Government of Western Australia
Department of Mines, Industry Regulation and Safety

Clearing Permit Decision Report

1. Application details and outcomes

1.1. Permit application details

Permit number:	9893/1
Permit type:	Purpose Permit
Applicant name:	Whitfield Minerals Pty Ltd
Application received:	21 September 2022
Application area:	60 hectares
Purpose of clearing:	Mineral production and associated activities
Method of clearing:	Mechanical Removal
Tenure:	Mining Leases 63/148, 63/170, 63/528
Location (LGA area/s):	Shire of Dundas
Colloquial name:	Lake Cowan Gypsum Operations

1.2. Description of clearing activities

Whitfield Minerals Pty Ltd proposes to clear up to 60 hectares of native vegetation within a boundary of approximately 171 hectares, for the purpose of mining production and associated activities. The project is located approximately four kilometres southwest of Norseman, within the Shire of Dundas.

The proponent was granted a clearing permit which has now expired (CPS 4912/4); hence the applicant submitted this new application. The proposed clearing is for an expansion of the existing gypsum mine.

1.3. Decision on application and key considerations

Decision:	Granted
Decision date:	3 November 2022
Decision area:	60 hectares of native vegetation

1.4. Reasons for decision

This clearing permit application was made in accordance with section 51E of the *Environmental Protection Act 1986* (EP Act) and was received by the Department of Mines, Industry Regulation and Safety (DMIRS) on 21 September 2022. DMIRS advertised the application for a public comment for a period of 21 days, and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix A), relevant datasets (Appendix D), the clearing principles set out in Schedule 5 of the EP Act (Appendix B), proposed avoidance and minimisation measures (Section 3.1), relevant planning instruments and any other matters considered relevant to the assessment (Section 3.3).

The assessment identified that the proposed clearing may result in:

- the potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values.
- potential land degradation in the form of wind erosion.

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 lead to have adverse impacts on the conservation of significant flora and fauna and the impacts of clearing can be minimised and managed to be unlikely to 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;
- staged clearing to minimise wind erosion; and
- take hygiene steps to minimise the risk of the introduction and spread of weeds.

1.5. Site map

A site map of proposed clearing is provided in Figure 1 below.

