



Clearing Permit Decision Report

1. Application details and outcomes

1.1. Permit application details

Permit number:	9841/1
Permit type:	Purpose Permit
Applicant name:	Mineral Resources Limited
Application received:	10 August 2022
Application area:	70 hectares
Purpose of clearing:	Haulage Road
Method of clearing:	Mechanical Removal
Tenure:	Miscellaneous Licence 47/569 Miscellaneous Licence 47/626 Miscellaneous Licence 47/627 Miscellaneous Licence 47/950 Miscellaneous Licence 47/951 Miscellaneous Licence 47/952 Miscellaneous Licence 47/953 Miscellaneous Licence 47/954
Location (LGA area/s):	Shire of East Pilbara
Colloquial name:	Phil's Creek Haul Road Realignment

1.2. Description of clearing activities

Mineral Resources Limited proposes to clear up to 70 hectares of native vegetation within a boundary of approximately 246 hectares, for the purpose of a haulage road. The project is located approximately 85 kilometres north west of Newman, within the Shire of East Pilbara.

The application is to allow for the construction of a road train haulage road.

1.3. Decision on application and key considerations

Decision:	Grant
Decision date:	1 December 2022
Decision area:	70 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 10 August 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 B), relevant datasets (Appendix F), supporting information provided by the applicant including the results of biological surveys (Appendix A; Appendix E), the clearing principles set out in Schedule 5 of the EP Act (Appendix D), proposed avoidance and minimisation measures (Section 3.1), relevant planning instruments and any other matters considered relevant to the assessment (Section 3.3). The Delegated Officer also took into consideration the purpose of the clearing to facilitate the construction of a haulage road.

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;
- the loss of native vegetation that is suitable habitat for *Macroderma gigas* (ghost bat) and *Dasyurus hallucatus* (northern quoll);
- impacts to potential short range endemic invertebrate species;

- impacts to vegetation associated with a watercourse;
- land degradation if cleared areas are left open for long periods of time; and
- impacts to surface water quality and land degradation if the banks of the Weeli Wolli Creek are destabilised.

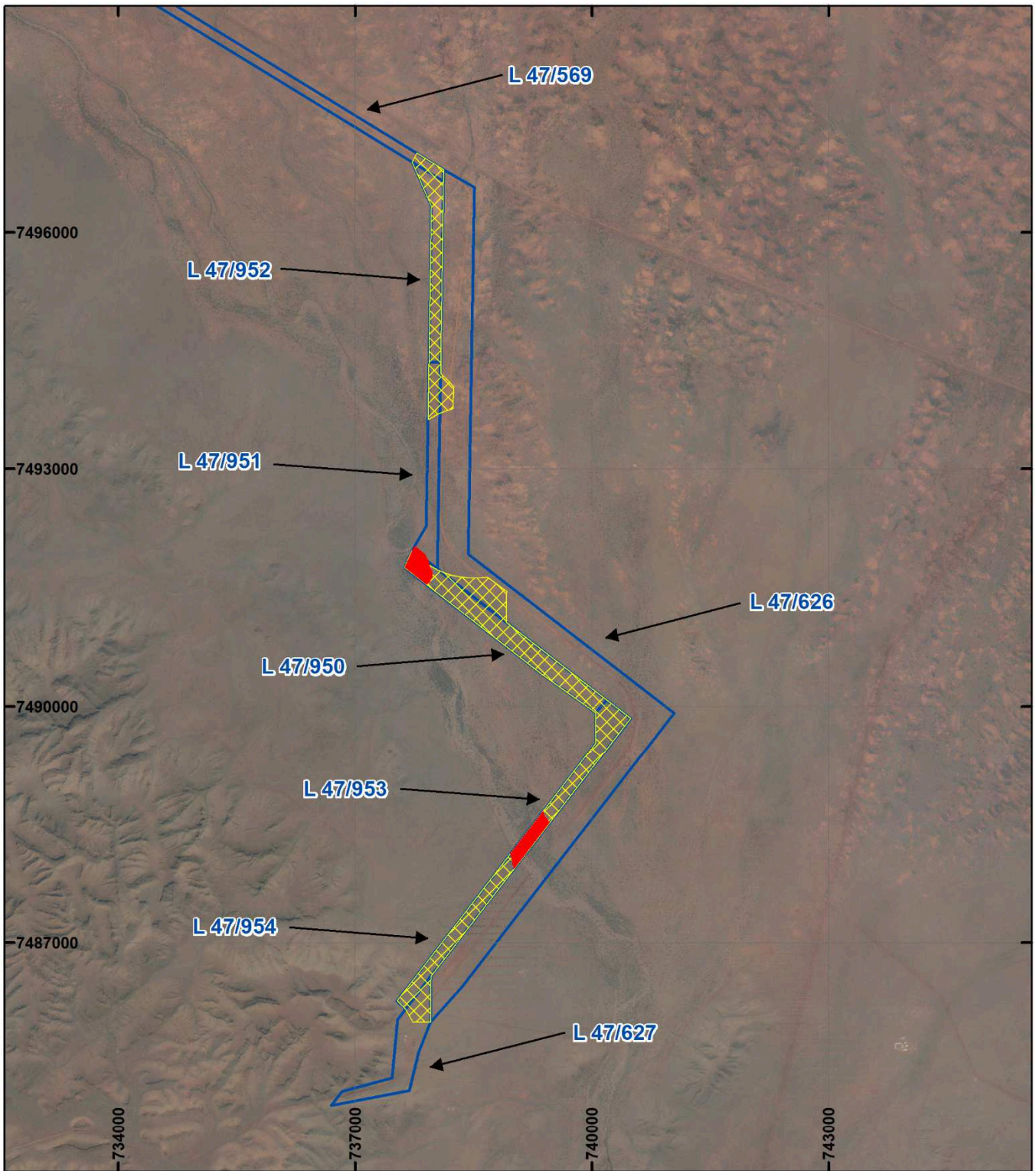
After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing can be managed by conditions and is not likely to lead to an unacceptable risk to environmental values.

