	
☐ 1-5 years	
☐ < 1 year	
Landform – options	
☐ Beach	☐ Lower slope
☐ Clay plain	☐ Mid slope
☐ Cliff	☐ Ridge
☐ Creek line	☐ River
☐ Dam	☐ Rocky outcrop / breakaway
☐ Drainage line	☐ Salt lake
☐ Dune crest	☐ Sand dune
☐ Dune slope	☐ Sand plain
☐ Dune swale	☐ Stony plain
☐ Escarpment	☐ Swamp
☐ Flat	☐ Undulating
☐ Gorge	☐ Upper slope
☐ Gully	☐ Wetland
☐ Intertidal / mangrove	☐ Water hole
☐ Lake / lake edge	
Habitat quality – options	
☐ *High-quality fauna habitat*—These areas closely approximate the vegetation mix and quality that would have been in the area before any disturbance. The habitat is connected to other habitats and likely contains the most natural vertebrate fauna assemblage.	
☐ *Very good fauna habitat*—These areas show minimal signs of disturbance (e.g., grazing, clearing, fragmentation, weeds) and generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat is connected to other habitats, and fauna assemblages in these areas will likely be minimally affected by disturbance.	
☐ *Good fauna habitat*—These areas showed signs of disturbance (e.g., grazing, clearing, fragmentation, weeds) but generally retained many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats, and fauna assemblages in these areas are likely to be affected by disturbance.	
☐ *Disturbed fauna habitat*– These areas showed signs of significant disturbance. Many of the trees, shrubs, and undergrowth have been cleared. These areas may be in the early succession and regeneration stages. Areas may show signs of significant grazing, containing weeds or damaged by vehicles or machinery. Habitats are fragmented or have limited connectivity with other fauna habitats. Fauna assemblages in these areas will likely differ significantly from what might be expected in the area had the disturbance not occurred.	
☐ *Highly degraded fauna habitat* – These areas often have a significant loss of vegetation, an abundance of weeds, and many vehicle tracks or are completely cleared. Limited or no fauna habitat connectivity. Fauna assemblages in these areas will likely significantly differ from what might have been in the pre-disturbance area.	

Habitat structure – combined into habitat description	
Upper stratum	
☐ Tall open woodland	☐ Scattered tall trees
☐ Tall woodland	☐ Scattered trees
☐ Open woodland	☐ Scattered low trees
☐ Woodland	☐ Low closed forest
☐ Open forest	☐ Low open forest
☐ Closed forest	☐ Low woodland
☐ Tall closed forest	☐ Low open woodland
☐ Tall open forest	
Middle stratum	
☐ Shrubland	☐ Open heath
☐ Tall shrubland	☐ Low closed heath
☐ Tall open shrubland	☐ Low open heath
☐ Low shrubland	☐ Tall closed scrub
☐ Scattered low shrubs	☐ Tall open scrub
☐ Low open shrubland	☐ Scattered tall shrubs
☐ Scattered tall shrubs	☐ Open shrubland
☐ Closed heath	☐ Scattered shrubs
Lower stratum	
☐ Closed hummock grassland	☐ Closed tussock grassland / sedgeland / herbland
☐ Mid-dense hummock grassland	☐ Tussock grass land / sedgeland / herbland
☐ Hummock grassland	☐ Open tussock grassland / sedgeland / herbland
☐ Open hummock grassland	☐ Scattered tussock / grasses / sedges / herbs
☐ Scattered hummock grassland	☐ Very open tussock grassland / herbland
Soil Type – options	
☐ Sand	☐ Silty loam
☐ Loamy sand	☐ Sand clay loam
☐ Clayey sand	☐ Clay
☐ Clay loam	☐ Peat / organic
☐ Silty clay loam	☐ Stony
☐ Sandy loam	
Soil colour - options	
☐ Black	☐ Red
☐ Brown	☐ White
☐ Grey	☐ Yellow
☐ Orange	

Surface stones – options			
☐	None	☐	Boulders (>250mm)
☐	Pebbles (0-50mm)	☐	Rocks
☐	Cobbles (51-250)		

3.4 MALLEEFOWL MOUNDS

The project area was searched using a utility-terrain vehicle (UTV) or by walking, with the distances between transects altered based on the density of the vegetation. The national Malleefowl monitoring program system was used to record details about each Malleefowl mound profile (National Malleefowl Recovery Team 2016). This report classifies mounds as:

Profile 1 (Typical crater with raised rim) – this is the typical mound shape of an inactive (dormant) mound, and without any accumulated vegetation in the crater.

Profile 2 (mound dug out) – this is a recently fully dug out mound with steep sides to the crater, with the base forming a box like structure with the sides normally 20-30cm deep. Sometimes litter has been raked into windrows in readiness to be placed in the mound.

Profile 3 (mound filled with litter) – this mound contains litter in the crater and is the next construction stage after profile 2. Layers of litter are evident on the surface, and there may or may not be sand mixed with the litter.

Profile 4 (active mound with no crater) – this active mound is closed, and dome shaped. Note that some mounds have a dome and no crater but are not active.

Profile 5 (mound with crater and often a peak at the centre) – this is an active mound that is being opened or closed by Malleefowl.

Profile 6 (disused or extinct mound) – this mound has not been used for some time and weathering and erosion have 'flattened' the original mound.

Profile 7 (very large flat mound) – this mound is very broad and flat and generally measures in excess of 10m in diameter. The mounds are thought to have been made by a species of mega-fauna (bird similar to a Malleefowl) or in Western Australia are likely to be extinct Burrowing Bettong or Boodie warrens.

For mounds that could potentially be used again, crossed sticks were placed at the centre of the mound, so if they were moved, then there was a method of indicating use (Plate 1).

Plate 1. Crossed sticks on a Malleefowl mound used to determine use

Note: this mound is not from the project area

3.5 SURVEY AND REPORTING STAFF

Dr Scott Thompson undertook the site survey and fauna habitat assessment with Eren Reid of Native Vegetation Solutions. Dr Scott Thompson completed fauna habitat mapping, Dr Graham Thompson prepared this report, and Dr Scott Thompson reviewed it before sending it to the client.

Senior scientists have appropriate, relevant post-graduate qualifications, extensive experience in conducting vertebrate fauna surveys and assessments, have published research articles on biodiversity, fauna assemblages, species of conservation significance, trapping techniques, and temporal variations in trapped fauna assemblages and are therefore appropriately trained and experienced to undertake the survey and prepare the assessment. Both Drs Thompson have undertaken multiple assessments in the region and are familiar with the habitats and fauna assemblages in the bioregion.

Dr Scott Thompson is the only environmental practitioner in Western Australia with independent specialist certification (CEnvP – Ecology Specialist) combined with post-graduate tertiary qualifications and is a licensed pest management technician (LPMT). This unique set of skills and qualifications ensures Scott undertakes fauna surveys, assessments, and control programs to the highest standard and quality assurance. The qualifications and experience of the survey and reporting personnel are shown in Table 2.

Table 2. Project personnel and their qualifications

Name	Qualifications	Experience	Role
Dr Scott Thompson	BSc. (Env. Sc.), MSc. (Env. Mngt.), PhD (Env. Sc./Mngt), Cert III (Vertebrate Pest Mngt), Cert IV (WHS). CEnvP (Ecology Specialist)	> 20 years	Principal zoologist Survey coordinator, field survey, fauna habitat mapping and report review.
Dr Graham Thompson	Post Grad. Dip. (Zool.), PhD (Zoology), Cert III (Vertebrate Pest Mngt),	> 20 years	Principal zoologist. Field surveys and report preparation.

3.6 TAXONOMY AND NOMENCLATURE

Taxonomy and nomenclature for fauna species used in this report are generally based on the WA Museum (WAM) species lists. Terrestrial Ecosystems has presumed that the fauna identifications referred to in the appendices or in reports used to provide local and regional comparative data were correct, and we have only corrected obvious records where the nomenclature was known to be incorrect.

3.7 LIMITATIONS

This Basic vertebrate fauna survey and risk assessment is based on information in the Commonwealth Government database and other published and unpublished fauna survey data for the bioregion and a site visit. It is acknowledged that multiple surveys conducted in different seasons, repeated over several years, are necessary to appreciate the fauna assemblage in the project area fully.

Lists of species potentially in and around the project area have been compiled from WAM records, Atlas of Living Australia, and reports of fauna surveys undertaken nearby. Some records in the Atlas of Living Australia and the WAM are very old, and those species are no longer present in the area. Terrestrial Ecosystems have not been able to verify the primary data and, therefore, cannot vouch for the accuracy of these records. All these data sources are known to contain errors, which should be considered when reading this assessment. These errors occur because of a misidentification of individuals, taxonomic name changes, and incorrect coordinates entered into the database.

The *EPBC Act* online matters of national environmental significance (MNES) database for terrestrial fauna includes historical records. It places a wide buffer around previously known locations of threatened species in its database. A search of this database will invariably include species that are either locally extinct or were never present in parts of the search area.

The EPA's (2020) *Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment* suggested that many variables may limit fauna surveys. Limitations associated with each of these variables are assessed in Table 3.

Table 3. Fauna survey limitations and constraints

Possible limitations	Constraint	Comment
Availability of data and information	No	Vertebrate fauna survey data is available for similar habitats near the project area.
Competency/experience of the survey team, including experience in the bioregion surveyed	No	The field zoologists and authors of this report have appropriate post-graduate qualifications, have undertaken multiple surveys and assessments in the Goldfields, have published a book and multiple refereed journal articles based on fauna surveys in the region and are familiar with the vertebrate fauna in this bioregion.
Scope of the survey, e.g. where faunal groups were excluded from the survey	No	The targeted searches for Malleefowl mounds were adequate to detect the presence of recently active breeding mounds and any Malleefowl tracks in the project area.
Timing, weather and season	No	The weather was suitable for a site visit.
Disturbance that may have affected results, e.g. fire, flood	No	Disturbances in the project area have been factored into this assessment.
The proportion of fauna identified, recorded or collected	N/A	
Adequacy of the survey intensity and proportion of survey achieved, e.g. the extent to which the area was surveyed	No	The survey intensity as adequate for its intended purpose and the Basic vertebrate fauna survey requirements were met.
Access problems	No	The site was accessible to UTV and walking in the more densely vegetated areas.
Problems with data and analysis, including sampling biases	N/A	This report collated and commented on data from other reports.

N/A = not applicable, Significant = major impact on the outcome of the risk assessment, Moderate = impacted parts of the field survey and risk assessment, Negligible = almost no impact on the survey and risk assessment.

4. RESULTS

4.1 FAUNA HABITAT

Thirty-two habitat assessments were completed in the project area (Figure 2). Excluding the disturbed and cleared areas, there are the following four broad fauna habitats in the project area:

- Mixed shrubland;
- Mixed Eucalypt woodland over mixed shrubs;
- Salmon Gum woodland; and
- Goldfields Blackbutt woodland.

The project area has been mined over many decades and ~40.5ha of the assessed area has been disturbed (Figure 2). The disturbance area includes a disused mining pit filled with waste mining material and partially rehabilitated, two mining pits, waste dumps, an administration area, and a camp south of the project area.

Plates 2 to 9 provide representative images of the fauna habitat types. There are also areas lacking vegetation due to past mining activities and human disturbances. (Plates 10 to 11). The density of trees and shrubs in the relatively undisturbed areas varied across the project area. The quality of fauna habitats ranges from highly degraded to very good, with the more degraded areas primarily resulting from historical and recent exploration and mining activities.

Plate 2. Mixed shrubland

Plate 3. Mixed shrubland

Plate 4. Salmon Gum woodland

Plate 5. Salmon Gum woodland

Plate 6. Goldfields Blackbutt woodland

Plate 7. Goldfields Blackbutt woodland

Plate 8. Mixed Eucalypt woodland over mixed shrubs

Plate 9. Mixed Eucalypt woodland over mixed shrubs

Plate 10. Disturbed area

Plate 11. Disturbed area

The results of the rapid habitat assessment are provided in Appendix D. Images of the habitat at each of these assessment points provide a more comprehensive overview of the habitats in the project area.

4.1.1 Malleefowl

The project area was searched for Malleefowl mounds and tracks. Malleefowl are predominantly ground-dwelling species and walk a considerable distance each day foraging for insects and seeds. Their tracks are distinctive, and in areas of soft sand or on sand tracks, their presence is easily detected. No Malleefowl mounds or tracks were observed during the site visit.

Given anthropogenic disturbance in the project area over a period of many years, it was not anticipated that Malleefowl would be recorded in the project area.

4.2 BIOREGIONAL VERTEBRATE FAUNA ASSEMBLAGE

Appendix B provides a summary of the fauna survey data available near the project area. There are appreciable differences in the recorded fauna assemblages within and among fauna surveys shown in Appendix B. These differences are partially due to the low survey effort often deployed, and they also reflect variations in soils and vegetation and temporal variations in the fauna assemblages.

Tables 4-7 provide a list of vertebrate species potentially found near the project area that have been compiled based on the fauna survey report results shown in Appendix B.

