Government of Western Australia
Department of Water and Environmental Regulation

Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9740/1
Permit type:	Purpose permit
Applicant name:	Talison Lithium Australia Pty Ltd
Application received:	18 May 2022
Application area:	0.79 hectares of native vegetation
Purpose of clearing:	Road construction or upgrades
Method of clearing:	Mechanical
Property:	Stanifer Street Road reserve (PIN 11559541) South Western Highway Road reserve (PIN 11559067)
Location (LGA area/s):	Shire of Bridgetown-Greenbushes
Localities (suburb/s):	Greenbushes

1.2. Description of clearing activities

The vegetation proposed to be cleared is contained within a single contiguous area (see Figure 1, Section 1.5).

The application is to widen Stanifer Street to allow for the safe movement of large vehicles including trucks in both directions to enter the mine sites area for around 400 meters in accordance with Main Roads Western Australia requirements. The design is aimed to provide the minimum Safe Intersection Sight Distance according to these standards.

1.3. Decision on application

Decision:	Granted
Decision date:	31 August 2022
Decision area:	0.79 hectares of native vegetation, as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix A), relevant datasets (see Appendix E.1), the findings of a flora and vegetation survey (see Appendix D), the clearing principles set out in Schedule 5 of the EP Act (see Appendix B), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration the purpose of the clearing is to widen the road to improve road safety.

The assessment identified that the proposed clearing will result in:

- the loss of native vegetation that is suitable habitat for black cockatoo species and other conservation significant fauna species
- the potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is unlikely to have long-term adverse impacts on the adjacent vegetation or fauna species and can be minimised and managed to unlikely lead to an unacceptable risk to environmental values.

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

- avoid, minimise to reduce the impacts and extent of clearing
- take hygiene steps to minimise the risk of the introduction and spread of weeds
- undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity
- pre-clearing fauna inspections

1.5. Site map

Figure 1 Map of the application area

The area crosshatched yellow indicates the area authorised to be cleared under the granted clearing permit.

2 Legislative context

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

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

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

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)

The key guidance documents which inform this assessment are:

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

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

Evidence was submitted by the applicant, explaining the following avoidance and mitigation measures.

- The location has been chosen to conform with the minimum required clearing of sightlines to ensure safe use of the intersection - 250m to the south and 150m to the north of the intersection of Stanifer Street and the Mine Service Area (MSA).
- This location is where trucks, including B Doubles, will enter and leave the MSA, and the additional clearing on Stanifer Street is required for truck and vehicle safety as heavy vehicles enter and leave the MSA, to continue travelling on to South-West Highway.
- There are no other alternative engineering solutions as the additional safety area is required for large vehicle egress and ingress to the MSA.
- This is required for safety of both trucks and vehicles, and to allow safe passing by smaller vehicles.

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

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix A) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see Appendix B) identified that the impacts of the proposed clearing present a risk to biological values (fauna, adjacent flora and vegetation) and neighboring conservation areas. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1. Biological values (priority and threatened flora) - Clearing Principles (a) and (c)

Assessment

According to available databases, 13 conservation significant flora species have been recorded within the local area. A review of these records and the species habitat preferences concluded that the application area may provide suitable habitat for the following species:

- *Caladenia validinervia* (Priority 1)
- *Thomasia dielsii* (Priority 1)
- *Tetratheca parvifolia* (Priority 3)
- *Carex tereticaulis* (Priority 3)
- *Acacia parkerae* (Priority 3)

A survey conducted in March 2022 (Onshore Environmental, 2022) identified 48 plant taxa, none of which are conservation significant. The survey noted that timing as a constraint. A comparison between the species targeted within the 2022 survey and the records from the available databases noted that of the four species within the local area that are considered to have habitat present within the application area, two of the Priority 1 species listed above were not considered within the survey.

Caladenia validinervia (Priority 1) is known from only nine records and has not been recorded outside of its September-October flowering period. Noting the survey was conducted outside of the optimal time and may have missed occurrences of this species, advice was sought from Department of Biodiversity Conservation and Attractions (DBCA). DBCA (2022) advised that habitat for this species is likely to be present in the larger surrounding vegetated area, however its presence within the application area is unlikely based on it being located high in the landscape with heavy lateritic souls and is within a narrow roadside corridor that has been previously disturbed.