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

- restrict the amount of clearing within major drainage habitat to 2.85 hectares;
- restrict the clearance of large trees, or vegetation within the drip line of large trees, within the major drainage habitat;
- avoid, minimise and reduce the impacts and extent of clearing;
- take hygiene steps to minimise the risk of the introduction and spread of weeds;
- avoid clearing watercourses where practicable, and ensure surface flows are maintained or reinstated downstream;
- engage a fauna spotter to traverse the project area ahead of clearing machinery; and
- commence construction no later than three months after undertaking clearing to reduce the risk of erosion.

1.5. Site map

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



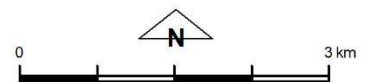
LEGEND

□ Mining Tenements

Clearing Instruments

▨ Areas Approved to Clear

Orthophotography sourced from Landgate



Scale 1:70,000

(Approximate when reproduced at A4)

Geocentric Datum Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

Information derived from this map should be confirmed with the data custodian acknowledged by the agency acronym in the legend.



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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.

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
- the polluter pays principle

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)
- *Mining Act 1978* (WA)

Relevant agreements (treaties) considered during the assessment include:

- Japan-Australia Migratory Bird Agreement
- China-Australia Migratory Bird Agreement
- Republic of Korea-Australia Migratory Bird Agreement

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, 2013)
- *Procedure: Native vegetation clearing permits* (DWER, 2021)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016a)
- Technical guidance – *Sampling of Short Range Endemic Invertebrate Fauna* (EPA, 2016b)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2020)

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

Supporting information was submitted by the applicant, demonstrating the avoidance and mitigation measures utilised during the site selection process. These included the following:

- The proposed permit area was selected to duplicate the existing Phil's Creek Haul Road as close as possible to the original alignment and proximity to the mine sites that it services (Phil's Creek Mine and Iron Valley Mine). This area was chosen as it is already heavily disturbed and degraded in parts, comprises no significant environmental features (species, communities or habitats) and has relatively flat topography, which is ideal for the safe construction and operation of a haul road.
- The amount of clearing proposed in the application includes the minimum disturbance required to construct a road alignment. When locating the final alignment, existing roads, disturbed areas and degraded areas will be favoured over clearing vegetation in good to excellent condition wherever possible.
- The proposed permit area was selected due to its proximity to already established infrastructure, such as the existing Phil's Creek Haul Road and turkeys nest (important for dust suppression).
- A significant reduction in the proposed clearing was achieved by proposing the use of the Iron Valley Mine's waste rock material as the road construction base, in place of utilising local borrow pits. Although, an allowance for borrow pits has been included in this application in the event that additional material is required. This would be limited to a maximum of between 1.5 to three hectares per tenement (Mineral Resources Limited, 2022).

The applicant provided further details on avoidance and mitigation methods used to limit potential impacts to conservation significant fauna in the additional information section below (Appendix A).