Table 4. Birds found near the project area

Family	Species	Common Name
Casuariidae	*Dromaius novaehollandiae*	Emu
Anatidae	*Cygnus atratus*	Black Swan
	Tadorna tadornoides	Australian Shelduck
	Anas gracilis	Grey Teal
Megapodiidae	*Leipoa ocellata*	Malleefowl*
Columbidae	*Phaps chalcoptera*	Common Bronzewing
	Phaps elegans	Brush Bronzewing
	Ocyphaps lophotes	Crested Pigeon
Cuculidae	*Chrysococcyx basalis*	Horsfield's Bronze-Cuckoo
	Chrysococcyx osculans	Black-eared Cuckoo
	Chrysococcyx lucidus	Shining Bronze-Cuckoo
	Cacomantis flabelliformis	Fan-tailed Cuckoo
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar
Podargidae	*Podargus strigoides*	Tawny Frogmouth
Caprimulgidae	*Eurostopodus argus*	Spotted Nightjar
Recurvirostridae	*Recurvirostra novaehollandiae*	Red-necked Avocet
Charadriidae	*Vanellus tricolor*	Banded Lapwing
Turnicidae	*Turnix varius*	Painted Buttonquail
Phalacrocoracidae	*Microcarbo melanoleucos*	Little Pied Cormorant
Accipitridae	*Lophoictinia isura*	Square-tailed Kite
	Hieraaetus morphnoides	Little Eagle
	Aquila audax	Wedge-tailed Eagle
	Accipiter fasciatus	Brown Goshawk
	Accipiter cirrocephalus	Collared Sparrowhawk
Cuculidae	*Heteroscenes pallidus*	Pallid Cuckoo
Strigidae	*Ninox boobook*	Southern Boobook
Alcedinidae	*Todiramphus pyrrhopygius*	Red-backed Kingfisher
Meropidae	*Merops ornatus*	Rainbow Bee-eater
Falconidae	*Falco cenchroides*	Nankeen Kestrel
	Falco longipennis	Australian Hobby
	Falco berigora	Brown Falcon
Timaliidae	*Zosterops lateralis*	Silvereye
Cacatuidae	*Eolophus roseicapilla*	Galah
	Nymphicus hollandicus	Cockatiel
Psittaculidae	*Polytelis anthopeplus*	Regent Parrot
	Neophema elegans	Elegant Parrot
	Barnardius zonarius	Australian Ringneck
Psittacidae	*Platycercus icterotis*	Western Rosella*
	Psephotus varius	Mulga Parrot
	Glossopsitta porphyrocephala	Purple-crowned Lorikeet
Ptilonorhynchidae	*Chlamydera guttata*	Western Bowerbird
	Ptilonorhynchus maculata	Spotted Bowerbird
Climacteridae	*Climacteris rufus*	Rufous Treecreeper
Maluridae	*Malurus pulcherrimus*	Blue-breasted Fairywren
	Malurus lamberti	Variegated Fairywren
	Malurus splendens	Splendid Fairywren

Family	Species	Common Name
	Malurus leucopterus	White-winged Fairywren
Meliphagidae	*Certhionyx variegatus*	Pied Honeyeater
	Purnella albifrons	White-fronted Honeyeater
	Lichenostomus cratitius	Purple-gaped Honeyeater
	Manorina flavigula	Yellow-throated Miner
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater
	Anthochaera carunculata	Red Wattlebird
	Gavicalis virescens	Singing Honeyeater
	Ptilotula ornata	Yellow-plumed Honeyeater
	Ptilotula penicillata	White-plumed Honeyeater (Western)
	Ptilotula keartlandi	Grey-headed Honeyeater
	Epthianura tricolor	Crimson Chat
	Epthianura aurifrons	Orange Chat
	Epthianura albifrons	White-fronted Chat
	Sugomel nigrum	Black Honeyeater
	Gliciphila melanops	Tawny-crowned Honeyeater
	Lichmera indistincta	Brown Honeyeater
	Nesoptilotis leucotis	White-eared Honeyeater
	Nesoptilotis flavicollis	Yellow-throated Honeyeater
	Melithreptus chloropsis	Gilbert's Honeyeater
	Melithreptus brevirostris	Brown-headed Honeyeater
Pardalotidae	*Pardalotus punctatus*	Spotted Pardalote
	Pardalotus rubricatus	Red-browed Pardalote
	Pardalotus striatus	Striated Pardalote
Acanthizidae	*Pyrrholaemus brunneus*	Redthroat
	Calamanthus campestris	Rufous Fieldwren
	Hylacola cauta	Shy Heathwren
	Acanthiza iredalei	Slender-billed Thornbill (Western)
	Acanthiza apicalis	Inland Thornbill
	Acanthiza chrysorrhoa	Yellow-rumped Thornbill
	Acanthiza uropygialis	Chestnut-rumped Thornbill
	Acanthiza robustirostris	Slaty-backed Thornbill
	Smicrornis brevirostris	Weebill
	Gerygone fusca	Western Gerygone
	Aphelocephala leucopsis	Southern Whiteface
	Pomatostomus superciliosus	White-browed Babbler
Cinclosomatidae	*Cinclosoma castanotum*	Chestnut Quail-thrush
Campephagidae	*Coracina maxima*	Ground Cuckooshrike
	Coracina novaehollandiae	Black-faced Cuckooshrike
	Lalage tricolor	White-winged Triller
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella
	Daphoenositta chrysoptera	Varied Sittella
Oreoicidae	*Oreoica gutturalis*	Crested Bellbird
Pachycephalidae	*Colluricincla harmonica*	Grey Shrikethrush
	Pachycephala inornata	Gilbert's Whistler
	Pachycephala pectoralis	Golden Whistler
	Pachycephala simplex	Grey Whistler
	Pachycephala rufiventris	Rufous Whistler
Artamidae	*Artamus personatus*	Masked Woodswallow
	Artamus cinereus	Black-faced Woodswallow
	Artamus cyanopterus	Dusky Woodswallow
	Cracticus torquatus	Grey Butcherbird
	Cracticus nigrogularis	Pied Butcherbird
	Gymnorhina tibicen	Australian Magpie
	Strepera versicolor	Grey Currawong
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail
	Rhipidura albiscapa	Grey Fantail
Monarchidae	*Grallina cyanoleuca*	Magpie-lark
Corvidae	*Corvus orru*	Torresian Crow
	Corvus bennetti	Little Crow
	Corvus coronoides	Australian Raven
Petroicidae	*Microeca fascinans*	Jacky Winter
	Petroica goodenovii	Red-capped Robin
	Melanodryas cucullata	Hooded Robin
	Eopsaltria griseogularis	Western Yellow Robin
	Drymodes superciliaris	Northern Scrub-Robin
	Drymodes brunneopygia	Southern Scrub-Robin
Locustellidae	*Cincloramphus mathewsi*	Rufous Songlark
Hirundinidae	*Hirundo neoxena*	Welcome Swallow
	Petrochelidon ariel	Fairy Martin
	Petrochelidon nigricans	Tree Martin
	Cheramoeca leucosterna	White-backed Swallow
Zosteropidae	*Zosterops lateralis*	Silvereye (Western)
Dicaeidae	*Dicaeum hirundinaceum*	Mistletoebird
Estrildidae	*Taeniopygia guttata*	Zebra Finch
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit

Table 5. Amphibians found near the project area

Family	Species	Common Name
Limnodynastidae	*Neobatrachus albipes*	White-footed Trilling Frog
	Neobatrachus kunapalari	Wheatbelt Frog
	Neobatrachus pelobatoides	Humming Frog
	Neobatrachus sutor	Shoemaker Frog
	Neobatrachus wilsmorei	Plonking Frog
	Pseudophryne occidentalis	Western Toadlet

Table 6. Mammals found in the project area

Family	Species	Common Name
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna
Bovidae	*Capra hircus*	Goat
	Ovis aries	Sheep
Canidae	*Canis lupus*	Dingo
Canidae	*Vulpes vulpes*	Red Fox
Felidae	*Felis catus*	Cat
Molossidae	*Austronomus australis*	White-striped Freetail Bat
	Mormopterus planiceps	Southern Free-tail Bat
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat
	Chalinolobus morio	Chocolate Wattled Bat
	Nyctophilus geoffroyi	Lesser Long-eared Bat
	Nyctophilus holtorum	Holt's Long-eared Bat
	Nyctophilus major	Greater Long-eared Bat
	Nyctophilus major tor	Central Long-eared Bat*
	Scotorepens balstoni	Inland Broad-nosed Bat
	Vespadelus baverstocki	Inland Forest Bat
	Vespadelus regulus	Southern Forest Bat
Dasyuridae	*Antechinomys laniger*	Kultarr
	Ningaui ridei	Wongai Ningaui
	Ningaui yvonneae	Mallee Ningaui
	Sminthopsis crassicaudata	Fat-tailed Dunnart
	Sminthopsis gilberti	Gilbert's Dunnart
	Sminthopsis hirtipes	Hairy-footed Dunnart
Burramyidae	*Cercartetus concinnus*	Southwestern Pygmy Possum
Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo
	Osphranter robustus	Euro
	Osphranter rufus	Red Kangaroo
Leporidae	*Oryctolagus cuniculus*	Rabbit
Muridae	*Mus musculus*	House Mouse
	Notomys mitchellii	Mitchell's Hopping Mouse
	Pseudomys albocinereus	Ash-grey Mouse
	Pseudomys bolami	Bolam's Mouse
	Pseudomys hermannsburgensis	Sandy Inland Mouse

Table 7. Reptiles potentially found near the project area

Family	Species	Common Name
Agamidae	*Ctenophorus cristatus*	Crested Dragon
	Ctenophorus fordi	Mallee Dragon
	Ctenophorus isolepis	Central Military Dragon
	Ctenophorus maculatus	Spotted Dragon
	Ctenophorus reticulatus	Western Netted Dragon
	Ctenophorus salinarum	Saltpan Dragon
	Ctenophorus scutulatus	Lozenge-marked Dragon
	Moloch horridus	Thorny Devil
	Pogona minor	Western Bearded Dragon
	Tympanocryptis pseudopsephos	Pebble Dragon
Carphodactylidae	*Nephrurus laevissimus*	Smooth Knob-tail
	Nephrurus vertebralis	Midline Knob-tail
	Underwoodisaurus milii	Barking Gecko
Diplodactylidae	*Amalosia reticulata*	Reticulated Velvet Gecko
	Crenadactylus ocellatus	Clawless Gecko
	Diplodactylus conspicillatus	Fat-tailed Gecko
	Diplodactylus granariensis	Wheatbelt Stone Gecko
	Diplodactylus pulcher	Beautiful Gecko
	Hesperoedura reticulata	Reticulated Velvet Gecko
	Lucasium maini	Main's Ground Gecko
	Oedura marmorata	Marbled Velvet Gecko
	Rhynchoedura ornata	Beaked Gecko
	Strophurus assimilis	Goldfields Spiny-tailed Gecko
	Strophurus elderi	Jewelled Gecko

Family	Species	Common Name
	Strophurus wellingtonae	Western Shield Spiny-tailed Gecko
Elapidae	*Acanthophis antarticus*	Southern Death Adder*
	Brachyurophis semifasciata	Half-girdled Snake
	Demansia psammophis	Yellow-faced Whipsnake
	Furina ornata	Orange-naped Snake
	Neelaps bimaculatus	Black-naped Burrowing Snake
	Suta gouldii	Gould's Snake
	Suta monachus	Hooded Snake
	Pseudechis australis	Mulga Snake
	Pseudonaja mengdeni	Western Brown Snake
	Pseudonaja modesta	Ringed Brown Snake
	Simoselaps bertholdi	Jan's Banded Snake
	Suta fasciata	Rosen's Snake
Gekkonidae	*Gehyra purpurascens*	Purplish Dtella
	Gehyra variegata	Variegated Gehyra
	Heteronotia binoei	Bynoe's Gecko
Pygopodidae	*Delma australis*	Marble-faced Delma
	Delma butleri	Unbanded Delma
	Delma fraseri	Fraser's Delma
	Lialis burtonis	Burton's Legless Lizard
	Pygopus nigriceps	Western Hooded Scaly-foot
Pythonidae	*Morelia spilota*	Carpet Python
	Aspidities ramsayi	Woma*
Scincidae	*Cryptoblepharus buchananii*	Buchanan's Snake-eyed Skink
	Ctenotus atlas	Southern Mallee Ctenotus
	Ctenotus brooksi	Wedgsnout Ctenotus
	Ctenotus leonhardii	Leonhardi's Ctenotus
	Ctenotus pantherinus	Leopard Ctenotus
	Ctenotus schomburgkii	Barred Wedgesnout Ctenotus
	Ctenotus uber	Spotted Ctenotus
	Ctenotus xenopleura	Wide-striped Ctenotus
	Cyclodomorphus branchialis	Common Slender Bluetongue
	Cyclodomorphus melanops	Spinifex Slender Blue-tongue
	Egernia depressa	Southern Pygmy Spiny-tailed Skink
	Egernia formosa	Goldfields Crevice Skink
	Egernia richardi	Bright Crevice-skink
	Eremiascincus richardsonii	Broad-banded Sand-swimmer
	Hemiergis gracilipes	South-western Mulch-skink
	Hemiergis initialis	South-western Earless Skink
	Lerista kingi	King's Slider
	Lerista muelleri	Wood Mulch-slider
	Lerista picturata	Southern Robust Slider
	Lerista timida	Timid Slider
	Liopholis inornata	Desert Skink
	Liopholis striata	Nocturnal Desert Skink
	Menetia greyii	Common Dwarf Skink
	Morethia butleri	Woodland Morethia Skink
	Morethia obscura	Shrubland Pale-flecked Morethia
	Tiliqua occipitalis	Western Blue-tongued Lizard
	Tiliqua rugosa	Bobtail
Typhlopidae	*Anilios australis*	Austral Blind Snake
	Anilios bicolor	Dark-spined Blind Snake
	Anilios bituberculatus	Prong-snouted Blind Snake
	Anilios hamatus	Pale-headed Blind Snake
Varanidae	*Varanus caudolineatus*	Stripe-tailed Monitor
	Varanus gouldii	Gould's Goanna
	Varanus tristis	Black-headed Monitor

4.3 SPECIES OF CONSERVATION SIGNIFICANCE

Fauna species of conservation significance are protected by the Commonwealth *EPBC Act 1999*, and this list includes species covered by international treaties such as the Japan-Australia Migratory Bird Agreement (JAMBA) and China-Australia Migratory Bird Agreement (CAMBA) and the Western Australia (WA) *BC Act 2016*. The WA BC *Act 2016* provides for publishing the *Wildlife Conservation (Specially Protected Fauna) Notice* that lists species under multiple categories. In addition, the DBCA maintains a list of fauna that require monitoring under four priorities based on the current knowledge of their distribution, abundance, and threatening processes. The *EPBC Act 1999* and *BC Act 2016* imply legislative requirements for managing anthropogenic impacts to minimise the effects of disturbances on species and their habitats. Priority species have no statutory

protection other than the DBCA wishes to monitor potential impacts on these species. Environmental consultants and proponents of developments are encouraged to avoid and minimise impacts on these species. Definitions of the significant fauna under the WA *BC Act* are provided in Appendix C.

Shorebirds, waders and marine migratory species have been excluded from this assessment as there is no suitable habitat for these species in or near the project area.

The Southern Whiteface, Peregrine Falcon and Central Long-eared Bat are the only threatened species of fauna potentially present in the project area. The following is an assessment of the likelihood of each of the species listed in Table 8 being found in the project area.

Table 8. Potential species of conservation significance found around the project area

Species	Status under Commonwealth EPBC Act	DBCA Schedule / Priority	Comment
Night Parrot *Pezoporus occidentalis*	Endangered	Critically Endangered	Highly unlikely to be in the project area due to a lack of suitable habitat. The potential for impacting on this species is very low.
Southern Whiteface *Aphelocephala leucopsis*	Vulnerable		It may be present in the project area. As it is a mobile species, the project's potential impact on this species is low.
Grey Falcon *Falco hypoleucos*	Vulnerable	Vulnerable	Unlikely to be seen in the project area, so the potential for impact on this species is low.
Malleefowl *Leipoa ocellata*	Vulnerable	Vulnerable	No mounds were present in the project area, and no Malleefowl or their tracks were recorded during the site assessment. Thus, the potential impact on this species is low.
Chuditch *Dasyurus geoffroii*	Vulnerable	Vulnerable	Unlikely to be seen in the project area, so the potential for impact on this species is low.
Fork-tailed Swift *Apus pacificus*	Migratory	Migratory	It may be seen very infrequently in the region, however, development is unlikely to impact this species.
Grey Wagtail *Motacilla cinerea*	Migratory	Migratory	Highly unlikely to be seen in the project area, so the potential for impact on this species is low.
Peregrine Falcon *Falco peregrinus*		OS	It may be seen very infrequently in the region, however, development is unlikely to impact this species.
Central Long-eared Bat *Nyctophilus major tor*		Priority 3	It may be present in the project area.
Western Rosella *Platycercus icterotis xanthogenys*		Priority 4	Unlikely to be seen in the project area, so the potential for impact on this species is low.
Southern Death Adder *Acanthophis antarcticus*		Priority 3	Unlikely to be seen in the project area, so the potential for impact on this species is low.
Woma *Aspidites ramsayi*		Priority 4	Unlikely to be in the project area

OS – Species otherwise in need of special protection.