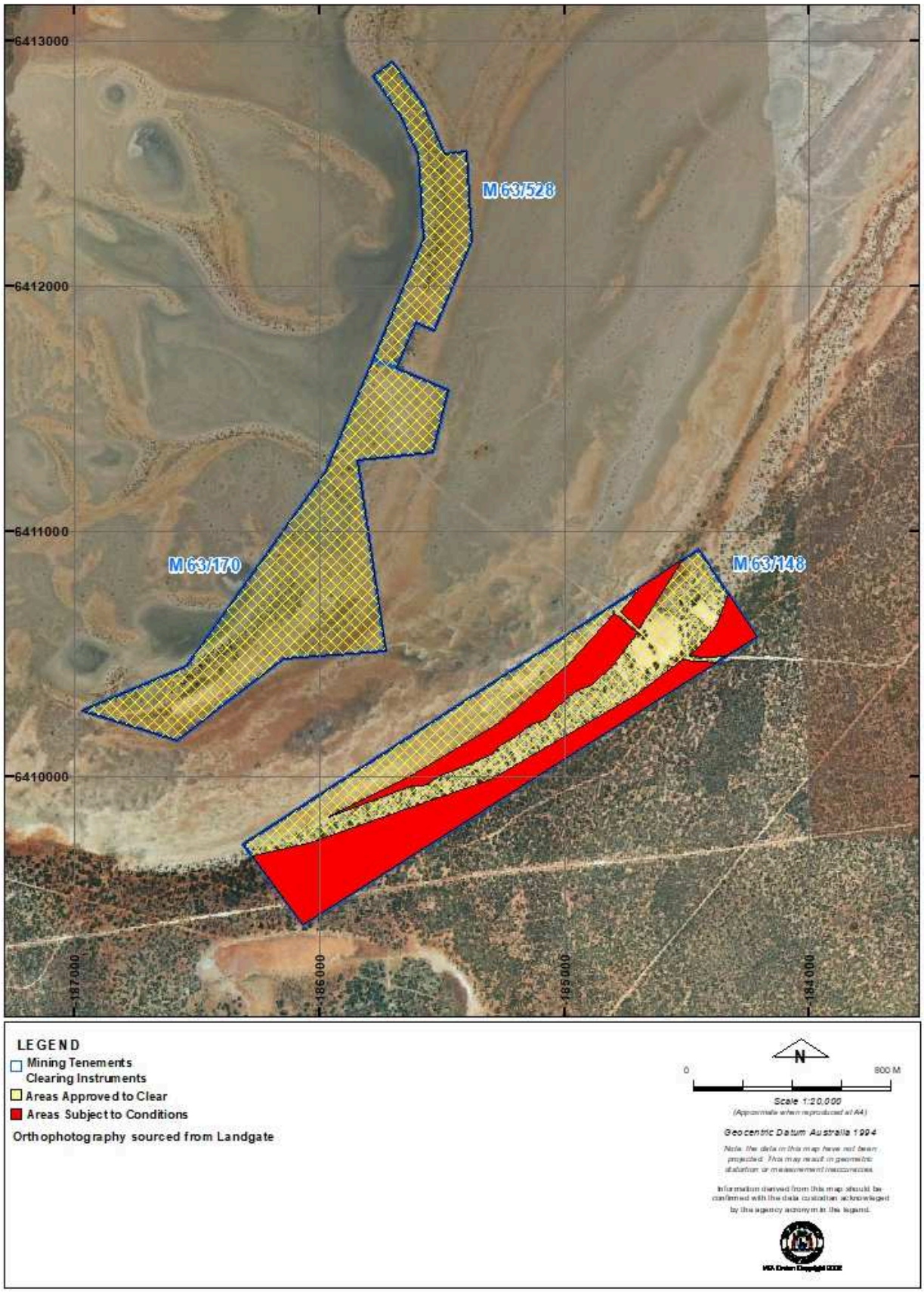

Figure 1. Map of the application area. The yellow area indicates the area within which conditional authorised clearing can occur under the granted clearing permit. The red areas indicate areas of restricted clearing.

2. Legislative context

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

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

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

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Country Areas Water Supply Act 1947* (WA) (CAWS Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Mining Act 1978* (WA)

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 2021)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2020)

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

During the assessment and following discussions with DMIRS, the applicant confirmed they do not intend to clear certain areas within their application. These areas are more densely vegetated and have not been subjected to biological surveys. Therefore, these areas have been restricted from native vegetation clearing (see Section 1.5. Site map for the areas subjected to conditions).

The applicant has provided the following avoidance measure to support this clearing permit application:

- Avoid and minimise impacts through the planning process to ensure the best possible location is cleared for the purpose of carrying out the intended business activities (Whitfield Minerals Pty Ltd, 2022).

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 **Error! Reference source not found.**) identified the impacts of the proposed clearing are limited and able to be managed to be environmentally acceptable with an avoid and minimise, and hygiene management conditions.

3.2.1. Biological values - Clearing Principles (a), (b) and (c)

Assessment

A reconnaissance flora and vegetation survey of the application area identified five major vegetation communities and recorded a total of 52 flora species belonging to 34 genera and 19 families, of which none were representative of any Threatened or Priority flora or Priority or Threatened Ecological Communities (NVS, 2012). The vegetation within the application area varies from very good to degraded condition (Keighery, 1994; NVS, 2012).

The flora and vegetation survey conducted in 2012 by Native Vegetation Solutions (NVS) did not include the entire application area. Furthermore, no additional or recent biological information has been provided in support of the application. A total of 35 flora species of conservation significance were identified within 20 kilometres radius from the application area (GIS Database). Of which, *Eucalyptus platydisca* (T)*, Eucalyptus brockwayi* (P3)*, Acacia dorsenna* (P1)*, Eremophila purpurascens* (P3)*, Philotheca apiculata* (P1)*, Eucalyptus jimberlanica* (P1)*, Eucalyptus websteriana* subsp. *norsemanica* (P1)*, Micromyrtus papillosa* (P1), and *Bossiaea arcuata* (P1) mostly occur around Lake Cowan (Western Australian Herbarium, 1998–), suggesting that the habitats within and around the lake are of local and regional significance for these species. Therefore, the areas identified in aerial imagery supporting a more densely vegetated areas that have not been subjected to biological surveys, have been restricted from native vegetation clearing. The site map on Section 1.5 shows the areas subjected to the clearing restriction condition. The remaining areas within the application area have been previously disturbed by mining operations, have bare sediments or support scattered vegetation (NVS, 2012; GIS Database).