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

3.2.1. Biological values (flora) - Clearing Principle (a)

Assessment

Based on known records within a 50 kilometre radius, several Priority flora species were considered likely to occur within the application area due to suitable habitat types and soils being present (B.2 Flora analysis table) (GIS Database; Western Australian Herbarium, 1998-).

Additionally, a flora survey undertaken by Rapallo (2022a) considers the following Priority species likely to occur within the application area:

- *Amaranthus centralis* – Priority 3
- *Calotis squamigera* – Priority 1
- *Euphorbia australis* var. *glabra* – Priority 3
- *Isotropis parviflora* – Priority 3
- *Themeda* sp. Hamersley Station (M.E. Trudgen 11431) – Priority 3

However, no conservation significant flora were recorded within the application area during the targeted or detailed surveys over the application area (Rapallo, 2022a). The flora survey involved a desktop study and likelihood assessment, a targeted flora survey and a detailed flora survey. Two botanists completed the targeted survey over the application area from 26 to 30 May 2021. The survey area was searched via systematic parallel traverses, spaced approximately 30 meters apart. The detailed survey was completed by two botanists from 23 June to 30 June 2021. A total of 41 flora quadrats (50 meters by 50 meters) were sampled, with additional flora taxa being recorded opportunistically while traversing between quadrats (Rapallo, 2022a).

A review of the Rapallo (2022a) flora survey indicates that the survey was designed to mostly comply with EPA technical guidelines for a detailed survey (EPA, 2016a). The survey timing and sampling techniques were in-line with guidelines specific to the Eremaean province. However, the survey effort was considered partially compliant as approximately only 75% of the predicted floristic diversity was recorded through the surveys (Rapallo, 2022a). Detailed surveys of linear infrastructure, such as a haulage road (Figure 1), should also incorporate vegetation unit characterisation of an area from 500 metres to 1,000 metres on both sides (EPA, 2016a). As the survey area did not extend beyond the boundary of the application area, it does not meet this guidance. However, the total application area width is between 150 and 400 metres wide, and the proposed disturbance area for the actual haulage road is much narrower (Rapallo, 2022a). It is also noted that the survey was undertaken during a single season. Additional sampling events during the same season or in a different season would likely yield additional taxa (Rapallo, 2022a).

Overall, the flora and vegetation surveys are considered adequate for the purposes of this assessment. While it is still possible that some of the above-listed Priority flora species may be present within the application area, the proposed clearing is not expected to have a significant impact on conservation significant flora. Any future amendment or extensions of this clearing permit would likely require further flora studies.

There were seven introduced flora species (weeds) recorded within the permit area; *Aerva javanica*, *Vachellia farnesiana*, *Malvastrum americanum*, *Cenchrus ciliaris*, *Cenchrus setiger*, *Portulaca oleracea*, and *Solanum lasiophyllum* (Rapallo, 2022a). The most frequently recorded weeds were *Cenchrus ciliaris* (buffel grass) and *Cenchrus setiger* (birdwood grass) which were recorded from all vegetation types. 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 introduction of weeds may be minimised by the implementation of a weed management condition.

Conclusion

For the reasons set out above, it is considered that the impacts of the proposed clearing on habitat for Priority flora is not likely to be significant. 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 measure will be required as conditions on the clearing permit:

- Take hygiene steps to minimise the risk of the introduction and spread of weeds.

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

Assessment

A targeted fauna survey was undertaken over the application area in April and June 2021 (Rapallo, 2022b). Based on a desktop review and potential habitat availability, the survey targeted the following species:

- *Dasycercus blythi* (Brush-tailed mulgara) – Priority 4
- *Dasyurus hallucatus* (Northern quoll) – Vulnerable
- *Falco hypoleucos* (Grey falcon) – Vulnerable
- *Falco peregrinus* (Peregrine falcon) – Other specially protected fauna
- *Liasis olivaceus barroni* (Pilbara olive python) – Vulnerable
- *Macroderma gigas* (Ghost bat) – Vulnerable
- *Macrotis lagotis* (Bilby) – Vulnerable
- *Pezoporus occidentalis* (Night parrot) – Critically Endangered
- *Pseudomys chapmani* (Western pebble-mound mouse) – Priority 4
- *Rhinonicteris aurantia* (Pilbara form) (Pilbara leaf-nosed bat) – Vulnerable

Two species of conservation significance were recorded within the application area, the ghost bat (*Macroderma gigas*) and the northern quoll (*Dasyurus hallucatus*).