Results of the Commonwealth *EPBC Act 1999* protected matters database search is provided in Appendix A.

Night Parrot (*Pezoporus occidentalis*) - Critically Endangered under the *BC Act 2016* and Endangered under the *EPBC Act 1999*

The Night Parrot is a small, arid-adapted, nocturnal, ground-feeding parrot (Johnstone and Storr 1998, Threatened Species Scientific Committee 2016). Its length is 22-25cm with a body mass of approximately 104g (Threatened Species Scientific Committee 2016), although it was suggested that they were semi-nomadic, the Night Parrots in south-western Queensland appear to be sedentary (Murphy 2015).

The Night Parrot was probably initially distributed over much semi-arid and arid Australia (Garnett et al. 2011, Threatened Species Scientific Committee 2016). Recordings in north-west and western Queensland in the early 1990-2000s were in a broad cross-section of available habitats (Cupitt and Cupitt 2008, Garnett et al. 2011, Boles et al. 2016). There have been recent sightings in the Pilbara in 1980, 2005, and 2017, central WA in 1979, north-eastern South Australia in 1979, western Queensland (including Pullen-Pullen-Mt Windsor-Diamantina population) in 1980, 1990, 1993, 2006 and 2013-17 (Davis and Metcalf 2008, Garnett et al. 2011, Charalambous 2016, Pickrell 2016, AG staff 2017, Palaszxzuk and Miles 2017, Rykers 2017, AG staff 2018), Pilbara in 2017 (Jones 2017), the northern Goldfields (Jackett et al. 2017) and Great Sandy Desert (Lindsay et al. 2024, Ngururrpa Rangers et al. 2024). Garnett *et al*. (2011) suggested that there were between 50-250 mature individuals in less than 5% of its previous range, but in recent research, there is estimated to be 40-50 birds in one region (Ngururrpa Rangers et al. 2024) so the Australia-wide estimate might be higher.

Wilson's (1937) summary of observations provided information on the early records of Night Parrots' preferred habitat and breeding sites. Recent information indicates its preferred habitat appears to be in Triodia grasslands, chenopod shrublands, shrubby samphire and floristically diverse habitats dominated by large-seeded species (Threatened Species Scientific Committee 2016, McCarthy 2017, Murphy et al. 2017b). At Pullen Pullen Reserve it nests in large, more or less ring-shaped Triodia, and the nest consists of a tunnel (25-30^{o} and 0^{o} to the ground; 20-33cm long) through an apron of dead spinifex leaves that leads to a chamber under a live hummock, with a shallow depression (3-4cm) excavated into the gravelly/sandy soil (Murphy et al. 2017a). In the northern Goldfields, the nest was again in a spinifex hummock; it was circular, with an excavated depression (~1.5-2.0cm) in sandy substrate (Hamilton et al. 2017, Jackett et al. 2017). The entrance tunnel was 62cm long and was downward sloping (27^{o}), with the entrance 28cm above the ground (Hamilton et al. 2017). It has clutches of two to four sub-elliptical, white eggs with a lustrous appearance (Murphy et al. 2017a). Breeding followed significant rains in March for the observations in Pullen-Pullen Reserve and in April in the northern Goldfields (Hamilton et al. 2017, Murphy et al. 2017a), but it is thought that breeding generally occurs between April and October (Murphy *et al*. 2017a).

Murphy et al. (2017b) placed a GPS tag on Night Parrots and reported that the two birds called at dusk from their diurnal roosts among spinifex hummocks. They then flew to more floristically diverse habitats dominated by large-seeded, prolifically seeding species to feed.

The Department of Biodiversity, Conservation and Attractions (Department of Parks and Wildlife 2017) survey guidelines for Night Parrots indicated that 'at the local (site) level, roosting and nesting sites are in clumps of dense vegetation, primarily old and large spinifex clumps (often >50 years unburnt), especially hummocks that are ring-forming. These may be in expanses or isolated patches but are sometimes associated with other vegetation types, such as dense chenopod shrubs. Spinifex hummocks that are collapsed (i.e., less than 40-50 cm in height) are not likely to provide adequate shelter.' Although there are old rings of spinifex in some areas, none of the spinifex hummocks were above 40cm, suggesting the habitat is unsuitable for this parrot.

As the preferred roosting and nesting sites for Night Parrots are not present in the project area and there is a significant threat to the species in the area (e.g., feral cats), the Night Parrot is unlikely to be present in the project area and will, therefore, not be impacted by any proposed development.

Southern Whiteface (*Aphelocephala leucopsis*) - Vulnerable species under the *EPBC Act 1999*

The Southern Whiteface is a recent addition to the *EPBC Act 1999*. It is a small bush bird found in the arid and semi-arid interior from the WA coast near Hamelin Bay through the Great Victoria Desert into the arid areas of South Australia, Victoria, NSW and Queensland (Johnstone and Storr 2004, Department of Climate Change Energy the Environment and Water 2023).

It is found in open woodlands and shrublands with an understorey of grasses and low shrubs (Department of Climate Change Energy the Environment and Water 2023). It forages on the ground, feeding on insects, spiders and seeds that are mostly found in the leaf litter. (Johnstone and Storr 2004, Department of Climate Change Energy the Environment and Water 2023).

The Southern Whiteface has been recorded in multiple fauna surveys in the region (Plate 12), so it is likely to be present in the project area. In recent years, almost every comprehensive avifauna survey in the region has recorded the presence of Southern Whiteface. It will readily move if disturbed. Given its widespread distribution, abundance in surveys and ability to move if disturbed, it is unlikely to be significantly impacted by vegetation clearing and low impact activities in the project area.

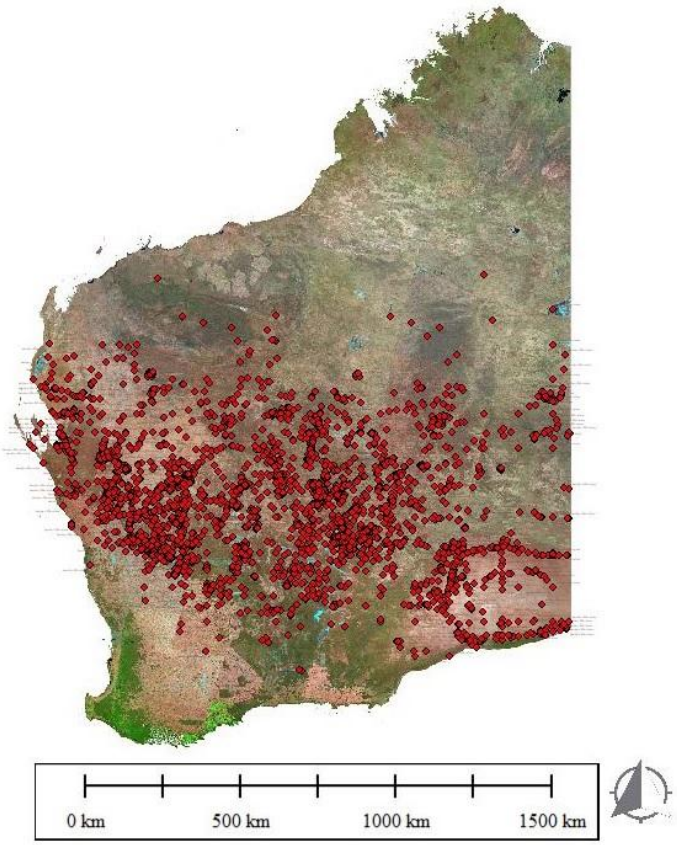

Plate 12. Southern Whiteface records in Terrestrial Ecosystems' fauna survey database

Removing or destroying a Southern Whiteface active nest could be considered a significant impact; therefore, if vegetation clearing is to be undertaken during the breeding season (i.e. August to September, presuming there have not been early rains, which will bring the breeding season forward), then there needs to be a check that no Southern Whiteface active nests will be impacted.

Malleefowl (*Leipoa ocellata*) - Vulnerable under the *BC Act 2016* and *EPBC Act 1999*

Malleefowl are large, ground-dwelling birds that rarely fly unless alarmed or are perching for the night. Historically, Malleefowl have been found in mallee regions of southern Australia from approximately the 26th parallel of latitude southwards. Before vegetation clearing for agriculture, Malleefowl were abundant in the WA Wheatbelt. Vegetation clearing for agriculture also opened adjacent bushland to predators, and in the southwest of WA, Malleefowl often only persist in isolated remnant patches of native vegetation. Sheep and other herbivores (e.g. goats, kangaroos) grazing in remnant vegetation removes or thins the undergrowth, and they also compete with Malleefowl for herbaceous foods and can cause changes to the structure and floristic diversity of foraging habitats (Benshemesh 2007).

Malleefowl and their eggs are vulnerable to predation by foxes, and newly hatched chicks are vulnerable to foxes, cats, and raptors (Priddel and Wheeler 1990, Benshemesh and Burton 1999, Benshemesh 2007, Lewis and Hines 2014). Their abundance in the Goldfields is low and sparsely distributed, favouring those areas that

are more densely vegetated. Malleefowl build distinctive nests that comprise a large mound of soil/rock covering a central core of leaf litter. These nest mounds range in diameter but sometimes span more than five metres and may be up to one metre high. Malleefowl are generally monogamous; once breeding commences, they pair for life. The presence of nest mounds indicates the presence of Malleefowl in the area.

Malleefowl have been observed in the bioregion, however, Terrestrial Ecosystems are unaware of recent records of active breeding mounds in the vicinity of the project area. No Malleefowl mounds were recorded in the project area, and no birds or tracks were recorded, so it is improbable that it is present.

Grey Falcon (*Falco hypoleucos*) – Vulnerable under the *BC Act 2016* and *EPBC Act 1999*.

This is Australia's rarest falcon, and it is mostly found in areas of less than 500mm rainfall south of latitude 26°S in Western Australia (Threatened Species Scientific Committee 2020). It is mostly found in timbered lowland plains, particularly *Acacia* shrublands that are crossed by tree-lined water courses (Threatened Species Scientific Committee 2020). However, this species has been observed in treeless areas and frequents tussock grassland and open woodland (Threatened Species Scientific Committee 2020).

This species was not seen during the site visit, has not been recorded in other fauna surveys in the project or adjacent areas, and if it were present, then would move away once disturbed.

Chuditch (*Dasyurus geoffroii*) – Vulnerable under the *BC Act 2016* and *EPBC Act 1999*

The Chuditch is the largest extant carnivorous marsupial in WA. It is usually active from dusk to dawn. Formally known from over 70% of Australia, the Chuditch now has a patchy distribution throughout the Jarrah forest and mixed Karri/Marri/Jarrah forest of south-west WA and other isolated areas. There is a historical Chuditch record from 1974 near Kambalda; however, the closest known recent populations of Chuditch are over 100km southwest of the project area.

Chuditch are solitary animals for most of their life and den in hollow logs, burrows, culverts, etc. and have also been recorded in tree hollows and rock cavities. Chuditch are opportunistic feeders and forage primarily on the ground at night. Their diet can include other mammals, birds, lizards, and bird and reptile eggs, but the majority is a mixture of large invertebrates (e.g. spiders, scorpions and crickets).

None of the fauna surveys in the adjacent areas have recorded the presence of Chuditch, and the presence of feral predators indicates that it is unlikely to be present in the project area.

Fork-tailed Swift (*Apus pacificus*) - Migratory species under the *EPBC Act 1999* and *BC Act 2016*

This species breeds in northeast and mid-east Asia and winters in Australia and southern New Guinea. It is a visitor to most parts of Western Australia, beginning to arrive in the Kimberley in late September, in the Pilbara in November, and in the southwest land division in mid-December, and leaving by late April. The Fork-tailed swift is almost exclusively an aerial species, foraging and sleeping on the wing. It is common in the Kimberley, uncommon to moderately common near northwest, west, and southeast coasts, and rare to scarce elsewhere. It rarely comes to the ground, usually only for breeding, so it is unlikely to be significantly impacted by vegetation clearing and low-impact disturbance in the project area. It is rarely seen in the Goldfields (Plate 13). Terrestrial Ecosystems assess that the Fork-tailed Swift may infrequently be seen in the region, however, any proposed vegetation clearing or development is unlikely to significantly impact this species as it is an aerial species and will move away to other areas if it is disturbed.

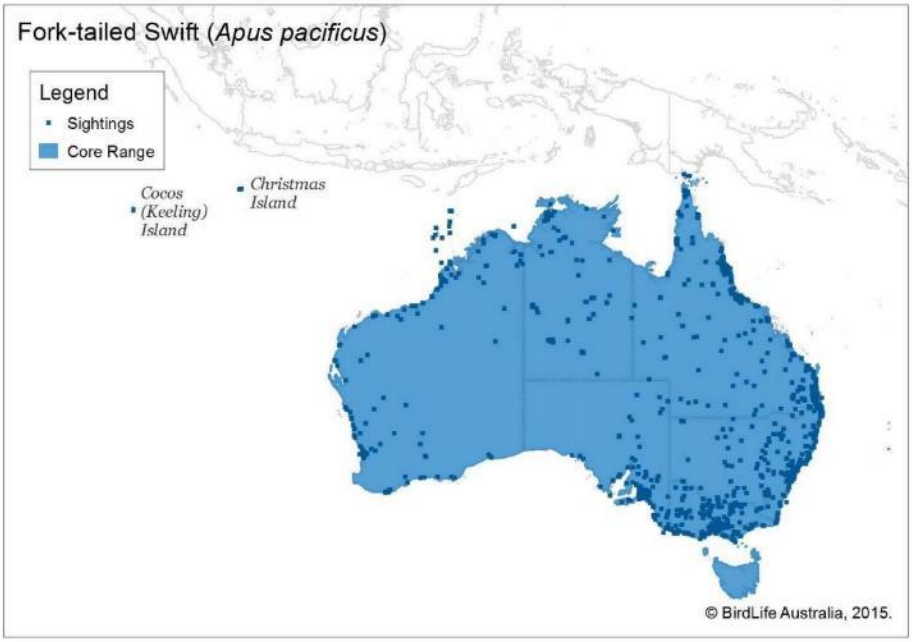

Plate 13. Range and actual reported sightings of the Fork-tailed Swift

(taken from http://www.environment.gov.au/biodiversity/threatened/publications/epbc-act-referral-guidelines-migratory-birds)

Peregrine Falcon (*Falco peregrinus*) - Otherwise specially protected under the *BC Act 2016*

The Peregrine Falcon is uncommon, although widespread throughout much of Australia excluding the extremely dry areas and has a wide and patchy distribution. It shows habitat preference for areas near cliffs along coastlines, rivers and ranges and within woodlands along watercourses and around lakes. Nesting sites include ledges along cliffs, granite outcrops and quarries, hollow trees near wetlands and old nests of other large bird species. There is no evidence to suggest any change in status in the last 50 years.