A desktop survey revealed that the survey area could possibly be suitable habitat for two introduced species (*Carrichtera annua* and *Tamarix aphylla)*; however no introduced species have been recorded during the field survey (NVS, 2012). Weeds have the potential to out-compete native flora and reduce the biodiversity of an area. Potential impacts to biodiversity as a result of the proposed clearing may be minimised by the implementation of a weed management condition.

Seven conservation significant fauna species have been identified within 20 kilometres of the application area (GIS Database). All records have been avian species, with some categorised as migratory birds (NVS, 2012; GIS Database). However, none of these have been recorded within the application area (GIS Database). Furthermore, the application area represents a small portion

of the Lake Cowan salt lake, and considering the lack of habitat features within the application area and that part of it has been previously disturbed for mining operations (NVS, 2012; GIS Database) it is unlikely that the application area represents a significant habitat for fauna. Lake Cowan has approximately 1,800 km^2 (GIS Database); therefore, suitable habitat for potential conservation fauna species may occur extensively outside the application area.

Conclusion

Based on the above assessment, it is considered that the impacts of the proposed clearing on potential habitats for Priority and Threatened flora and fauna are not likely to be significant if avoidance, mitigation and management measures are implemented.

For the reasons set out above, it is considered that the impacts of the proposed clearing on potential habitats for conservation significant flora species can be managed with conditions to be environmentally acceptable. There is potential for weeds being present within the application area and the proposed clearing has the potential to exacerbate the spread of weeds.

Conditions

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

- avoid, minimise to reduce the impacts and extent of clearing;
- restricted clearing to minimise potential impacts to significant flora species; and
- take hygiene steps to minimise the risk of the introduction and spread of weeds.

3.3. Relevant planning instruments and other matters

The clearing permit application was advertised on 11 October 2022 by the Department of Mines, Industry Regulation and Safety inviting submissions from the public. No submissions were received in relation to this application.

There is one native title claim (WC1999/002) over the area under application (DPLH, 2022). This claim has been determined by the Federal Court on behalf of the claimant group. However, the mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore, the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There is one registered Aboriginal Sites of Significance within the application area (DPLH, 2022). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

Other relevant authorisations required for the proposed land use include:

- A Mining Proposal / Mine Closure Plan approved under the *Mining Act 1978*.

It is the proponent's responsibility to liaise with the Department of Water and Environmental Regulation and the Department of Biodiversity, Conservation and Attractions, to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