Thomasia dielsii (Priority 1) is known from 13 records and has typically been recorded from August to November in vegetation types like those of the application area and under similar conditions (within road verges). The species is described as an upright rounded shrub. The survey completed did not report any species of flora that could not be identified, as such, it is assumed that if this species was present within the application area, it would have been identified within the survey effort. DBCA (2022) confirmed that this species is identifiable to genus level when not flowering and no sterile *Thomasia'*s were recorded or other possible misidentifications noted within the survey of the area, indicating that this species is unlikely to be present.

Conclusion
Based on the above assessment, the proposed clearing is not considered likely to impact habitat that is suitable for priority or threatened flora.

Conditions
No flora management conditions required.

3.2.2. Biological values (fauna) - Clearing Principles (b)

Assessment
According to available databases, 15 conservation significant fauna species have been recorded within the local area. While the mapped vegetation type and presence of understory indicates the application area may provide suitable habitat for terrestrial species (chuditch, quenda, western brush wallaby), it is considered they are not likely to use the application area as their primary habitat given the area is along a main access track. Additionally, there is extensive suitable habitat in adjacent areas which is further away from the highway and the main access road. Although recorded within the local area, it is not considered likely that bilby, quokka or numbats would occupy the application area.

Avian and arboreal species recorded within the local area have a likelihood of occurring within the application area based on the findings of available databases and the flora/vegetation survey provided (Onshore Environmental, 2022). It is noted that there is a recording of south-western brush-tailed phascogale (dead) within the application area which is recent and indicates the species use the vegetation within the application aera.

Avian species
Three species of conservation significant black cockatoo have been recorded within a 10-kilometre radius. The application is within the mapped distribution of the Carnaby's cockatoo, forest red-tailed black cockatoo and Baudin's cockatoo. The application area occurs within the core habitat for forest red-tail black cockatoo and the area in which breeding is likely to occur for Carnaby's cockatoo.

Noting the foraging and common food items as listed within '*Referral guideline for three Western Australian threatened black cockatoo species*' (DAWE, 2022) and the description of the vegetation type within the application area as '*Eucalyptus marginata* subsp. *marginate* and *Corymbia calophylla* over *Bossiaea linophylla (Pteridium esculentum, Macrozamia riedlei)* over *Bossiaea ornata* and *Leucopogon capitellatus (Xanthorrhoea gracilis, Opercularia hispidula)* on brown sandy loam on lateritic hill slopes', it is considered the application area provides foraging habitat for all three species. The application area is long and linear and adjacent to a heavily used access track for a lithium mine located to the south. The proposed clearing of 0.79 hectares along this access track is not considered to impact significant habitat given its location and the remaining vegetation within the local area (43 per cent). The application area is surrounded by Greenbushes State Forest which contains similar habitat in the same or better condition. The proposed clearing is not expected to significantly impact the foraging resource for these black cockatoo species within the local area.

There are 10 records of black cockatoo roosts within the local area. The application area is not considered to provide significant roosting opportunities for black cockatoos given the amount of other suitable trees within the local area which are also in proximity to dams but not so close to the main roads. The loss of vegetation from the proposed clearing is not likely to impact roosting habitat.

There are no records of black cockatoos breeding within the local area and the closest breeding record is approximately 33 kilometres to the west of the application area. Regardless of the lack of records within the local area, the vegetation within the application area provides suitable breeding habitat (given it's a forest and contains marri and jarrah), however it is not known if any trees within the application area contain hollows. The black cockatoo referral guidelines (DAWE, 2022) further assign breeding habitat as containing following:

- Known nesting trees: Trees (live or dead but still standing) which contains a hollow where black cockatoo breeding has been recorded or which demonstrates evidence of breeding (i.e., showing evidence of use through scratches, chew marks or feathers).
- Suitable nesting trees: Trees with suitable nesting hollows present, although no evidence of use. Note that any species of tree may develop suitable hollows for breeding.
- Suitable nest hollow: Any hollow with dimensions suitable for use for nesting by black cockatoos. Characteristics of hollows used by each species is available in the SPRAT database. Suitable nest hollows are only found in live trees with a DBH of at least 500 mm. Usually this will be a natural hollow, but artificial hollows may also be suitable in some circumstances (for example, where the artificial hollow has been specifically designed for use by black cockatoos).
- Potential nesting trees: Trees that have a suitable DBH to develop a nest hollow, but do not currently have hollows. Trees suitable to develop a nest hollow in the future are 300-500 mm DBH. Note that many species of eucalypt may develop suitable hollows for breeding.