Terrestrial Ecosystems assessment is that the Peregrine Falcon may infrequently be seen in the project area. However, the proposed developments are unlikely to significantly impact this species as it will move away to other areas if it is disturbed.

Central Long-eared Bat (*Nyctophilus major tor*) – Priority 4 with the DBCA

Records in the Atlas of Living Australia indicated this species has been found in the general area. It roosts in tree cavities, foliage and under loose bark, so it is potentially in the project area.

Given that the project area represents a small fraction of similar habitat in the general area and it will readily move is disturbed, vegetation clearing in the project area is unlikely to significantly impact this species.

Western Rosella (*Platycercus icterotis xanthogenys*) – Priority 4 with the DBCA

The mallee form of the Western Rosella is found mostly in eucalypt and *Casuarina* woodland and shrublands, especially Wandoo, Flooded Gums and Salmon Gums. It has been recorded in other surveys south of the project area, but not in the nearby area (see Appendix B).

Given a lack of records for this species in adjacent areas, it is improbable that it is present in the project area.

Southern Death Adder (*Acanthophis antarcticus*) - Priority 3 species with DBCA

The Southern Death Adder is found in various habitats, from rainforests to shrublands and heaths. The distribution map in the Atlas of Living Australia indicates that it has not been recorded around the project area and there are no records in the DBCA threatened species database in this area.

It is improbable the Southern Death Adder is present in the project area and, therefore, impacted by the proposed vegetation clearing.

Woma (*Aspidites ramsayi*) - Priority 1 species with DBCA

The Woma Python was once found in a crescent shaped geographic distribution from Shark Bay to Kitchener, but it is distribution has been reduced to an area on the western Australian coast near Shark Bay, in the eastern section around Kitchener and a small population on the sand plain near Mt Dimer/Mt Walton, with individuals being occasionally recorded in the sand plain of the northern Goldfields.

In Western Australia, it is found in arid woodland or shrubland areas, typically on sand plains. It has not been recorded recently near the project area, so it is highly improbable the Woma Python is present in the project area and, therefore, impacted by the proposed vegetation clearing.

5. DISCUSSION

5.1 ADEQUACY OF THE FAUNA SURVEY DATA FOR FAUNA HABITATS REPRESENTED IN THE PROJECT AREA

The EPA's (2020) Technical Guidance on terrestrial fauna surveys indicated that the type of survey should be determined based on:

- level of existing regional knowledge;
- type and comprehensiveness of recent local surveys;
- degree of existing disturbance or fragmentation at the regional scale;
- extent, distribution and significance of habitats;
- significance of species likely to be present;
- sensitivity of the environment to the proposed activities; and
- scale and nature of impact.

The comprehensive fauna survey was undertaken by Thompson (2004) including similar habitat, albeit approximately 25km to the north, and it provides a near complete list of the small trappable vertebrate fauna species that would be in the project area. In addition, the Western Australian Museum and the State conservation Department's Goldfields surveys for the Boorabbin – Southern Cross study area (Keighery et al. 1995), the Goldfields Reserves (Chapman et al. 1991) and Phoenix Environmental Services (2014) survey of Bullabulling also provides useful fauna assemblage data relevant to the project area.

Much of the project area has been disturbed by previous exploration and mining activity, with the consequence that a generic, Detailed, and Targeted survey of the project area is unlikely to provide additional information that would alter an assessment by government regulators and is therefore not required.

The EPA's (2020) *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* are not specific about when a Detailed or Targeted vertebrate fauna survey is required. Rather, it has indicated that the level of survey effort should be determined after consideration of the criteria in Table 9.

Table 9. Criteria for determining survey requirements

Criteria	Response
Level of existing regional knowledge	Surveys have been conducted in the region, and similar habitat types are common regionally. The local vertebrate fauna species are well known; additional trapping efforts are unlikely to add new fauna species to the existing knowledge.
Type and comprehensiveness of recent local surveys	Multiple surveys are available for the bioregion. They provide contextual information concerning the project area and compile a species list.
Degree of existing disturbance or fragmentation at the regional scale	The project area is fragmented and degraded
Extent, distribution, and significance of habitats	The available fauna habitats are not unique and are widely represented in the bioregion.
Significance of species likely to be present	The Southern Whiteface (Vulnerable) will likely be in the project area and region.
Sensitivity of the environment to the proposed activities	There was no evidence to suggest that the project area has a unique fauna habitat that is environmentally sensitive from a vertebrate fauna perspective.
Scale and nature of impact.	The project's scale is small relative to the availability of similar fauna habitats in adjacent areas, and it is unlikely to have a large impact on fauna in the bioregion.

5.1.1 Amphibians

Frogs are usually only detected immediately after rainfall or around semi-permanent pools. There was no evidence of long-standing drainage channels filled with water in the project area, a habitat that would support arid-adapted frogs. *Cyclorana maini*, *C. occidentalis*, *Pseudophryne occidentalis, Neobatrachus kunapalari* and *Neobatrachus wilsmorei,* and *Litoria rubella* could be recorded near the project area. The *Cyclorana* sp. and *Neobatrachus* sp. burrow into the ground and aestivate between rainfall events. *Pseudophryne occidentalis* and *L. rubella* find shelter under rocks and in crevices during the dry periods and enter temporary ponds to breed after major rainfall events. All species have a wide-spread distribution and are abundant. Development of the project area is likely to result in a loss of individuals within the disturbed area; however, it is unlikely to impact these species significantly when assessed in a regional context.

There are no amphibians of conservation significance in the Goldfields.

5.1.2 Reptiles

Reptile species richness in the project area will be comparable with similar eucalypt woodlands and shrublands elsewhere in the bioregion (Thompson 2004, Thompson and Thompson 2006). The list provided in Table 7 represents species likely to be found over a large area of diverse habitat types. Eucalypt woodlands with mixed shrubland would typically support up to 20-30 species of reptiles, but many of these would be in low abundance. No characteristics of the reptile assemblage or reptiles of conservation significance are anticipated to be in the project area. The reptile fauna assemblage is also unlikely to be significantly different to that in the neighbouring areas, and given that there were large expanses of similar habitat in adjacent areas, vegetation clearing in the project area is unlikely to have a significant impact on reptiles when assessed in a regional context.

The project area's fauna habitats are similar to adjacent areas, so the loss of reptiles during vegetation clearing is unlikely to be significant in a bioregional context.

5.1.3 Birds

Avian species richness in the Goldfields is influenced by rainfall (Craig and Chapman 2003) and is generally higher in woodlands than chenopod shrublands and more sparsely vegetated areas. The list provided in Table 4 represents species likely to be found over a large area of diverse habitat types. Eucalypt and mallee woodlands typically support up to 50-70 species of birds, but many of these would be in very low numbers and are only present after significant rainfall. Birds typically move from an area once vegetation clearing commences, so the impact is relatively low if the area is small. However, eggs and chicks in nests are often lost during the clearing process.

Semi-arid and arid areas of inland Australia support a diverse range of transient and nomadic species that move through large areas in search of available resources. Heavy rain, followed by flowering and seeding of many plant species, is often sufficient to draw many nomadic species to the general area. These species move on to other areas once the resource is depleted or better resources are available in adjacent areas.

Predation by feral cats and foxes has significantly reduced the abundance of Malleefowl in the Goldfields. There are a few remaining small populations, mainly in areas of dense shrubland, as the dense vegetation provides the adult birds with some protection from predators. No recently active Malleefowl breeding mounds and no birds or tracks were recorded in the site assessment, so it is improbable that it is present.

The Southern Whiteface and Peregrine Falcon could be present but readily move to adjacent areas if disturbed. Vegetation clearing in the project area is unlikely to significantly impact the conservation of significant avifauna species when similar habitats exist in the adjacent areas.

5.1.4 Mammals

The diversity of small terrestrial mammals in the project area would be typical of the surrounding areas. None of the mammals potentially found in the project area are of conservation significance, except the Central Long-eared Bat, and the impacts on small terrestrial mammals during vegetation clearing are unlikely to be significant in a bioregional context. The Central Long-eared Bat may be present in the project area, but it will readily move if disturbed, and any impacts will likely be insignificant.

The project area supports a small population of rabbits and is likely to support a small population of cats and wild dogs, although none of these were recorded during the site visit.

Vegetation clearing in the project area is unlikely to impact the mammal fauna of the bioregion significantly.

5.2 BIODIVERSITY VALUE

An ecological assessment of a site should consider its biodiversity value at the genetic, species and ecosystem levels and its ecological functional value at the ecosystem level. Inadequate data exist to assess the ecological value at the genetic level, however, this is not a significant constraint as the only species of conservation significance (i.e. Southern Whiteface, Central Long-eared Bat, Peregrine Falcon) potentially resident in the project area will readily move if disturbed.

Fauna habitats in the project area are abundant and in similar conditions in adjacent areas. Therefore, the fauna assemblage in the project area will also likely be present in adjacent areas. The available fauna survey data (Appendix B) provides an indication of the vertebrate fauna that are potentially in the project area.

5.2.1 Ecological functional value at the ecosystem level

Vertebrate species potentially in the project area are wide-ranging and have been recorded in various other fauna surveys in the bioregion (Appendix B). The project area is degraded due to mining activity over many decades. The most significant impact on vertebrate fauna in the project and surrounding areas, in addition to vegetation clearing and mining, will be feral cats and, to a lesser extent, wild dogs.

5.2.2 Maintenance of threatened ecological communities

The project area does not support a threatened vertebrate ecological community.

5.2.3 Condition of fauna habitat

Uncleared fauna habitat in the project area is in reasonable condition; however, there are multiple areas of historical mining activity, including large pits, waste dumps, the remains of built infrastructure and tracks that crisscross much of the project area. Over a long period, introduced predators are likely to have been one of the most significant impacts on the vertebrate fauna in the project area. The uncleared fauna habitat of the project area is like that in the many square kilometres of adjacent habitat; therefore, clearing of the vegetation is unlikely to significantly impact the vertebrate fauna when considered in a bioregional context.

5.2.4 Ecological linkages

The project area does not provide an important ecological linkage or fauna movement corridor, as the surrounding bioregion is mainly intact.

5.2.5 Size and scale of the proposed disturbance

The project area is small (i.e. ~71ha) compared to the availability of similar habitats in adjacent areas. More than 40% of the project area has already been disturbed and degraded.

5.2.6 Abundance and distribution of similar habitat in the adjacent areas

The fauna assemblage in the project area is like that in the many square kilometres of similar habitat in adjacent areas and the bioregion, so the loss of vegetation and the local vertebrates is unlikely to have a significant impact.

5.2.7 Potential impacts on ecosystem function

Clearing native vegetation will likely result in the loss of small vertebrate fauna that cannot move away during the clearing process. The few larger animals, such as kangaroos, large goannas, snakes, and most birds, will move into adjacent areas once the clearing commences. There will be a small loss of native fauna due to vehicle strikes on access tracks, but this impact will be very low. Shifting animals into adjacent areas may increase the pressure on resources in those areas, and there may be some disruption to the ecosystems for a short period until a balance is restored.

The impacts associated with clearing vegetation in the project area on the vertebrate fauna in a local, landscape, and bioregional context are likely to be low as there is a very small amount of clearing and vast tracts of similar habitat in adjacent areas.

6. POTENTIAL IMPACTS

6.1 POTENTIAL IMPACTS ON FAUNA

Clearing vegetation will potentially affect vertebrate fauna in numerous ways, including death/injury of fauna during clearing, grading, impacts on vehicles, and loss of habitat.

Although there are anticipated short-term impacts on fauna, they are not considered to significantly impact fauna habitat and assemblages in a bioregional context in the long term. The overall impact on fauna species and species of conservation significance will be minimal, provided the recommended management procedures are implemented and adhered to.

6.2 DIRECT IMPACTS

Vegetation clearing of additional areas in the project area will potentially affect fauna in the following ways.

6.2.1 Animal deaths during the clearing process and displacement of fauna

Clearing vegetation and activities associated with the mining development will result in the loss of small fauna that retreat to burrows, such as reptiles and mammals. Nocturnal species are unlikely to be active when most land clearing occurs. This will inevitably result in these individuals being killed or injured in their burrows or as they attempt to escape. Larger terrestrial animals and avian species will most often move to adjacent areas. These species will be required to establish new activity areas and home ranges, which could result in the temporary displacement of resident species, however, this loss of fauna is unlikely to have a significant impact when considered in a bioregional context.

Clearing large areas increases fauna habitat edges. Small mammals can respond both positively and negatively to edges depending on their ecological traits (Laurance 1991, 1994, Goosem and Marsh 1997, Goosem 2000). Edge and disturbance effects can lead to altered and, most often, higher levels of predation, restricting or increasing fauna movements and altering assemblage structure (Oxley et al. 1974, Paton 1994, Baker et al. 1998, Temple 1998, Luck et al. 1999, Goosem et al. 2001). Goldingay and Whelan (1997) and Clarke and Oldland (2007) reported that edge effects can extend up to 150-200m from the edge for some species, meaning the impact area on vertebrate fauna is likely larger than the cleared footprint.

6.2.2 Reduction or loss of activity areas and closure of burrows

Clearing vegetation and associated mining activities will likely destroy reptile and mammal burrows or foraging habitats that are currently in use or could be used again. Clearing vegetation in areas that form part of an individual's activity area can potentially force these animals into adjacent areas. These areas may offer fewer resources, placing individuals under survival pressure. It could also cause individuals to move into the territories of other individuals, increasing competition for resources. Forced relocations could increase the possibility of predation.

6.3 INDIRECT IMPACTS

In addition to the obvious impact of vegetation clearing, there can be an equally significant or greater impact on the adjacent areas because of 'edge effects'. Edge effects can disrupt ecological processes such as predation, dispersal, and animal movements and can change assemblage structure. Consequently, the impact area will always be much larger than the cleared area. Vehicle tracks and areas cleared for mining activity also tend to develop weed infestations that can impact natural fauna habitats.

There are numerous potential threats associated with vegetation clearing and the construction of infrastructure that could impact the vertebrate fauna in the project area. Some of these are discussed below.