End

Appendix A. Site characteristics

A.1. Site characteristics

Characteristic	Details
Local context	The project is located approximately four kilometres southwest of Norseman, within the Shire of Dundas in the extensive land use zone (GIS Database). The predominant land use in the region is grazing of native pastures, conservation, mining activity and urban development.
Ecological linkage & Conservation areas	The nearest conservation area is an Un-named Nature Reserve which is located approximately nine kilometres north of the application area (GIS Database). As the application area is located adjacent to an existing mine and is to allow for the expansion of mining activities, it is not considered to be an ecological linkage to other areas of vegetation.
Vegetation description	The vegetation of the application area is broadly mapped as the following Beard vegetation associations: 9: Medium woodland; coral gum (*Eucalyptus torquata*) and goldfields blackbutt (*Eucalyptus le soufii*); 125: Bare areas; salt lakes; and 3106: Medium woodland; salmon gum and Dundas blackbutt (GIS Database). A reconnaissance flora and vegetation survey was conducted over the application area by Native Vegetation Solutions (NVS, 2012). The following five vegetation associations were recorded within the application area (NVS, 2012): • *Eucalyptus salicola* woodland on gypsum dunes; • *Casuarina pauper* and *Callitris columellaris* over *Melaleuca quadrifaria* and *Darwinia* sp. Karonie shrubland; • *Tecticornia* shrubland; • *Eucalyptus salicola* open woodland over *Casuarina pauper*, *Callitris columellaris* and *Melaleuca quadrifaria* shrubland; and • *Casuarina pauper* and *Callitris columellaris* over *Melaleuca quadrifaria* shrubland.
Vegetation condition	The vegetation survey (NVS, 2012) indicate 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. 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. to • Degraded: Structure severely disturbed; regeneration to good condition requires intensive management. The majority of the proposed clearing area has been either previously cleared for mining production or has bare ground due to the salt lake nature (GIS Database).
Climate and landform	The application area is mapped within elevations of 260 meters AHD (GIS Database). The climate of the region is semi-arid, and the annual rainfall average of approximately 286 millimetres (BoM, 2022a).
Soil description and land degradation risk	The application area is located within the Kambalda Zone, characterised by Flat to undulating plains, hills and ranges on greenstone and granitic rocks of the Yilgarn Craton with calcareous loamy earths, red loamy earths, salt lakes soils and some red-brown hardpan shallow loams and red sandy duplexes (DPIRD, 2022). The soil is mapped as part of the SV2 Atlas System, described as saline valleys with some dunes including barchan forms - salt lake channels, mostly devoid of true soils, and their fringing areas (DPIRD, 2022).
Waterbodies and hydrogeography	There are no permanent waterbodies or watercourses within the application area (GIS Database). The majority of the permit area falls within the lake bed of Lake Cowan, a non-perennial salt lake which is usually dry, only filling occasionally after significant rainfall (CALM, 2002). The application area is located within the Goldfields Groundwater Area (RIWI Act); however, it is not within a Public Drinking Water Source Area (GIS Database).
Flora	There are records of 35 Priority flora species within 20 kilometres of the application area (GIS Database). None of these records are within the application area (GIS Database). Flora survey undertaken by NVS (2012) did not record any Threatened or Priority flora species within the application area.
Ecological communities	There are no mapped Threatened or Priority Ecological Communities (TEC/PEC) within the application area (NVS, 2012; GIS Database).

Characteristic	Details
Fauna	There are records of seven conservation significant fauna species within 20 kilometres of the application area (GIS Database). All of these records are birds (some migratory) and none of them are within the application area (GIS Database).

A.1. Flora analysis table

With consideration for the site characteristics set out above, and relevant datasets (see Appendix D.1), some conservation significant flora species identified within 20 kilometres radius required further consideration highlighted bellow.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable soil type? [Y/N]	Radius of search (km) approx.	Number of known records within 20 kilometres (total)	Are surveys adequate to identify? [Y, N, N/A]
Acacia dorsenna	P1	Y	Y	3.5	5	N
Acacia kerryana	P2	Y	Y	9.0	5	N
Allocasuarina eriochlamys subsp. *grossa*	P3	N	Y	6.0	19	N
Allocasuarina globosa	T	N	N	8.5	6	N
Aotus sp. Dundas (M.A. Burgman 2835)	P2	Y	Y	13.5	2	N
Atriplex lindleyi subsp. *conduplicata*	P3	Y	Y	3.0	1	N
Austrostipa turbinata	P3	N	Y	11.0	1	N
Austrostipa vickeryana	P3	N	Y	4.5	1	N
Beyeria sulcata var. *truncata*	P3	N	Y	<20	2	N
Bossiaea arcuata	P1	Y	Y	10	12	N
Calandrinia lefroyensis	P1	N	Y	13.5	1	N
Eremophila purpurascens	P3	N	Y	4.5	30	N
Eucalyptus brockwayi	P3	Y	Y	2.0	68	N
Eucalyptus jimberlanica	P1	N	Y	3.0	24	N
Eucalyptus platydisca	T	N	Y	2.0	33	N
Eucalyptus websteriana subsp. *norsemanica*	P1	N	Y	6.0	13	N
Micromyrtus papillosa	P1	Y	Y	5.5	15	N
Notisia intonsa	P3	N	Y	6.0	2	N
Philotheca apiculata	P1	Y	Y	3.5	21	N
Pityrodia chrysocalyx	P3	N	Y	5.0	3	N
Thysanotus brachyantherus	P2	N	Y	16.0	1	N

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

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: A desktop and flora assessment did not identify any Threatened or Priority flora within the application area (NVS, 2012; GIS Database). No conservation significant fauna have been recorded within the permit area (GIS Database).	May be at variance	Yes Refer to Section 3.2.1, above.