The ghost bat was recorded from a single call recorded at the Weeli Wolli Creek in April 2021. The survey area does not contain roosting caves for this species (Rapallo, 2022b). However, trees along the edges of watercourses may be one of the preferred vantage points for foraging ghost bats, (Bat Call WA, 2021). Therefore, the Weeli Wolli Creek may be significant as a foraging habitat. A vegetation management condition to avoid clearing riparian vegetation will ensure foraging habitat for the ghost bat is retained where practicable. Additionally, the inclusion of the permit condition to avoid, minimise and reduce the impacts and extent of clearing will provide protection for ghost bat habitat, as well as protecting suitable habitat for other conservation significant fauna species.

The northern quoll (*Dasyurus hallucatus*) was identified through hair analysis from a scat collected on one of the two-hectare plots searched in June 2021 (Rapallo, 2022b). The habitat at this site was loamy spinifex plain, and did not align with shelter (denning) habitat for the species. The scat was likely from a quoll that was foraging or dispersing (Rapallo, 2022b). As there is potentially suitable denning habitat within 500 metres of the application area, this may increase the significance of foraging habitat inside the application area. A fauna management condition requiring a spotter to traverse the project area ahead of clearing machinery will avoid injury or mortality to any northern quolls foraging or dispersing within the application area. This condition has the additional benefit of avoiding injury or mortality to other native fauna species that may be present at the time of clearing. Given the importance of riparian vegetation for this species, potential impacts to northern quoll may additionally be minimised with the implementation of the vegetation management condition to avoid clearing riparian vegetation.

The targeted fauna survey identified six broad fauna habitats (Rapallo, 2022b):

- Acacia woodland (116 hectares)
- Loamy spinifex plain (54 hectares)
- Stony spinifex plain (28 hectares)
- Major drainage (19 hectares)
- Floodplain (11 hectares)
- Minor drainage (8 hectares)

The major drainage habitat was assessed as having high significance, with the other habitats assessed as having moderate significance. The application area comprises a narrow corridor, with all of the broad vertebrate fauna habitats within extending outside the survey area boundaries either side. The proposed disturbance footprint would therefore not clear any discrete 'islands' of fauna habitat identified in the survey area (Rapallo, 2022b).

Major drainage habitat provides a range of microhabitats, such as fallen timber, large trees and tree hollows, and a stable source of food and water (Rapallo, 2022b). This provides foraging and dispersal opportunities for conservation significant fauna. Given the high significance of the major drainage habitat, and its importance as habitat for both the ghost bat and the northern quoll specifically, a permit condition will be implemented to limit the amount of clearing within this habitat type. Mineral Resources Limited (2022) has indicated that 2.85 hectares of the major drainage habitat is required to be cleared for the current proposed footprint of the haulage road. The restricted clearing permit condition will therefore allow a maximum of 2.85 hectares of major drainage habitat to be cleared. Any subsequent changes to the proposed haul road footprint would not be able to further encroach on the major drainage habitat, limiting impacts to significant habitat for the ghost bat and northern quoll.

Several migratory bird species listed under both the BC Act and EPBC Act have been recorded within 50 kilometres of the application area (GIS Database). Suitable habitat is present within the major drainage habitat of the application area when the Weeli Wolli Creek is seasonally inundated. The vegetation management condition to avoid clearing riparian vegetation and the restricted clearing condition limiting clearance of major drainage habitat, will additionally provide protection for suitable habitat of migratory species.

Other conservation significant fauna species that were recorded within 50 kilometres and identified as having suitable habitat within the application area, but were not included in the targeted fauna survey (Rapallo, 2022b), include (GIS Database):

- *Anilius ganei* (Gane's blind snake (Pilbara)) – Priority 1
- *Leggadina lakedownensis* (Northern short-tailed mouse, Lakeland Downs mouse, kerakenga) – Priority 4
- *Ninox connivens connivens* (barking owl (southwest subpopulation)) – Priority 3

While there are no records of these species within the application area, this may be because they were not searched for during the targeted fauna survey. Therefore, it is possible that individuals of these species may access the application area. The conditions placed on the permit for the protection of other conservation significant fauna species that have been identified within the application area will have the additional benefit of protecting potential habitat for the above-listed species.

The construction of the haul road has the potential to impact on several short range endemic (SRE) taxa that have all, or most of their known range, restricted to the proposed disturbance footprint (Rapallo, 2022c). A baseline, single-season, SRE invertebrate survey was conducted over the application area from 6 to 16 April 2021 and 31 May to 4 June 2021 (Rapallo, 2022c). At the first field visit in April, 10 wet pitfall traps were deployed at each of the 12 sampling sites that were distributed across the six broad vertebrate fauna habitats. These traps were then collected in the subsequent May/June field visit, excluding one of the 12 sites which was washed away following heavy rainfall flooding the Weeli Wolli Creek (Rapallo, 2022c). The 'Technical Guidance – Sampling of short range endemic invertebrate fauna' (EPA, 2016b), recommends that the optimal time for SRE surveys in the Pilbara Region is between November and April. Therefore, this sampling effort was towards the end of this timeframe.