Photographs provided by the applicant indicate that the trees within the application area are young and may not be large enough to contain suitable nesting hollows for black cockatoo specie. However, in the absence of a targeted survey, breeding habitat within the application area may be present.

According to available databases, there are seven records of masked owls within the local area and one record of Peregrine falcon. These species are known from a variety of habitats but is known to utilise tree hollows for breeding. Noting the vegetation described within the application area, the application area may provide suitable breeding habitat for these species.

Phascogale and possum species

Two species of phascogale and one species of possum have been recorded within the local area. A review of the records of western-ringtail possum within the local area show an association of being near water sources (dams) and are not considered likely to reside within the application area.

The habitat preferences of phascogale species in Western Australia are not well documented. Available information suggests red-tail phascogale have preference for wandoo forest (Western Australian Museum, 2022) and the brushtail phascogale (southwestern) are found in woodland and forest of marri and jarrah (DBCA, undated). The habitat preferences are aligned with the records of the species in the local area given that the vegetation types within the local area are more suited to the brush-tail phascogale (50 records within the local area). Given the species prefer hollows and application area contains jarrah and marri trees, there is a possibility that the application area provides habitat for the species.

Conclusion

Based on the above assessment, the proposed clearing may result in impacts to individuals if present at the time of clearing. Additionally, the loss of or impact on breeding trees can be detrimental to black cockatoos, particularly if in use as a current breeding tree.

For the reasons set out above, it is considered that the impacts of the proposed clearing on conservation significant fauna can be managed by undertaking pre-clearing fauna surveys and undertaking additional management measures based on the findings of these surveys.

The applicant may have notification responsibilities under the EPBC Act for impacts to Baudin's black cockatoo, Carnaby's cockatoo, and forest red-tailed black cockatoo and their habitats, as set out in the EPBC Act. The applicant

has been advised to contact the federal Department of Climate Change, Energy, the Environment and Water) to discuss EPBC Act referral requirements.

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

- Avoid and minimise measures
- Fauna inspection (pre-clearing) surveys
- Installation of artificial hollows
- Slow progressive clearing

3.2.3. Conservation areas - Clearing Principles (h)

Assessment
The area under application falls within the Stanifer road reserve which intersects Greenbushes State Forest for a total of approximately 342 meters. The vegetation proposed to be cleared is contiguous with vegetation that connects to the state forest.

Conclusion

For the reasons set out above, it is considered the proposed clearing has the potential to introduce weeds and/or dieback which could impact the quality of the adjacent native vegetation including the State Forest.

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

- Weed and dieback conditions

3.3. Relevant planning instruments and other matters

The Shire of Bridgetown-Greenbushes provided a letter of support for the application noting the following (Shire of Bridgetown-Greenbushes, 2022):

- Clearing may only be undertaken within Shire controlled land to the extent described in the attached drawing "Proposed Clearing within Road Reserve – Stanifer St Cross-Over".
- Shire land must be left in a tidy and levelled state in accordance with the areas original condition as a minimum. 3. All cleared vegetation must be removed from Shire land unless approval to the contrary is given.
- The applicant is responsible for identify any infrastructure that may be affected and for taking the necessary measures to ensure no damage occurs. The applicant is responsible for any costs that may result from the clearing activity.
- The Shire is to be notified within 14 days of works being completed.
- The Shires endorsement is conditional on the applicant undertaking the activity in accordance with all relevant acts and regulations.