Assessment against the clearing principles	Variance level	Is further consideration required?
There are no known Threatened or Priority Ecological Communities within the permit area (NVS, 2012; GIS Database). However, as no recent biological surveys have been conducted within the whole application area, and it presents potential habitats for conservation significant flora species, a condition restricting the clearing in these critical areas has been placed in the permit to minimise potential impacts to these species.		
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 does not contain significant habitat for conservation significant fauna (GIS Database). In addition, part of the application area is surrounded by existing disturbance for mining related infrastructure (GIS Database).	Not likely to be at variance	Yes *Refer to Section 3.2.1, above.*
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: There are no known records of Threatened flora within the application area (GIS Database). A flora survey of the application area did not record any species of Threatened flora (NVS, 2012). Based on the soil type, close proximity (2 kilometres) of known records of *Eucalyptus platydisca* (Threatened) and their numbers, this species may potentially be present within the permit area. A condition restricting the clearing of potential habitats for this species has been placed in the clearing permit to avoid potential impacts to this species.	May 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: There are no known Threatened Ecological Communities (TECs) located within the application area (GIS Database). The nearest TEC (*Allocasuarina globosa*) is located approximately eight kilometres south of the application area (GIS Database). A vegetation survey of the application area did not identify any TECs (NVS, 2012).	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 application area falls within the Eastern Goldfields subregion of the Coolgardie Interim Biogeographic Regionalisation for Australia (GIS Database). Approximately 98% of the pre-European vegetation still exists in the Coolgardie Bioregion (Government of Western Australia, 2019). The application area is broadly mapped as Beard vegetation association 9, 125, and 3106 (GIS Database). Over 90% of the pre-European extent of this vegetation association remains uncleared at both the state and bioregional level (Government of Western Australia, 2019). The permit area does not contain any remnants nor does it form part of any remnants in the local area (GIS Database).	Not likely to be 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: There are no conservation areas in the vicinity of the application area. The nearest DBCA managed land is an Un-named Nature Reserve which is located approximately nine kilometres northeast of the application area (GIS Database). The proposed clearing is unlikely to impact on the environmental values of any conservation area.	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
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."* Assessment: The application area is located within Lake Cowan which is mapped as a non-perennial lake (GIS Database). The riparian vegetation identified within the survey area occurs upon a series of dunes on the Lake Cowan surface (NVS, 2012). The vegetation is typical of gypsiferous dunes around salt lakes (NVS, 2012). Native Vegetation Solutions (2012) have identified that the clearing of this vegetation is unlikely to significantly affect the ecological communities associated with the lake as it represents only a relatively small proportion of the local vegetation association. A condition restricting the clearing of native vegetation on specific areas will protect the most significant vegetation parts within the application area in the lake. Given that the vegetation types within the application area are well represented both locally and regionally, and that a clearing restriction condition has been placed in the permit, it is unlikely that the proposed clearing will have any significant environmental impact on riparian vegetation.	Not likely to be at variance	No
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The soil is mapped as part of the SV2 Atlas System, described as saline valleys with some dunes including barchan forms - salt lake channels, mostly devoid of true soils, and their fringing areas (DPIRD, 2022). The application area is located within Lake Cowan which is an ephemeral salt lake (GIS Database) and the vegetation to be cleared consists of predominantly salt tolerant species. Salinity levels are high (greater than 35,000 mg/L Total Dissolved Solids). The application area is mostly flat and is also located in an area where the average annual evaporation rate (approximately 2200 millimetres) greatly exceeds the local annual rainfall (289 millimetres) (BoM, 2022a). Given the above there is unlikely to be any significant surface water movement and the application area has a low risk of water erosion. The sandy nature of the soils associated with dunes within the lake may lead to some risk of wind erosion following the removal vegetation. Therefore, a condition requiring staged clearing has been placed in the permit to avoid wind erosion.	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: There are no Public Drinking Water Source Areas within or in close proximity to the application area (GIS Database). The groundwater in the area is brine with a Total Dissolved Solids (TDS) greater than 35,000 mg/L (GIS Database). Average annual rainfall is low at approximately 286 millimetres (BoM, 2022a), therefore surface water flow is unlikely to be high during normal seasonal rains. In addition, as the application area experiences an average annual evaporation rate between 2000 to 2400 millimetres (BoM, 2022b), during normal rainfall events, surface water within the application area is likely to evaporate quickly and removal of vegetation is unlikely to contribute to a rising saline water table. The proposed clearing of 60 hectares of native vegetation for the expansion of existing mining is unlikely to cause any significant impact on the surface or groundwater 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:	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
The climate of the region is semi-arid, with a low average annual rainfall of approximately 286 millimetres (BoM, 2022a). Therefore, surface water flow is likely to be low during normal seasonal rains. Furthermore, the average evaporation rate over the application area is approximately 2200 (BoM, 2022b), hence, the surface water is likely to evaporate quickly after usual rainfall events. Therefore, the proposed clearing is unlikely to cause, or exacerbate, the incidence or intensity of flooding.		