The invertebrates collected by Rapallo (2022c) were sorted into potential SRE category taxa and sent to Alacran Environmental Sciences for morphological identification and DNA sequencing. This process yielded 26 SRE category taxa, of which seven were widespread and 19 were identified as potential SRE taxa (Appendix E). Out of these 19 potential SRE taxa, five were found to have regional matches based on sequence comparisons. The remaining 14 potential SRE taxa did not have regional matches, and therefore are currently only known from the CPS 9841/1 application area (Rapallo, 2022c).

Out of the total 19 potential SRE taxa from within the application area, nine were collected exclusively from within the proposed haulage road footprint and none of these had regional matches (Rapallo, 2022c). Out of the nine taxa collected within the proposed footprint only, four were collected from multiple broad vertebrate fauna habitats. Five taxa were collected only from within the proposed haulage road footprint area, and from a single broad vertebrate fauna habitat. These five taxa are listed below:

- Acanthodillo 'PCr2'
- Acanthodillo 'PCr3'
- Buddelundiinae sp.
- Indolpium 'PCr3'
- Indolpium 'PCr4'

The survey report (Rapallo, 2022c) identifies that disruption to sheet flow could impact Acacia woodland and loamy spinifex plain habitats that provide habitat for SRE taxa. To minimise impacts on potential SREs, planning should incorporate drainage design to minimise alterations to sheet flow. Conceptual design for the haul road in different locations is provided in the mining proposal, however it is not clear if the proposed road designs will minimise disruption to sheet flow in these habitat types (DBCA, 2022).

On a broad scale, there is good connectivity of the vertebrate fauna habitats to the surrounding landscape. Therefore, it is unlikely that the potential SRE taxa collected would be restricted to the survey area habitats (Rapallo, 2022c). Given that there are expansive tracts of similar habitat adjacent to the application area and no relictual habitats have been identified, impacts to potential SRE invertebrate species due to the proposed clearing can be managed to an acceptable level through permit conditions. A condition to maintain existing surface flows, or reinstate downstream into existing drainage lines, will be implemented to manage impacts to potential SREs.

Conclusion

Based on the above assessment, the proposed clearing will impact on habitat for conservation significant fauna species including the ghost bat, northern quoll, and several potential SRE species. The applicant has reduced the potential impact to these conservation significant fauna species by incorporating several avoidance and mitigation strategies (Appendix A). Individuals may be impacted by the proposed clearing, however, the impacts to fauna will be minimised by the implementation of conditions on the permit.

Conditions

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

- A restricted clearing condition limiting the amount of major drainage habitat that can be cleared;
- To avoid, minimise and reduce the impacts and extent of clearing, decreasing potential impacts to suitable habitat for conservation significant fauna species;
- A fauna management condition requiring a fauna spotter to traverse the project area ahead of clearing machinery at the time of clearing, and alert machinery operators to avoid injury or mortality to native fauna;
- A watercourse management condition to avoid clearing riparian vegetation to protect significant habitat for the ghost bat and the northern quoll; and
- A surface water flow condition to maintain sheet flow and prevent impacts to potential SREs.

3.3. Relevant planning instruments and other matters

The clearing permit application was advertised on 26 August 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 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 are no 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.

It is noted that the proposed clearing may impact on *Macroderma gigas* (ghost bat), *Dasyurus hallucatus* (northern quoll) and several migratory bird species, which are protected matters under the Environment Protection and Biodiversity Conservation Act 1999 (the EPBC Act). The proponent may be required to refer the project to the (Federal) Department of Agriculture, Water and the Environment for environmental impact assessment under the EPBC Act. The proponent is advised to contact the Department of Agriculture, Water and the Environment for further information regarding notification and referral responsibilities under the EPBC Act.