No Aboriginal sites of significance have been mapped within the application area. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

End

Appendix A. Site characteristics

A.1. Site characteristics

Characteristic	Details
Local context	The area proposed to be cleared is part of a part of an expansive tract of native vegetation in the intensive land use zone of Western Australia. It is adjacent to areas of state forest and is along a main access toad to a town and a mine. Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 43 per cent of the original native vegetation cover.
Ecological linkage	The application area is not within any mapped ecological linkages.
Conservation areas	The Greenbushes State Forest is on both sides of the application area. At its closest point, the Application area is 15 meters from the State Forest boundary.
Vegetation description	The survey provided (Onshore Environmental, 2022) described the vegetation within the application area as; low forest of Eucalyptus marginata subsp. marginate and *Corymbia calophylla* over Low Scrub of *Bossiaea linophylla* (*Pteridium esculentum*, *Macrozamia riedlei*) over Open Dwarf Scrub D of *Bossiaea ornata* and *Leucopogon capitellatus* (*Xanthorrhoea gracilis*, *Opercularia hispidula*) on brown sandy loam on lateritic hill slopes. This is consistent with the mapped vegetation type Dwellingup, D1 which is described as open forest of *Eucalyptus marginata subsp. marginata-Corymbia calophylla* on lateritic uplands in mainly humid and subhumid zones. The full survey descriptions and maps are available in Appendix D. The mapped vegetation type retains approximately 82 per cent of the original extent (Government of Western Australia, 2019).
Vegetation condition	The vegetation survey (Onshore Environmental, 2022) indicates the vegetation within the proposed clearing area is in good to degraded (Keighery, 1994) condition, described as: • Good: Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. • Degraded: Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. The full Keighery (1994) condition rating scale is provided in Appendix C. The full survey descriptions and mapping are available in Appendix D.
Climate and landform	The application area appears to be on a gradual decline to the north. Graduating contours from 320 meters (Australian Height Datum) to 300 meters Australian Height Datum are mapped within the application area.
Soil description	The soil is mapped as Mornington Hill Subsystem which is described as Low hills on laterite overlying granite, relief 40-80 m, slope 5-20%. Soils are sandy and loamy gravels with some deep sands and loamy earths.
Land degradation risk	The mapped soil type has a high risk of wind erosion and subsurface acidification and a low risk of all other forms of land degradation.
Waterbodies	The desktop assessment and aerial imagery indicated that a minor non-perennial river is located approximately 500 meters away from the application area.

Characteristic	Details
Hydrogeography	The application area is located approximately 178 meters from the Dumpling Gully Surface Water Area (a proclaimed area under the *RIWI Act 1914*). The mapped groundwater salinity is 500-1000 milligrams total dissolved solids per litre.
Flora	According to available databases, 13 conservation significant flora species have been recorded within the local area.
Ecological communities	There are no mapped ecological communities within the local area.
Fauna	According to available databases, 15 conservation significant fauna species have been recorded within the local area. The most frequently recorded species is Forest red-tailed black cockatoo.

A.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Jarrah Forest	1,501,221.93	579,813.47	38.62	222,916.97	14.85
Vegetation complex					
Dwellingup, D1 **	208,490.90	181,038.81	86.83	171,561.01	82.29
Local area					
10km radius			43	-	-

*Government of Western Australia (2019a)

**Government of Western Australia (2019b)

A.3. Fauna analysis table

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (local areal)	Are surveys adequate to identify? [Y, N, N/A]
Calyptorhynchus banksii naso (Forest red-tailed black cockatoo)	VU	Y	Y	1.3	77	N
Zanda calyptorhynchus (Baudins cockatoo)	EN	Y	Y	0.483	10	N
Zanda latirostris (Carnabys cockatoo)	EN	Y	Y	0.74	14	N
Dasyurus geoffroii (chuditch)	VU	Y	Y	1.1	33	N
Falco peregrinus (Peregrine falcon)	OS	Y	Y	9.9	1	N
Hydromys chrysogaster (water-rat)	P4	N	N	5.3	3	N/A
Isoodon fusciventer (quenda)	P4	Y	Y	2.4	57	N
Macrotis lagotis (bilby)	VU	Y	Y	6.0	1	N
Myrmecobius fasciatus (numbat)	EN	Y	Y	4.6	1	N
Notamacropus irma (western brush wallaby)	P4	Y	Y	1.2	20	N
Phascogale calura (Red-tailed phascogale)	CD	Y	Y	6.0	1	N
Phascogale tapoatafa wambenger (South-western brush-tailed phascogale)	CD	Y	Y	0	50	N
Pseudocheirus occidentalis (western ringtail possum)	CR	Y	Y	2.4	6	N
Setonix brachyurus (quokka)	VU	Y	Y	6.0	1	N
Tyto novaehollandiae novaehollandiae (masked owl)	P3	Y	Y	2.2	7	N