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.
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. Sources of information

D.1. GIS databases

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

- Clearing Regulations – Schedule One Areas (DWER-057)
- DBCA – Lands of Interest (DBCA-012)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography, Linear (DWER-031)
- IBRA Vegetation Statistics
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Mapping – Best Available (DPIRD-027)
- WA Now Aerial Imagery

Restricted GIS Databases used:

- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Mapping – Best Available (DPIRD-027)
- Soil Landscape Mapping – Rangelands (DPIRD-064)
- WA Now Aerial Imagery

D.2. References

BoM (2022a) Bureau of Meteorology Website – Climate Data Online, Norseman Aero. Bureau of Meteorology. http://www.bom.gov.au/climate/data/ (Accessed 15 October 2022).

BoM (2022b) Bureau of Meteorology Website – Evaporation. Bureau of Meteorology. Water and the Land: Evaporation (bom.gov.au) (Accessed 19 October 2022).

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

NVS (2012) Level 1 Flora and Vegetation Survey of Lake Cowan Gypsum Operations. Report prepared for Whitfield Minerals Pty Ltd by Native Vegetation Solutions, June 2012.

Whitfield Minerals Pty Ltd (2022) Whitfield Minerals Pty Ltd application for clearing permit within Mining Lease M 63/148, M 63/170, and M 63/528. Whitfield Minerals Pty Ltd, September 2022.

4. Glossary

Acronyms:

BC Act	*Biodiversity Conservation Act 2016,* Western Australia
BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia (now DPLH)
DAFWA	Department of Agriculture and Food, Western Australia (now DPIRD)
DAWE	Department of Agriculture, Water and the Environment, Australian Government
DBCA	Department of Biodiversity, Conservation and Attractions, Western Australia
DER	Department of Environment Regulation, Western Australia (now DWER)
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia
DMP	Department of Mines and Petroleum, Western Australia (now DMIRS)
DoEE	Department of the Environment and Energy (now DAWE)
DoW	Department of Water, Western Australia (now DWER)
DPaW	Department of Parks and Wildlife, Western Australia (now DBCA)
DPIRD	Department of Primary Industries and Regional Development, Western Australia
DPLH	Department of Planning, Lands and Heritage, Western Australia
DRF	Declared Rare Flora (now known as Threatened Flora)
DWER	Department of Water and Environmental Regulation, Western Australia
EP Act	*Environmental Protection Act 1986*, Western Australia
EPA	Environmental Protection Authority, Western Australia
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Federal Act)
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
PEC	Priority Ecological Community, Western Australia
RIWI Act	*Rights in Water and Irrigation Act 1914*, Western Australia
TEC	Threatened Ecological Community

Definitions:

{DBCA (2019) Conservation Codes for Western Australian Flora and Fauna. Department of Biodiversity, Conservation and Attractions, Western Australia}:-

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:

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:**

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 One - 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 Two - 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 Three - 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 Four - 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.

Principles for clearing native vegetation:

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

(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.

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

(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.

(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.

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

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

(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.

(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.

(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.