End

Appendix A. Additional information provided by applicant

Summary of comments	Consideration of comment
<p>No ghost bat roosting habitat, including caves or old workings, were recorded in the application area. Aerial photographs indicate that roosts may occur in rocky areas to the south-west and west along the Hamersley Range, occurring approximately 500 meters from the application area. Mineral Resources Limited have not conducted surveys for active roosts outside of the permit area, given the distance of potential roost habitats from existing tenements, but assume the potential presence of roost habitat in this area.</p> <p>Clearing impacts on foraging habitat within the permit area will be minimised through the implementation of the following measures:</p> <ul style="list-style-type: none"> • All clearing activities will be managed in accordance with the Mineral Resources Limited Land Clearing Procedure (MRL-EN-PRO-0004) and the Site Disturbance Permit System (ENV-EN-PRO-0005). • The final haul road alignment will be designed to minimise clearing of native vegetation as much as practicable (i.e. utilise previously cleared or degraded areas, wherever possible). • All clearing activities (including supporting activities such as borrow pits, laydown areas) shall minimise impacts to the 'major drainage' habitat as much as practicable. • Fauna refuges such as large trees and tree hollows, will be pushed to the side of cleared areas and retained where practicable. These can provide ongoing refuge for fauna during construction and operation and help re-establish habitat during rehabilitation. • Cleared areas are to be rehabilitated if not required during operation of the haul road (i.e. borrow pits, lay down areas). 	<p>Mineral Resources Limited were requested to provide information on specific management measures that will be implemented to minimise impacts to the ghost bat during the proposed clearing.</p> <p>While there is no suitable ghost bat roosting habitat within the application area, the Weeli Wolli Creek may provide foraging habitat. Trees along the edges of watercourses may be one of the preferred vantage points for foraging ghost bats (Bat Call WA, 2021).</p>
<p>The Rapallo (2022b) survey area does not contain rocky areas with caves and overhangs, which comprise the most common shelter habitat for northern quoll. The survey area does not contain shelter (denning) habitat, but aerial photographs show that rocky areas with potentially suitable denning habitat occur 500 meters south of the survey area and beyond. The northern quoll was confirmed to occur in the permit area on loamy spinifex plain habitat. Clearing impacts will be minimised through standard management measures, highlighted above, with respect to clearing native vegetation. For northern quoll, the Site Disturbance Permit System may include provision for fauna spotters and handling, if required.</p>	<p>Mineral Resources Limited were requested to provide information on specific management measures that will be implemented to minimise impacts to the northern quoll during the proposed clearing.</p> <p>While there is no suitable denning habitat for the northern quoll within the application area, the record of an individual indicates that it does contain suitable foraging habitat. The close proximity of potential denning habitat for the northern quoll increases the importance of this foraging habitat within the application area.</p>
<p>Clearing impacts to short range endemic (SRE) invertebrate species will be minimised through standard management measures, highlighted above, with respect to clearing native vegetation. No measures specific to SREs are proposed. As is noted in the supporting document, the survey sites where the single collections were recorded are located within the acacia woodland, major drainage and stony spinifex plain fauna habitats. All these fauna habitats are known to occur extensively outside the survey area and the application area in all directions. The design of the new haul road would not create isolated patches of habitat and it is therefore considered unlikely to significantly impact on any SRE species or habitats.</p>	<p>Mineral Resources Limited were requested to provide information on specific management measures that will be implemented to minimise impacts to the SRE invertebrate species during the proposed clearing.</p> <p>It is noted that when inferring the potential ranges of individual taxa using habitat profiling and mapping, assumptions are made about which potential habitat is actually used by individual taxa. Therefore, in some cases (due to the paucity of information involved with novel and undescribed species and potential habitat specialization), taxa may be at high risk from development activities and require a risk-based and adaptive management approach (DBCA, 2022).</p> <p>A copy of the Fauna Management Procedure (MRL-EN-PRO-001) for Mineral Resources Limited sites was provided, however an adaptive management approach is not specified.</p>