6.3.1 Habitat fragmentation and edge effects

In addition to the direct impacts of vegetation clearing, infrastructure, including tracks, has the potential to fragment habitat. Cleared linear tracks of land are 'unnatural' in much of the habitat. These linear structures partition existing activity areas, isolate sections of established communities and may alter long and medium-term movement patterns around established home ranges, particularly for small mammals and reptiles. A reduction in the population because of this development would be difficult to detect, given our current knowledge of the spatial ecology of most small mammals in the area. The project area contains disturbed vegetation and existing vehicle tracks. The impacts of habitat fragmentation due to additional vehicle tracks would be quite low.

6.3.2 Introduced fauna and weeds

An increase in human activity is often associated with an increase in the abundance of introduced species, such as the house mouse (*Mus musculus*), fox (*Vulpes vulpes*), cat (*Felis catus*) and wild dogs (*Canis lupus*). This increase may be due to a decline in habitat health, increased road kills, poor waste disposal and easier access to areas via tracks.

House mice, foxes, cats and wild dogs are known to be established in the area. In many situations, they have become a 'naturalised' species in the Australian bush. Increases in fox, dog or cat numbers can harm native fauna because they predate on and compete with native species, severely disrupting the natural balance. Increases in fox, dog or cat numbers can harm native fauna because they predate on and compete with native species, severely disrupting the natural balance. The feral cat is a particularly damaging predator of native fauna, and any increase in their numbers could have a detrimental effect on local native fauna (Kinnear 1993, Bamford 1995, Woinarski et al. 2017, Woinarski et al. 2018, Murphy et al. 2019)Hence, it is important to ensure that feral predator populations, such as cats, are controlled.

Infrastructure that supports feral species, such as rubbish disposal sites and bins, should be managed to minimise increases in these populations.

Introduced plant species can successfully and rapidly invade areas of cleared native vegetation or otherwise disturbed by humans. Introduced plant species may replace native species that provide shelter or foraging areas for native fauna. Significant changes to vegetation structure will alter the fauna habitat and consequently may influence fauna species composition. Preparing and implementing a weed management plan will reduce their threat to native fauna species.

6.3.3 Road fauna deaths

Increased road fauna deaths are likely to occur when new roads and tracks are constructed or upgraded, affecting kangaroos, nocturnal birds, and ground-dwelling large carnivorous predators. Species such as goannas and raptors are attracted to carrion on road verges, and therefore, there is an increased propensity for these species to be killed by vehicles. Given the small size of the project area and the likely low level of additional vehicle movements, the impact of road fauna deaths is likely to be low once the area becomes operational.

6.3.4 Fire

Increased human activity is often associated with an altered fire regime, which can lead to the degradation of natural ecosystems. Fire has been identified as one of the threatening processes for some species of conservation significance as many small mammal and bird species rely on long, unburnt vegetation.

Due to the sparse vegetation, fires are unlikely to threaten native fauna species near the project area significantly.

6.3.5 Anthropogenic activity

Unnatural noises, vibrations, artificial light sources, and vehicle and human movement in an area may be sufficient to force individuals or fauna species to move from adjacent areas or alter their activity periods. This disturbance will likely occur during the vegetation clearing and when mining activity commences. The overall impact is likely confined to a relatively small area and is unlikely to be significant.

6.3.6 Dust

Dust generated from shifting topsoil and spoil and vehicle traffic can degrade surrounding vegetation, reducing its ability to absorb sunlight and influencing photosynthetic rates. Degradation of these areas may potentially render the habitat unsuitable for fauna. Dust suppression and management programs are essential to minimising impacts on fauna in areas adjacent to the mine. An effective dust management and monitoring program is required.

7. VERTEBRATE FAUNA RISK ASSESSMENT

7.1 RISK ASSESSMENT

Fauna surveys to support Environmental Impact Assessments (EIA) are part of the environmental risk assessment undertaken to consider what potential impacts a development might have on the biodiversity of a particular area and region. Potential impacts on fauna from the proposed development are identified and briefly described above. Tables 10, 11 and 12 summarise the risk assessment associated with this project.

Any risk assessment is a product of the likelihood of an impact occurring and the consequences of that impact. Likelihood and consequences are categorised and described below. The assessed risk level (likelihood x consequences) is then calculated as the overall risk for vegetation clearing. This is followed by an assessment of the acceptability of the risk associated with each of the impacts. Disturbances and vegetation clearing impact the fauna on multiple scales – site, local, landscape, and regional. Each of these is considered in the risk assessment. This assessment should be considered in the context of the summary in Table 12.

Table 10. Fauna impact risk assessment descriptors

Likelihood		
Level	Description	Criteria
A	Rare	The environmental event may occur, or one or more fauna species of conservation significance may be present in exceptional circumstances.
B	Unlikely	The environmental event could occur, or one or more fauna species of conservation significance could be present at some time.
C	Moderate	The environmental event should occur, or one or more fauna species of conservation significance should be present at some time.
D	Likely	The environmental event will probably occur, or one or more fauna species of conservation significance will be present in most circumstances.
E	Almost certain	The environmental event is expected to occur, or one or more fauna species of conservation significance are expected to be present in most circumstances.
Consequences		
Level	Description	Criteria
1	Insignificant	Insignificant impacts on fauna of conservation significance or regional biodiversity, and the loss of individuals will be negligible in the context of the availability of similar fauna or fauna assemblages in the area.
2	Minor	Impact on fauna localised and no significant impact on species of conservation significance in the study area. Loss of species at the local scale.
3	Moderate	An appreciable loss of fauna in a regional context or a limited impact on species of conservation significance in the study area.
4	Major	Significant impact on species of conservation significance or their habitat in the project area and/or regional biodiversity and/or a significant loss in the biodiversity at the landscape scale.
5	Catastrophic	Loss of species at the regional scale and/or a significant loss of species categorised as 'vulnerable' or 'endangered' under the *EPBC Act 1999* at a regional scale.
Acceptability of Risk		
Level of risk	Management Action Required	
Low	No action is required.	
Moderate	Avoid if possible. This will require routine management with internal audits and a review of monitoring results annually.	
High	Externally approved management plan to reduce risks, monitor major risks annually with external audit and review of management plan outcomes annually. May a referral to the Commonwealth under the *EPBC Act 1999*.	
Extreme	Unacceptable, and the project should be redesigned or not proceed.	

Table 11. Levels of acceptable risk

		Likelihood				
		Rare or very low (A)	Unlikely or low (B)	Moderate (C)	Likely (D)	Almost certain (E)
Consequence	Insignificant (1)	Low	Low	Low	Low	Low
	Minor (2)	Low	Low	Low	Moderate	Moderate
	Moderate (3)	Low	Moderate	Moderate	High	High
	Major (4)	Moderate	Moderate	High	High	Extreme
	Catastrophic (5)	Moderate	High	High	Extreme	Extreme

Table 12. A risk assessment of the impact of ground disturbance activity on fauna

			Before management				With management		
	Potential impacts		**Inherent risk**			**Risk controls**	**Residual risk**		
Factor			Likelihood	Consequence	Significance		Likelihood	Consequence	Significance
Fauna survey data	Inadequate survey data to adequately assess the risks	Unknown loss of fauna, fauna of conservation significance, and fauna assemblages, and an incomplete fauna assessment.	B	2	Low				
	Inadequacy of comparative data	Limits on the availability of comparative data reduced the capacity to assess the uniqueness of the fauna assemblages in the project area.	B	2	Low				
Clearing vegetation	Loss of fauna habitat – local scale	Loss of terrestrial fauna in the project area.	E	2	Mod	Where possible, reduce the extent of clearing.	E	2	Mod
	Loss of fauna habitat – landscape scale	Loss of some fauna during vegetation clearing.	B	1	Low				
	Loss of fauna habitat – regional scale	Small loss of some fauna from the region.	B	1	Low				
	Loss of a threatened ecological fauna community	Loss of an undetected threatened ecological fauna community.	A	3	Low				
	Habitat fragmentation	Fauna movement is restricted, resulting in fauna death and biodiversity loss.	A	2	Low				
Death or loss of conservation significant fauna	Loss of a unique terrestrial fauna ecosystem	Loss of an ecosystem containing fauna with high species richness, high abundance, and numerous top-of-the-food chain predators.	A	2	Low				
	Night Parrot	Loss of a Night Parrot or small population of Night Parrots.	A	3	Low				
	Southern Whiteface	Loss of a Southern Whiteface or small population of Southern Whiteface.	A	2	Low				
	Malleefowl	Loss of a Malleefowl or small population of Malleefowl.	B	2	Low	Limit vehicle speeds to 80kph to minimise collisions with Malleefowl.	B	2	Low

			Before management				With management		
	Chuditch	Loss of a Chuditch or small population of Chuditch.	A	2	Low				
	Grey Falcon	Loss of a Grey Falcon or small population of Grey Falcon.	A	2	Low				
	Western Rosella	Loss of a Western Rosella or small population of Western Rosella.	A	2	Low				
	Central Long-eared Bat	Loss of a Central Long-eared Bat or small population of Central Long-eared Bat.	B	2	Low				
	Oriental Plover	Loss of a Oriental Plover or small population of Oriental Plover.	A	2	Low				
	Fork-tailed Swift	Loss of a Fork-tailed Swift or small population of Fork-tailed Swift.	A	2	Low				
	Grey Wagtail	Loss of a Grey Wagtail or small population of Grey Wagtail.	A	2	Low				
	Peregrine Falcon	Loss of a Peregrine Falcon or small population of Peregrine Falcon.	A	2	Low				
Human impacts	Increase or spread of weeds	Changed vegetation and a resulting loss of fauna habitat.	E	2	Mod	Implementation of a weed management plan.	D	2	Low
	Road kills	Animals being killed by vehicles as they cross roads	E	1	Low	Limiting speeds	E	1	Low
	Dust	Increased potential for dust	E	2	Mod	Implementation of a dust management plan.	C	2	Low

7.2 NATIVE VEGETATION CLEARING PRINCIPLES AS THEY PERTAIN TO VERTEBRATE FAUNA

The *Environmental Protection Act (1986)* provides criteria to judge the potential impact of a development on clearing native vegetation on flora and fauna. These criteria have been listed below with a response to indicate how clearing the vegetation in the project area might be judged against these principles as they relate to fauna and fauna assemblages (Table 13). Where possible, native vegetation should not be cleared if any of the following principles are compromised.

Table 13. Assessment of impact using the native vegetation clearing principles

Principle	Response
It comprises a high level of biological diversity.	Clearing vegetation will not comprise a high level of biodiversity. The project area will likely support a small population of Southern Whiteface, a small bush bird listed as Vulnerable under the *EPBC Act*. This bird is widespread in this part of the Goldfields and will move if disturbed.
It comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	Clearing the vegetation will not result in the loss of significant habitats for indigenous fauna, as there is an abundance of similar habitats in the region.
It includes, or is necessary for the continued existence or, rare flora.	N/A
It comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.	The project area does not include habitats necessary for maintaining Malleefowl or Southern Whiteface in the bioregion. However, given these species are in low abundance, all populations of both species (if present) should be managed and conserved.
It is significant as a remnant of native vegetation in an area that has been extensively cleared.	The area contains no significant remnant vegetation communities.
It is growing in, or in association with, an environment associated with a watercourses or wetland.	There is no watercourse or wetland near the project area.
The clearing of the vegetation is likely to cause appreciable land degradation.	N/A
The clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	Clearing vegetation is unlikely to impact the environmental values of the bioregion.
The clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	N/A
The clearing of the vegetation is likely to cause, or exacerbate the incidence of flooding.	N/A

7.3 CRITERIA FOR ASSESSING POTENTIAL IMPACTS ON VULNERABLE SPECIES

No Malleefowl were recorded and they are not expected to be impacted by further development of the project area. The assessment for potential impacts on Vulnerable fauna is therefore only relevant for the Southern

Whiteface. The significance of the potential impacts of vegetation clearing in the project area is assessed per the criteria in the Commonwealth Government's significant impact assessment criteria (Department of the Environment 2013) in Table 14.

Table 14. Criteria for assessing the potential impacts on Southern Whiteface
(taken from: Department of the Environment 2013)

Vulnerable Species	Southern Whiteface
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:	
• lead to a long-term decrease in the size of an important population of a species	No
• reduce the area of occupancy of an important population	No
• fragment an existing important population into two or more populations	No
• adversely affect habitat critical to the survival of a species	No
• disrupt the breeding cycle of an important population	No
• modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No
• result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	No
• introduce disease that may cause the species to decline, or	No
• interfere substantially with the recovery of the species.	No
• modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	No

An important population is defined (Department of the Environment 2013) as:

- key source populations either for breeding or dispersal;
- populations that are necessary for maintaining genetic diversity; and/or
- populations that are near the limit of the species range.

There are ~200 records of Southern Whiteface within 100km of the project area, so the number of individuals that are periodically onsite does not constitute an 'important population'. In addition, any Southern Whiteface living in the project area immediately before it is cleared will readily move to surrounding areas. The answer to Criteria 1 is 'No'.

Southern Whiteface records indicate this small bush bird is widespread in the bioregion. Had the Southern Whiteface occupancy area in Western Australia been randomly surveyed instead of survey sites being selected (i.e. mining locations and places where there is vehicle access), then it would have been evident that this bird is geographically widely distributed in Western Australia. No evidence indicates that the number of Southern Whiteface recorded in and around the project area represents an important population. Therefore, the loss of a small quantity of vegetation in the project area will not reduce its area of occupancy or displace an important population. The answer to Criteria 2 is 'No'.

The Southern Whitefaces' geographic distribution includes the entire width of southern Western Australia, extending into South Australia and the Northern Territory. The loss of a very small part of these many thousands

of square kilometres of similar habitat, particularly when the bird is mobile, probably has a shifting activity area and will readily move if disturbed, will not fragment an existing population into two or more populations to the extent that it will impact on the species. There is no evidence that the very small number of Southern Whiteface recorded in and around the project area represents an important population.

There is no evidence to suggest that the small population of Southern Whiteface in and near the project area is a key source population, a population necessary to maintain genetic diversity, or is near the limit of its geographic range. The answer to Criteria 3 is 'No'.

Habitat that is critical to the survival of Southern Whiteface is described in the Commonwealth Conservation Advice as:

- relatively undisturbed open woodlands and shrublands with an understorey of grasses or shrubs, or both;
- habitat with low tree densities and an herbaceous understory litter cover which provides an essential foraging habitat; and
- living and dead trees with hollows and crevices which are essential for roosting and nesting.

This critical habitat description is vague and applies to thousands of square kilometres of inland Western Australia in the Midwest, Murchison, Goldfields, and elsewhere. The loss of a very small part of these many thousands of square kilometres of similar habitat, particularly when the bird is mobile, probably has a shifting activity area, and will readily move if disturbed, will not adversely affect habitat critical to the survival of the species to the extent of adversely impacting on the survival of the species. The answer to Criteria 4 is 'No'.