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

A.4. Land degradation risk table

Risk categories	Mornington Hill Subsystem
Wind erosion	>70% of map unit has a high to extreme wind erosion risk
Water erosion	<3% of map unit has a high to extreme water erosion risk
Salinity	<3% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	>70% of map unit has a high subsurface acidification risk or is presently acid
Flood risk	<3% of the map unit has a moderate to high flood risk
Water logging	<3% of map unit has a moderate to very high waterlogging risk
Phosphorus export risk	10-30% of map unit has a high to extreme phosphorus export risk

Appendix B. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment: The area proposed to be cleared does not contain locally or regionally significant flora, fauna, habitats, assemblages of plants.	Not likely to be at variance	Yes *Refer to Section 3.2.1, above.*
Principle (b): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."* Assessment: The area proposed to be cleared contain foraging habitat for species of black cockatoos and may contain breeding/nesting habitat for these species and others that have been recorded within the local area.	May be at variance	*Yes* *Refer to Section 3.2.2, above.*
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: The area proposed to be cleared is unlikely to contain habitat for flora species listed under the BC Act.	Not likely to be at variance	Yes *Refer to Section 3.2.1, above.*
Principle (d): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community."* Assessment: The area proposed to be cleared does not contain species that can indicate a threatened ecological community	Not likely to be at variance	No
Environmental value: significant remnant vegetation and conservation areas		
Principle (e): *"Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared."* Assessment: The extent of the mapped vegetation type and the native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area.	Not at variance	No
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."* Assessment: Given the distance to the nearest conservation area, the proposed clearing may have an impact on the environmental values of adjacent conservation areas.	May be at variance	Yes *Refer to Section 3.2.3, above.*
Environmental value: land and water resources		
Principle (f): *"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."*	Not at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
Assessment: Given no water courses or wetlands are recorded within 500 meters the application area, the proposed clearing is unlikely to impact on- or off-site hydrology and water quality.		
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The mapped soils are highly susceptible to wind erosion. Noting the extent of the proposed clearing and the extent of the remaining vegetation, the proposed clearing is not likely to have an appreciable impact on land degradation.	Not likely to be at variance	No
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."* Assessment: Given no water courses or wetlands are recorded within 500 meters the application area, the proposed clearing is unlikely to impact surface or ground water quality.	Not likely to be at variance	No .
Principle (j): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."* Assessment: The mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding. Given no wetland or watercourses are recorded within 500 meters of the application area, the proposed clearing is unlikely to contribute to waterlogging.	Not likely to be at variance	No

Appendix C. Vegetation condition rating scale

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

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

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

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.

Condition	Description
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Appendix D. Biological survey information excerpts

Broad Floristic Formation	*Eucalyptus* Low Forest A
Vegetation Type	HS Bo - Low Forest A of Eucalyptus marginata subsp. marginate and Corymbia calophylla over Low Scrub B of Bossiaea linophylla (Pteridium esculentum, Macrozamia riedlei) over Open Dwarf Scrub D of Bossiaea ornata and Leucopogon capitellatus (Xanthorrhoea gracilis, Opercularia hispidula) on brown sandy loam on lateritic hill slopes

Area Mapped	0.420 ha or 47% of the study area
Quadrats Sampled	SR01, SR02, SR03
Soils	Brown sandy loam
Land Form	Lateritic hill slopes
Priority Ecological Community	No
Conservation Significant Flora	None
Introduced Species	**Acacia baileyana, *Acacia decurrens, *Acacia podalyriifolia, *Acacia pycnantha, *Briza maxima, *Cotoneaster glaucophyllus, *Eucalyptus resinifera, *Lavandula stoechas, *Rubus ulmifolius*
Vegetation Condition	Good to Degraded
Disturbances	Road verge, weeds, soil disturbance (historic), rubbish, non-provenance eastern states eucalypt that has volunteered from adjacent mine rehabilitation
Average Fire Age	Old (6+ years)

Photo and description of vegetation type and condition (Onshore Environmental, 2022)

Vegetation Condition	Area (ha)	% of Study Area
Good	0.64	82.1
Degraded	0.14	17.9
Total	0.78	100.0

Photo and description of vegetation type and condition (Onshore Environmental, 2022)

Appendix E. Sources of information

E.1. GIS databases

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

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines

- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

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

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