Appendix B. Site characteristics

B.1. Site characteristics

Characteristic	Details
Local context	The project is located approximately 85 kilometres north west of Newman (GIS Database). The area proposed to be cleared is part of an expansive tract of native vegetation in the extensive land use zone of Western Australia.
Ecological linkage	According to available databases, the application area does not contain any known or mapped ecological linkages.
Conservation areas	The closest conservation area is the Karijini National Park which is located approximately 80 kilometres west of the application area (GIS Database).
Vegetation description	The vegetation of the application area is broadly mapped as the following Beard vegetation association: 29: Sparse low woodland; mulga, discontinuous in scattered groups (GIS Database).
Vegetation condition	The vegetation survey by Rapallo (2022a) indicates the vegetation within the proposed clearing area ranges from very good to completely degraded, with the majority of quadrats ranked as poor (Trudgen, 1991) condition. The full Trudgen (1991) condition rating scale is provided in Appendix D.
Climate and landform	The application area is mapped within elevations of 440 to 500 metres Australian Height Datum (GIS Database). Data from the nearest weather station indicates mean annual rainfall is approximately 305 millimetres (BoM, 2022). Landforms described within the survey area for the detailed and targeted flora survey include rocky hills, small gorges, mostly seasonal watercourses, and gravelly loam valleys (Rapallo, 2022a).
Soil description	The soil is mapped as the following soil units (DPIRD, 2022): <ul style="list-style-type: none"> • 285Ne: Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands • 285Bg: Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands • 284Ri: Narrow, seasonally active flood plains and major river channels supporting moderately close, tall shrublands or woodlands of acacias and fringing communities of eucalypts sometimes with tussock grasses or spinifex • 284Ur: Stony plains, alluvial plains and drainage lines supporting shrubby soft spinifex grasslands <p>A soils assessment by RGS (2022) was undertaken using samples taken from the existing haul road area adjacent to the application area. Four soil mapping units (SMU) were described:</p> <ul style="list-style-type: none"> • SMU 1 – Red Duplex • SMU 2 – Red Loamy Earth • SMU 3 – Red Loamy Gravel Earth • SMU 4 – Rocky Sand/Loam
Land degradation risk	The soils mapped in the adjacent area are described as overall being potentially dispersive and may be prone to erosion on steeper slopes (RGS, 2022). As the application area will be used for a relatively flat haul road, the risk of erosion is lowered.
Waterbodies	The desktop assessment and aerial imagery indicated that the application area is intersected at two points by major river the Weeli Wolli creek (GIS Database).
Hydrogeography	The application area is not mapped within any Public Drinking Water Source Areas (GIS Database). The mapped groundwater salinity is 500-1,000 milligrams per litre total dissolved solids which is described as marginal (GIS Database).
Flora	There are records of 14 flora of conservation significance within 50 kilometres of the application area (GIS Database). No conservation significant flora taxa were recorded during both the targeted and detailed flora survey by Rapallo (2022a). The detailed flora and vegetation survey recorded 164 flora taxa from 32 different families. These comprised 157 native taxa and seven introduced taxa (weeds). The most well-represented families were Fabaceae (40 taxa), Poaceae (23 taxa), and Malvaceae (21 taxa).

Characteristic	Details
	<p>Of the 164 flora taxa recorded, 22 taxa (13%) were annuals, 23 (14%) were annual or short-lived perennial, 98 (60%) were perennials, while twenty-one taxa (13%) did not have life cycle information available on FloraBase (Rapallo, 2022a).</p> <p>Seven vegetation types were mapped across the survey area, as listed below (Rapallo, 2022a):</p> <ul style="list-style-type: none"> • A1 – Mixed acacia woodland with <i>Corymbia hamersleyana</i> over *<i>Cenchrus</i> grassland (97 hectares) • A2 – Mixed acacia woodland with <i>Corymbia hamersleyana</i> over *<i>Cenchrus</i> / <i>Triodia</i> grassland (15 hectares) • A3 – Sparse mixed shrubland over isolated tussock grasses (4 hectares) • B1 – Major drainage channel with <i>Eucalyptus victrix</i> and <i>E. camaldulensis</i> over *<i>Cenchrus</i> grassland (21 hectares) • B2 – Floodplain with <i>Eucalyptus victrix</i> and mixed acacias over *<i>Cenchrus</i> grassland (11 hectares) • C – Mixed acacia woodland with <i>Corymbia hamersleyana</i> over <i>Triodia pungens</i> hummock grassland (54 hectares) • D – <i>Eucalyptus gamophylla</i> over <i>Acacia adoxa</i> and <i>Grevillea wickhamii</i> over <i>Triodia basedowii</i> or <i>T. vanleeuwenii</i> hummock grassland (35 hectares)
Ecological communities	<p>There are no Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) recorded within the application area (GIS Database).</p> <p>The nearest PEC mapped in the area is vegetation of sand dunes of the Hamersley Range/Fortescue Valley (Priority 3). Several records occur within 700 metres to two kilometres west of the southern portion of the application area (GIS Database). Several further records exist approximately 9 kilometres north west and 10 kilometres south east of the application area. Rapallo (2022a) conducted a review of aerial imagery and field surveys but did not record any sand dune landforms within the survey area. It was concluded that this PEC was unlikely to occur within the application area.</p> <p>The Priority 1 Fortescue Valley Marsh PEC is located 11 kilometres north of the application area (GIS Database). Rapallo (2022a) indicates that the survey area did not contain any landforms resembling a wetland and did not record any samphires which are associated with the PEC.</p> <p>The Priority 1 Weeli Wolli Spring Community PEC is located 17 kilometres south of the application area (GIS Database). The flora survey by Rapallo (2022a) states that no pools or other water bodies were present along the Weeli Wolli creek where it intersected the survey area, indicating it is non-perennial.</p>
Fauna	<p>There are records of 27 fauna of conservation significance within 50 kilometres of the application area (GIS Database).</p> <p>A targeted conservation significant vertebrate fauna survey and habitat assessment undertaken by Rapallo (2022b) recorded two Threatened species, <i>Macroderma gigas</i> (ghost bat) and <i>Dasyurus hallucatus</i> (Northern quoll).</p> <p>A baseline short range endemic (SRE) invertebrate survey by Rapallo (2022c) identified 26 SRE category taxa through morphological identifications and DNA sequencing. Of these, fourteen were identified as potential SRE taxa without regional matches, and therefore only known from the Phil's Creek haul road realignment survey area (Rapallo, 2022c)</p>