Johnstone and Storr (2004) reported that the Southern Whiteface builds a dome-shaped nest with a side entrance mainly in a hollow branch, a tree trunk, a crevice between branches, a stump, a fence post, or a recumbent log entrance through a knot-hole or crack. Nests are made with grass, bark, rootlets, feathers and wool and lined with feathers, wool, fur and soft plant down (Johnstone and Storr 2004). Such habitats and materials are widely available in the Midwest, Murchison and Goldfields of Western Australia. Based on the geographic records, this small bush bird very obviously breeds in thousands of locations in the semi-arid areas of Western Australia. There is no evidence that the very small number of Southern Whiteface recorded in and around the project area represents an important population. The answer to Criteria 5 is 'No'.

Quality habitat is not defined for the Southern Whiteface, but presumably, it is areas with a high abundance of this species concentrated in a particular area. Even the defined 'habitat critical to its survival' (Department of Climate Change Energy the Environment and Water 2023) is very widely available in the Goldfields, Murchison, and Midwest of Western Australia. Although the Southern Whiteface has been recorded in the project area, there is no evidence to suggest or indicate that it is a 'quality habitat', and it does not differ appreciably from the habitat in the many square kilometres of surrounding habitat in which the Southern Whiteface has been recorded. The answer to Criteria 6 is 'No'.

The proposed action will not result in invasive species harmful to the Southern Whiteface (e.g. cats) becoming established in the species habitat, as these invasive species are already present in the area. The answer to Criteria 7 is 'No'.

There is no suggestion or evidence to indicate that the proposed action will introduce disease into the Southern Whiteface habitats that would adversely significantly impact this small bush bird. The answer to Criteria 8 is 'No'.

There is no recovery plan for Southern Whiteface, and it is highly improbable that the proposed action will significantly and detrimentally impact the overall Southern Whiteface population or the bioregional Southern Whiteface population. The answer to Criteria 9 is 'No'.

Based on an assessment using criteria in the Commonwealth Government's (Department of the Environment 2013) significant impact assessment criteria, the proposed action will not significantly impact this species.

The Department of Climate Change, Energy, the Environment and Water's (2023) conservation advice listed the issues shown in Table 15 as threats to the Southern Whiteface. Against each threat is a comment on whether the proposed action will significantly increase this threat.

Table 15. Threats to Southern Whiteface as described in the Conservation Advice to the Commonwealth Government Minister

Threat	Response
Habitat loss caused by clearing for agriculture	The proposed action at Phillips Find is not clearing land for agriculture.
Habitat degradation caused by domestic livestock grazing	The cattle on the pastoral stations nearby were present long before the Phillipds Find mining activity was undertaken.
Increased frequency or length of droughts	The mining operations cannot influence the frequency or length of droughts in the Goldfields.
Increased likelihood of extreme events (i.e., wildfire, drought and heatwaves)	The mining operations cannot influence the likelihood of extreme events in the Goldfields.

Mitigation

The following two mitigation measures will reduce the potential impact of vegetation clearing and the wind farm on the Southern Whiteface:

- Clearing vegetation outside the breeding season of April to September (Johnstone and Storr 1998), and having a zoologist search each area for Southern Whiteface active nests before vegetation clearing will reduce the probability of disturbing an active Southern Whiteface nest. If an active nest(s) is found, then a 250m buffer is implemented around the nest site until all chicks have fledged; and
- Minimising vegetation clearing by redesigning the infrastructure location to avoid the more densely vegetated areas.

7.4 REFERRAL UNDER THE EPBC ACT

As discussed above, the project area does not support old-growth spinifex with a structure used as both retreat and nesting sites by the Night Parrot, so it is highly improbable that this species is present. No Malleefowl, tracks or mounds were recorded in the project area, so they are unlikely to be present. Southern Whiteface is widespread and relatively abundant in the Goldfields and Midwest of Western Australia. They will readily move if disturbed, so if an active nest is not disturbed, clearing vegetation in the project area is unlikely to have a significant impact.

8. SUMMARY

Native Vegetation Solutions, on behalf of BML Ventures Pty Ltd, requested a Basic and Targeted fauna assessment for a section of the Phillips Find project area to enable further vegetation clearing and expansion of the mining operations. The project area (~70.7ha) is approximately 40km north-northwest of Coolgardie in Western Australia.

The assessed project area includes an active mining area with two pits, waste dumps, an administration area, haul roads and a camp. A previously mined area in the northern section is partially rehabilitated. There are four broad fauna habitats in the project area: mixed shrubland, mixed Eucalypt woodland over mixed shrubs, Salmon Gum woodland, and Goldfields Blackbutt woodland.

No Malleefowl, their tracks or recent breeding mounds were recorded in the project area. The Southern Whiteface (listed as Vulnerable) has been recorded in similar habitats nearby so that it could be present in the project area. This small bush bird is widespread in the Midwest and Goldfields and readily moves if disturbed. However, removing or destroying a Southern Whiteface active nest could be considered a significant impact; therefore, if vegetation clearing is to be undertaken during the breeding season (i.e. August to September, presuming there have not been early rains, which will bring the breeding season forward), then there needs to be a check that no Southern Whiteface active nests will be impacted.

Peregrine Falcon and Central Long-eared Bat may be in the project area. Both species will readily move if disturbed and are unlikely to be significantly impacted by vegetation clearing.

9. MANAGEMENT STRATEGIES

The purpose of this section is to identify generic management and mitigation strategies to address the potential impacts of development in the project area.

9.1 RECOMMENDATIONS

All contractors and staff involved in vegetation clearing, development, and ongoing operations should be made aware of the possible presence and issues associated with terrestrial fauna in the area through the induction process.

> **Recommendation 1:** An induction program that includes a component on managing fauna is mandatory for staff working in the project area.
>
> **Recommendation 2:** The induction program should incorporate information on protecting fauna and reporting deaths and sightings of feral fauna or fauna of conservation significance.

The project area is already partially disturbed. Using existing roads and tracks to construct and operate the mine will minimise the need for additional disturbance.

> **Recommendation 3:** Where possible, access routes are aligned to existing roads and tracks or follow the boundaries of broad-scale vegetation associations in the area.

Clearing vegetation in the project area may remove habitat that Southern Whiteface has used and could use in the future. These impacts are unlikely to be significant in a regional context; however, mitigation can further reduce potential impacts.

> **Recommendation 4:** Clearing vegetation is undertaken outside the Southern Whiteface breeding season of April to September, acknowledging that rainfall events can influence the breeding season**.**
>
> **Recommendation 5:** If clearing is to occur in the Southern Whiteface breeding season, a zoologist familiar with the species will search the area for active nests before vegetation clearing is undertaken.
>
> **Recommendation 6:** If an active Southern Whiteface nest(s) is found, a 250m buffer is implemented around the nest site until all chicks have fledged.

Dust generated from vegetation clearing and development could potentially degrade surrounding vegetation, reducing its ability to absorb sunlight and influencing photosynthetic rates. Degradation of these areas will potentially render the habitat unsuitable for fauna. Dust suppression and management programs are essential to minimising impacts on fauna during the exploration program.

> **Recommendation 7:** The impact of dust on adjacent vegetation and fauna habitat is managed against appropriate KPIs and following the site processes and procedures.

Pets should not be permitted on site, and feral and pest fauna numbers should be monitored and controlled. All putrescible waste likely to attract animals should be suitably contained and disposed of so as not to encourage fauna feeding around the site.

It is likely that the project area supports a population of feral and pest species. Reducing the impacts of feral cats will reduce the stress on fauna and fauna assemblages in the area. Dead animals on the road also tend to attract raptors, goannas and even cattle, which are then likely to be killed.

Recommendation 8: Pets are not permitted on the project.

Recommendation 9: All waste and rubbish should be contained in bins, regularly removed from the project, placed in the landfill, and suitably covered to exclude access to predator species.

Recommendation 10: Feeding of native fauna is prohibited.

Recommendation 11: A feral pest control program is implemented in the project area in cooperation with nearby pastoralists and mining operations.

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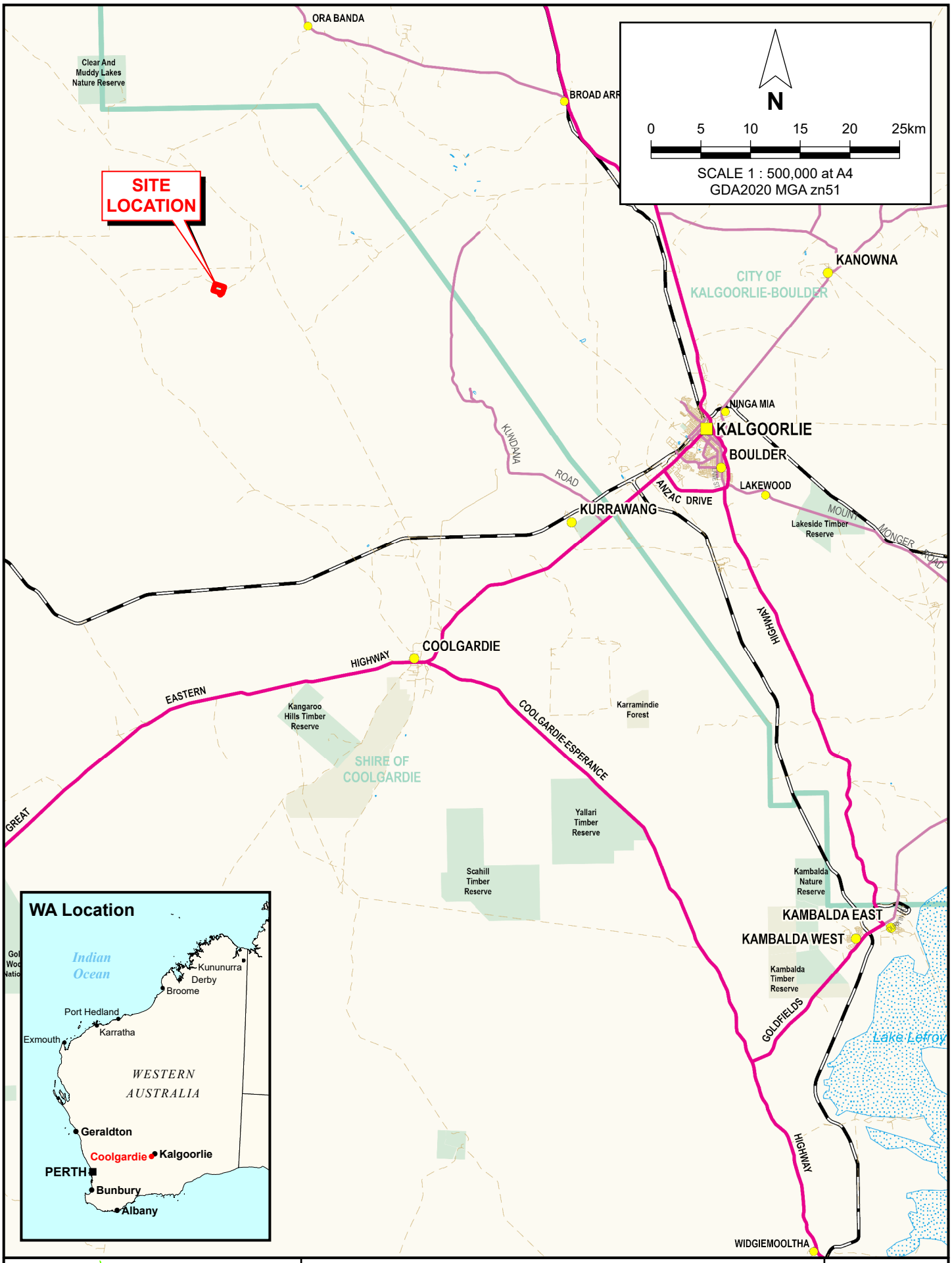
Figures

Basic and Targeted Fauna Survey and Assessment
Phillips Find Project Area



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TERRESTRIAL ECOSYSTEMS

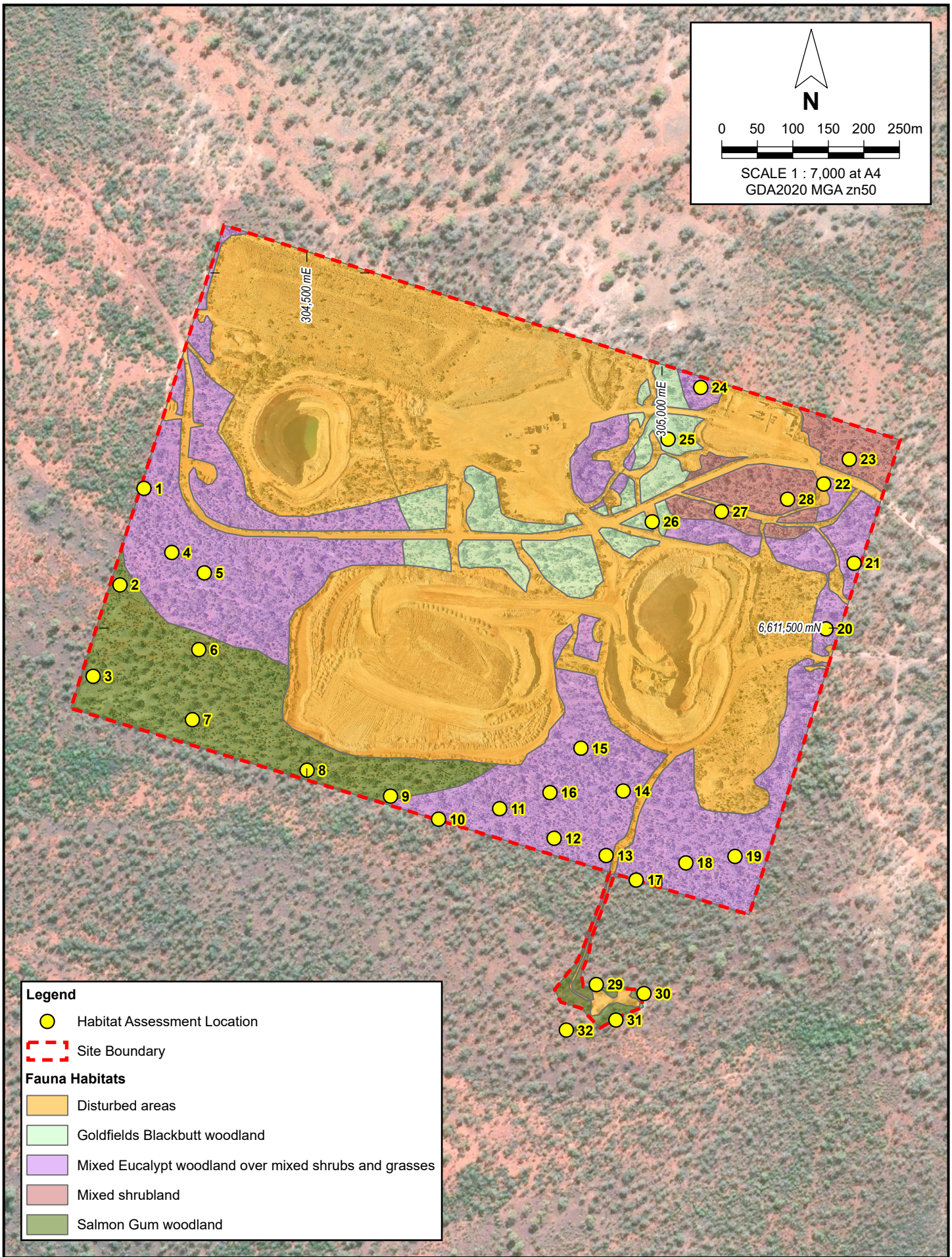
Drawn: S. Thompson | Date: 15 Jan 2025

BML Ventures Pty Ltd
BASIC VERTEBRATE FAUNA SURVEY AND ASSESSMENT
PHILLIPS FIND PROJECT AREA

REGIONAL LOCATION

Figure 1

Job: 2024-0158



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TERRESTRIAL ECOSYSTEMS

Drawn: S. Thompson | Date: 15 Jan 2025

BML Ventures Pty Ltd
BASIC VERTEBRATE FAUNA SURVEY AND ASSESSMENT
PHILLIPS FIND PROJECT AREA

FAUNA HABITAT TYPES AND HABITAT ASSESSMENT LOCATIONS

Figure 2

Job: 2024-0158

Appendix A.
Results of the EPBC Act Protected Matters Search

Basic and Targeted Fauna Survey and Assessment
Phillips Find Project Area

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 07-Jan-2025

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	12
Listed Migratory Species:	7

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	11
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	3
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	1
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Species			[Resource Information]
Status of Conservation Dependent and Extinct are not MNES under the EPBC Act. Number is the current name ID.			
Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pezoporus occidentalis Night Parrot [59350]	Endangered	Species or species habitat may occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In buffer area only
INSECT			
Ogyris subterrestris petrina Arid Bronze Azure [77743]	Critically Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
MAMMAL			
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat may occur within area	In feature area
PLANT			
Gastrolobium graniticum Granite Poison [14872]	Endangered	Species or species habitat may occur within area	In buffer area only
Ricinocarpos brevis [82879]	Endangered	Species or species habitat may occur within area	In buffer area only
Thelymitra stellata Star Sun-orchid [7060]	Endangered	Species or species habitat may occur within area	In buffer area only

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chalcites osculans as Chrysococcyx osculans			
Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area	In feature area
Merops ornatus			
Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Motacilla cinerea			
Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Thinornis cucullatus as Thinornis rubricollis			
Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area	In buffer area only
Tringa nebularia			
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Clear And Muddy Lakes	Nature Reserve	WA	In buffer area only
Credo	NRS Addition - Gazettal in Progress	WA	In buffer area only
Rowles Lagoon	Conservation Park	WA	In buffer area only

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status
Rowles Lagoon System	WA	In buffer area only

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Appendix B. Vertebrate Fauna Recorded in Biological Surveys in the Region

Basic and Targeted Fauna Survey and Assessment
Phillips Find Project Area

B.1 VERTEBRATE FAUNA ASSESSMENTS

Appendix C. Definitions of Significant Fauna under the WA Biodiversity Conservation Act 2016 and Priority Species

Basic and Targeted Fauna Survey and Assessment
Phillips Find Project Area

ATTACHMENT C
DEFINITIONS OF SIGNIFICANT FAUNA UNDER THE WA BIODIVERSITY CONSERVATION ACT 2016

Threatened, Extinct and Specially Protected fauna or flora[1] are species[2] which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such. The *Wildlife Conservation (Specially Protected Fauna) Notice 2018* and the *Wildlife Conservation (Rare Flora) Notice 2018* have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018* to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016*. Categories of Threatened, Extinct and Specially Protected fauna and flora are:

T Threatened Species

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR Critically endangered species

Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

[1] The definition of flora includes algae, fungi and lichens

[2] Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

EN Endangered species

Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU Vulnerable species

Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct Species

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

EX Extinct species

Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW Extinct in the wild species

Species that "*is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the pwild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially Protected Species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI Migratory birds protected under an international agreement

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD Species of special conservation interest (conservation dependant fauna)

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS Other specially protected species

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

P Priority species

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations

P1 Priority 1: Poorly-known species

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

P2 Priority 2: Poorly-known species

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

P3 Priority 3: Poorly-known species

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

P4 Priority 4: Rare, Near Threatened and other species in need of monitoring

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Appendix D.
Fauna habitat assessment results

Basic and Targeted Fauna Survey and Assessment
Phillips Find Project Area

Date: 12/12/2024 Habitat Assessment #: 1 Observer: Dr Scott Thompson

GDA94 51; 304271 mE 6611697 mN Fire History: > 5yrs Landform: Flat plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Sand and pebbles

Habitat Type: Mixed eucalyptus woodland over mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 2 Observer: Dr Scott Thompson

GDA94 51; 304237 mE 6611561 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Sand and pebbles

Habitat Type: Eucalyptus (Salmon Gum) woodland

Date: 12/12/2024 Habitat Assessment #: 3 Observer: Dr Scott Thompson

GDA94 51; 304199 mE 6611432 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Eucalyptus (Salmon Gum) woodland

Date: 12/12/2024 Habitat Assessment #: 4 Observer: Dr Scott Thompson

GDA94 51; 304310 mE 6611606 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles

Habitat Type: Mixed eucalyptus woodland over mixed shrubland

TERRESTRIAL ECOSYSTEMS

Date: 12/12/2024 Habitat Assessment #: 5 Observer: Dr Scott Thompson

GDA94 51; 304356 mE 6611578 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles

Habitat Type: Mixed eucalyptus woodland over mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 6 Observer: Dr Scott Thompson

GDA94 51; 304348 mE 6611470 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles

Habitat Type: Eucalyptus (Salmon Gum) woodland

Date: 12/12/2024 Habitat Assessment #: 7 Observer: Dr Scott Thompson

GDA94 51; 304339 mE 6611371 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Eucalyptus (Salmon Gum) woodland

Date: 12/12/2024 Habitat Assessment #: 8 Observer: Dr Scott Thompson

GDA94 51; 304500 mE 6611300 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Eucalyptus (Salmon Gum) woodland

TERRESTRIAL ECOSYSTEMS

Date: 12/12/2024 Habitat Assessment #: 9 Observer: Dr Scott Thompson

GDA94 51; 304618 mE 6611263 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Eucalyptus (Salmon Gum) woodland

Date: 12/12/2024 Habitat Assessment #: 10 Observer: Dr Scott Thompson

GDA94 51; 304685 mE 6611231 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles

Habitat Type: Mixed eucalyptus woodland over mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 11 Observer: Dr Scott Thompson

GDA94 51; 304772 mE 6611246 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed eucalyptus woodland over mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 12 Observer: Dr Scott Thompson

GDA94 51; 304848 mE 6611204 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles

Habitat Type: Mixed eucalyptus woodland over mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 13 Observer: Dr Scott Thompson

GDA94 51; 304921 mE 6611180 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed eucalyptus woodland over mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 14 Observer: Dr Scott Thompson

GDA94 51; 304945 mE 6611271 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed eucalyptus woodland over mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 15 Observer: Dr Scott Thompson

GDA94 51; 304886 mE 6611331 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed eucalyptus woodland over mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 16 Observer: Dr Scott Thompson

GDA94 51; 304842 mE 6611268 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed eucalyptus woodland over mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 17 Observer: Dr Scott Thompson

GDA94 51; 304964 mE 6611145 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles

Habitat Type: Mixed eucalyptus woodland over mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 18 Observer: Dr Scott Thompson

GDA94 51; 305034 mE 6611169 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed eucalyptus woodland over mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 19 Observer: Dr Scott Thompson

GDA94 51; 305103 mE 6611178 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed eucalyptus woodland over mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 20 Observer: Dr Scott Thompson

GDA94 51; 305231 mE 6611499 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed eucalyptus woodland over mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 21 Observer: Dr Scott Thompson

GDA94 51; 305270 mE 6611591 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed eucalyptus woodland over mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 22 Observer: Dr Scott Thompson

GDA94 51; 305228 mE 6611703 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Pebbles and cobbles

Habitat Type: Disturbed

Date: 12/12/2024 Habitat Assessment #: 23 Observer: Dr Scott Thompson

GDA94 51; 305264 mE 6611738 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 24 Observer: Dr Scott Thompson

GDA94 51; 305055 mE 6611839 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Cobbles and Boulders

Habitat Type: Mixed eucalyptus woodland over mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 25 Observer: Dr Scott Thompson

GDA94 51; 305009 mE 6611766 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Pebbles and cobbles

Habitat Type: Eucalyptus (Blackbutt) woodland

Date: 12/12/2024 Habitat Assessment #: 26 Observer: Dr Scott Thompson

GDA94 51; 304986 mE 6611650 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Rock and boulders

Habitat Type: Eucalyptus (Blackbutt) woodland

Date: 12/12/2024 Habitat Assessment #: 27 Observer: Dr Scott Thompson

GDA94 51; 305084 mE 6611664 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Mixed shrubland

Date: 12/12/2024 Habitat Assessment #: 28 Observer: Dr Scott Thompson

GDA94 51; 305177 mE 6611681 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Cobbles and boulders

Habitat Type: Mixed shrubland

TERRESTRIAL ECOSYSTEMS

Date: 12/12/2024 Habitat Assessment #: 29 Observer: Dr Scott Thompson

GDA94 51; 304908 mE 6610998 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles

Habitat Type: Eucalyptus (Salmon Gum) woodland

Date: 12/12/2024 Habitat Assessment #: 30 Observer: Dr Scott Thompson

GDA94 51; 304975 mE 6610985 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Eucalyptus (Salmon Gum) woodland

TERRESTRIAL ECOSYSTEMS

Date: 12/12/2024 Habitat Assessment #: 31 Observer: Dr Scott Thompson

GDA94 51; 304935 mE 6610948 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Good Surface: Pebbles and cobbles

Habitat Type: Eucalyptus (Salmon Gum) woodland

Date: 12/12/2024 Habitat Assessment #: 32 Observer: Dr Scott Thompson

GDA94 51; 304865 mE 6610934 mN Fire History: > 5yrs Landform: Undulating plain

Soil Type: Sandy clay Habitat Quality: Disturbed Surface: Pebbles and cobbles

Habitat Type: Eucalyptus (Salmon Gum) woodland

TERRESTRIAL ECOSYSTEMS


DETECTION DOG

Appendix B : Aboriginal Cultural Heritage Inquiry System (ACHIS) Database Search Reports for M16/130 and M16/168

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Lodged

Search Criteria

No Aboriginal Cultural Heritage (ACH) Lodged in Mining Tenement - M 16/130

Disclaimer

Aboriginal heritage holds significant value to Aboriginal people for their social, spiritual, historical, scientific, or aesthetic importance within Aboriginal traditions, and provides an essential link for Aboriginal people to their past, present and future. In Western Australia Aboriginal heritage is protected under the *Aboriginal Heritage Act 1972*.

All Aboriginal cultural heritage in Western Australia is protected, whether or not the ACH has been reported or exists on the Register.

The information provided is made available in good faith and is predominately based on the information provided to the Department of Planning, Lands and Heritage by third parties. The information is provided solely on the basis that readers will be responsible for making their own assessment as to the accuracy of the information. If you find any errors or omissions in our records, including our maps, it would be appreciated if you provide the details to the Department via https://achknowledge.dplh.wa.gov.au/ach-enquiry-form and we will make every effort to rectify it as soon as possible.

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Coordinates

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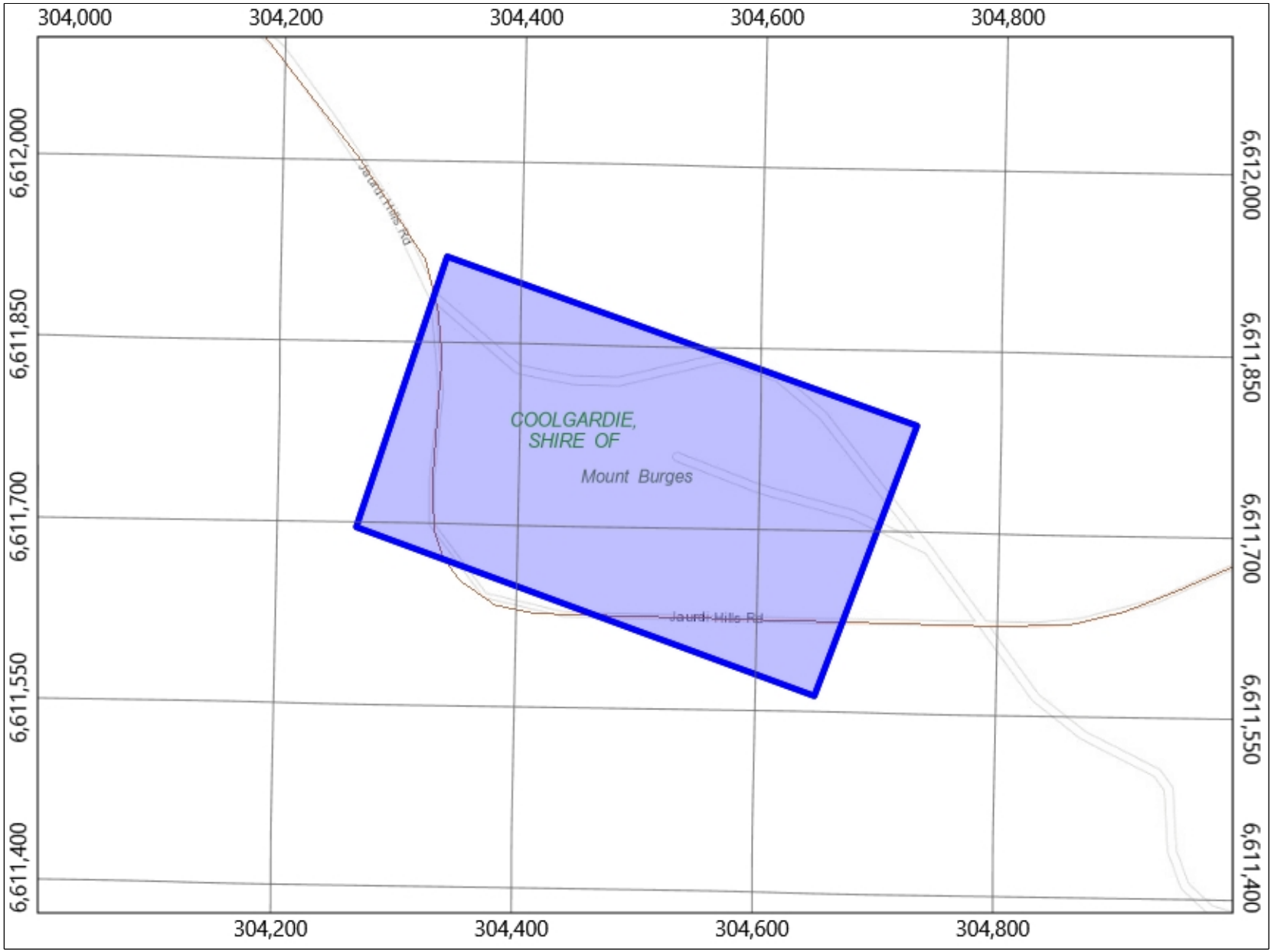
Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Lodged



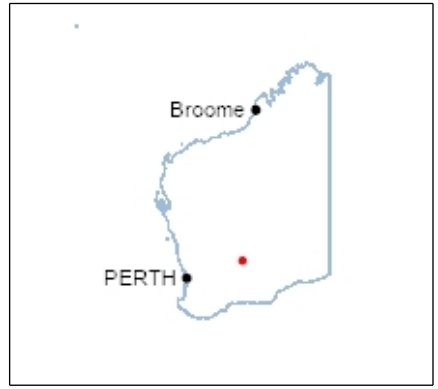
Legend

- Aboriginal Cultural Heritage (ACH) Lodged
- Search Area
- Aboriginal Community
  - *Permanent*
  - *Seasonal*
  - *Town Based*
- Town
- Road
- River
- Local Government Authority

0.18 kilometres

Map Scale 1 : 5,580

MGA Zone 51 (GDA2020)



Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Register

Search Criteria

No Aboriginal Cultural Heritage (ACH) Register in Mining Tenement - M 16/130

Disclaimer

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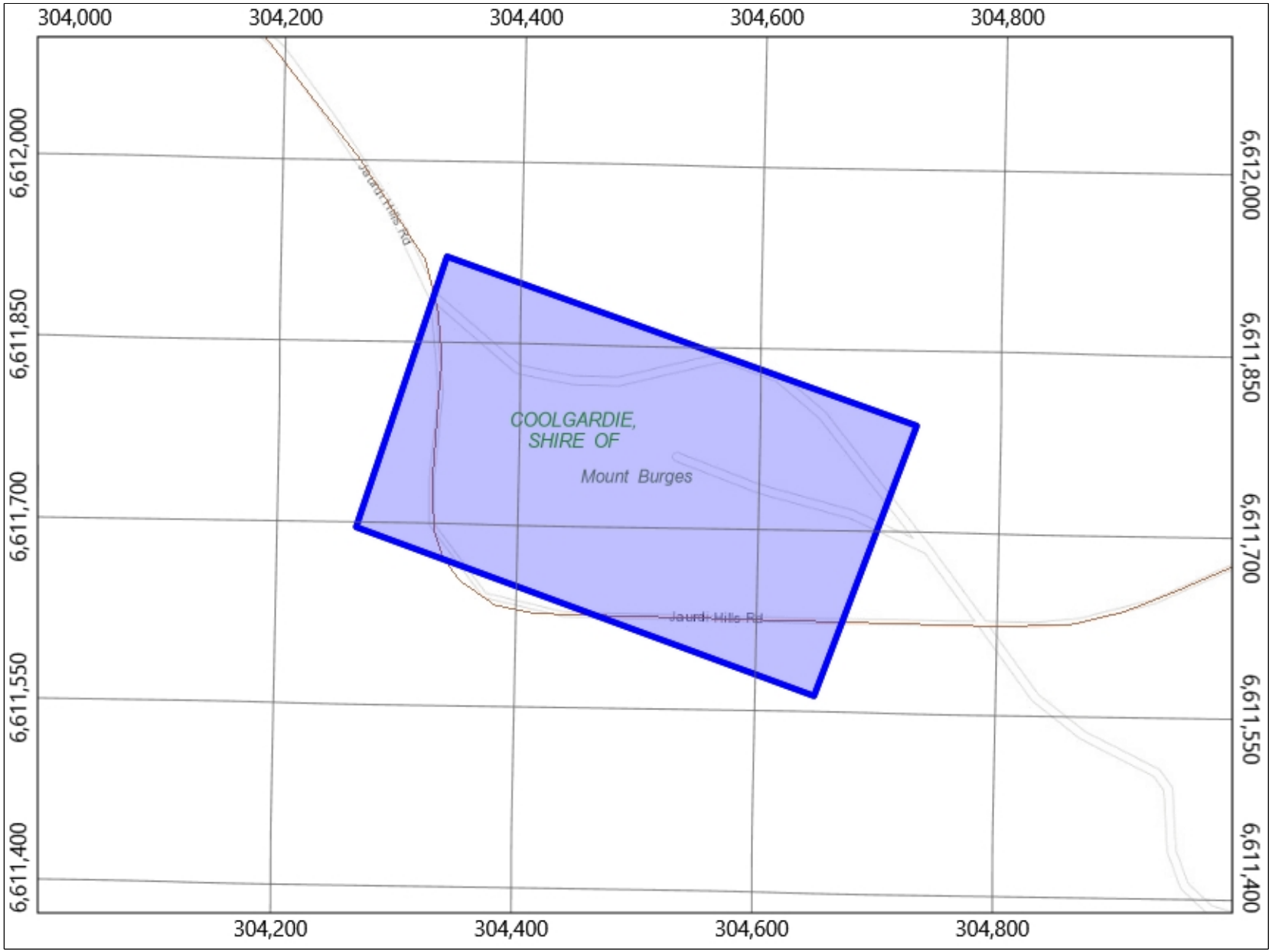
Department of Planning, Lands and Heritage

Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Register



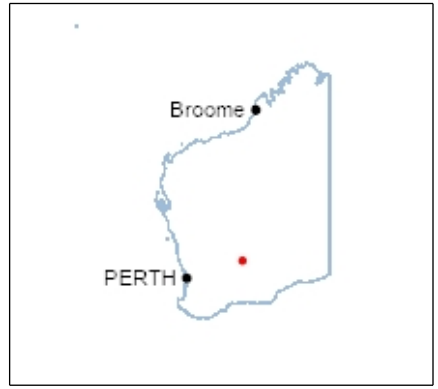
Legend

- Aboriginal Cultural Heritage (ACH) Register
- Search Area
- Aboriginal Community
  - *Permanent*
  - *Seasonal*
  - *Town Based*
- Town
- Road
- River
- Local Government Authority

0.18 kilometres

Map Scale 1 : 5,580

MGA Zone 51 (GDA2020)



Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Lodged

Search Criteria

No Aboriginal Cultural Heritage (ACH) Lodged in Mining Tenement - M 16/168

Disclaimer

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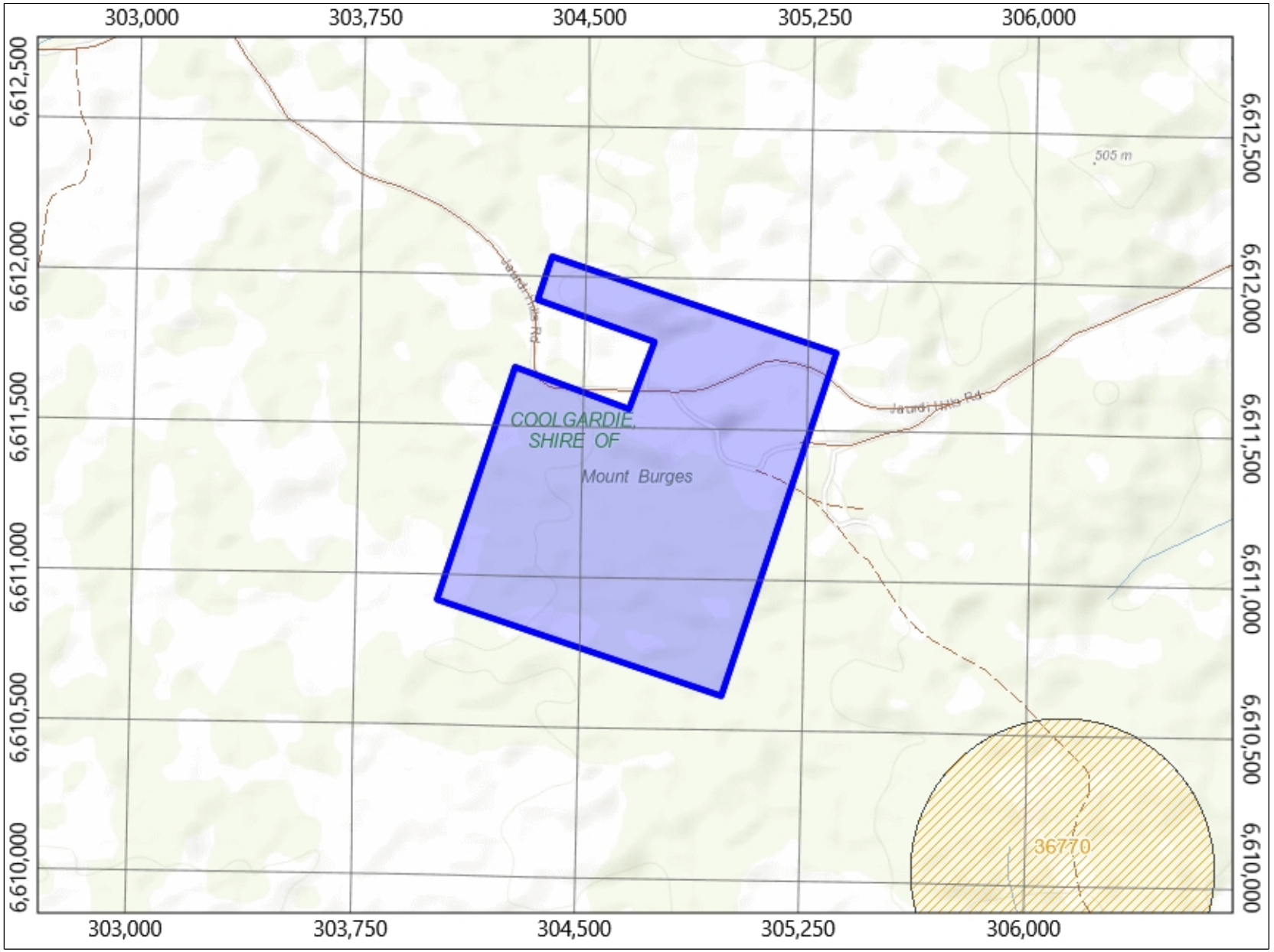
Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Lodged



Legend

- Aboriginal Cultural Heritage (ACH) Lodged
- Search Area
- Aboriginal Community
  - *Permanent*
  - *Seasonal*
  - *Town Based*
- Town
- Road
- River
- Local Government Authority

0.74 kilometres

Map Scale 1 : 22,400

MGA Zone 51 (GDA2020)

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Register

Search Criteria

No Aboriginal Cultural Heritage (ACH) Register in Mining Tenement - M 16/168

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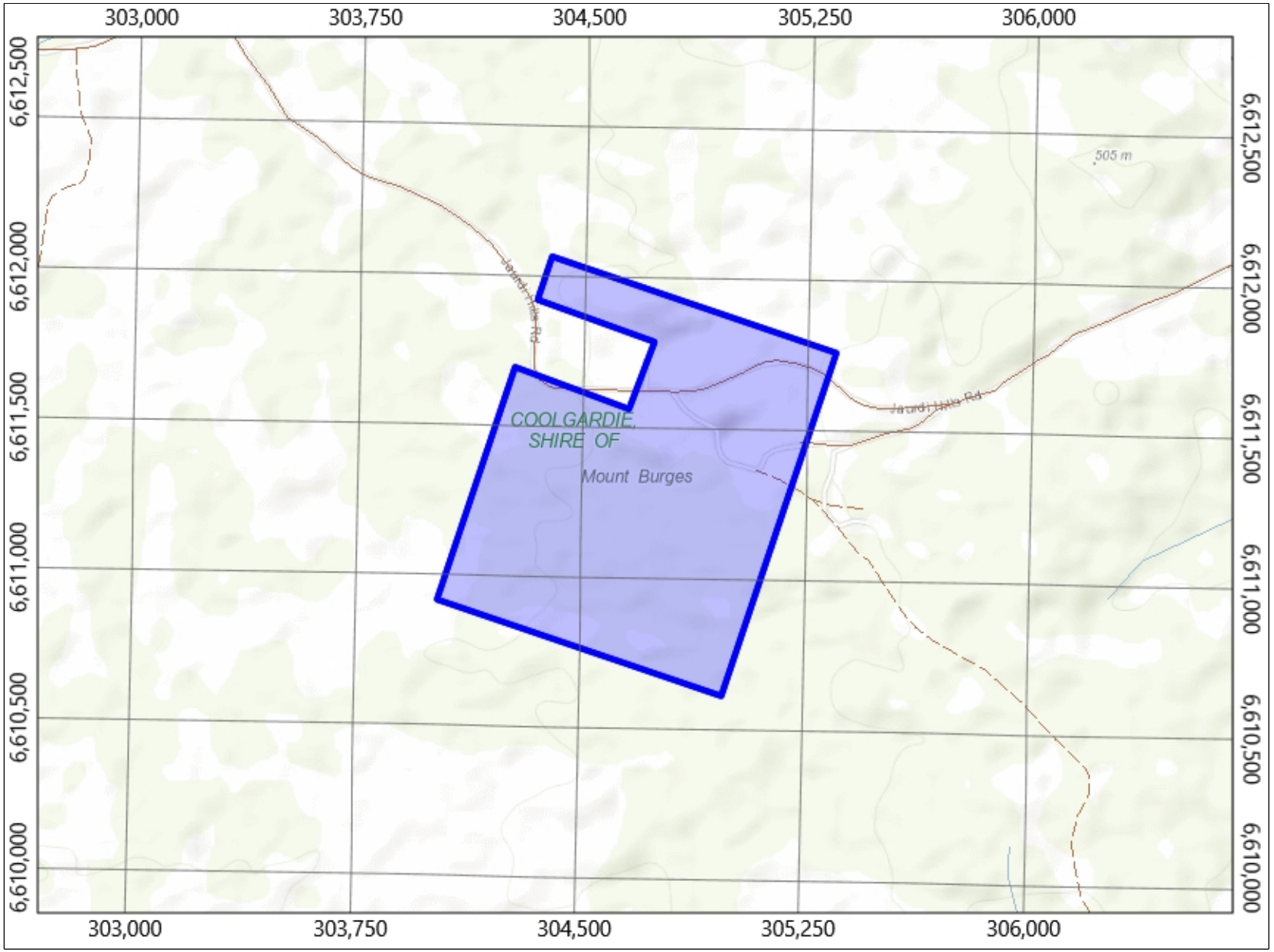
Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Register



Legend

- Aboriginal Cultural Heritage (ACH) Register
- Search Area
- Aboriginal Community
  - *Permanent*
  - *Seasonal*
  - *Town Based*
- Town
- Road
- River
- Local Government Authority

0.74 kilometres

Map Scale 1 : 22,400

MGA Zone 51 (GDA2020)