B.2. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix F.1), and biological survey information, impacts to the following conservation significant flora required further consideration (Rapallo, 2022a; Western Australian Herbarium, 1998-).

Species name	Conservation status (WA)	Suitable habitat features? [Y/N]	Suitable soil type? [Y/N]	Number of records (within 50km)
<i>Acacia bromilowiana</i>	Priority 4	Y	Y	1
<i>Acacia subtiliformis</i>	Priority 3	N	N	2
<i>Aristida jerichoensis</i> var. <i>subspinulifera</i>	Priority 3	Y	Y	10
<i>Dampiera metallorum</i>	Priority 3	N	N	1
<i>Eremophila spongiorcarpa</i>	Priority 3	N	N	7
<i>Fimbristylis sieberiana</i>	Priority 3	Y	Y	1

Species name	Conservation status (WA)	Suitable habitat features? [Y/N]	Suitable soil type? [Y/N]	Number of records (within 50km)
<i>Goodenia</i> sp. East Pilbara (A.A. Mitchell PRP 727)	Priority 3	N	N	4
<i>Indigofera gilesii</i>	Priority 3	N	N	1
<i>Lepidium catapycnon</i>	Priority 4	Y	Y	29
<i>Myriocephalus scalpellus</i>	Priority 1	Y	Y	1
<i>Rhagodia</i> sp. Hamersley (M. Trudgen 17794)	Priority 3	Y	Y	1
<i>Stylidium weeliwollii</i>	Priority 3	Y	Y	1
<i>Tecticornia globulifera</i>	Priority 1	N	N	3
<i>Vittadinia</i> sp. Coondewanna Flats (S. van Leeuwen 4684)	Priority 1	Y	Y	2

B.3. Fauna analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix F.1), and biological survey information, impacts to the following conservation significant fauna required further consideration (Birdlife Australia, 2022; Rapallo, 2022b).

Species name	Conservation status (WA)	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Number of records (within 50km)	Are surveys adequate to identify? [Y, N, N/A]
<i>Anilius ganeii</i> (Gane's blind snake (Pilbara))	Priority 1	Y	Y	3	N/A
<i>Apus pacificus</i> (fork-tailed swift)	Migratory	Y	Y	3	N/A
<i>Calidris acuminata</i> (sharp-tailed sandpiper)	Migratory	Y	Y	1	N/A
<i>Charadrius veredus</i> (oriental plover)	Migratory	N	N	2	N/A
<i>Dasycercus blythi</i> (brush-tailed mulgara)	Priority 4	Y	Y	6	Y
<i>Dasyurus hallucatus</i> (northern quoll)	Endangered	Y	Y	501	Y
<i>Falco hypoleucos</i> (grey falcon)	Vulnerable	Y	Y	4	Y
<i>Falco peregrinus</i> (peregrine falcon)	Other specially protected	Y	Y	27	Y
<i>Gelochelidon nilotica</i> (gull-billed tern)	Migratory	N	N	5	N/A
<i>Hydroprogne caspia</i> (caspiian tern)	Migratory	N	N	1	N/A
<i>Leggadina lakedownensis</i> (Northern short-tailed mouse, Lakeland Downs mouse, kerakenga)	Priority 4	Y	Y	1	N/A
<i>Liasis olivaceus barroni</i> (Pilbara olive python)	Vulnerable	Y	Y	25	Y
<i>Macroderma gigas</i> (ghost bat)	Vulnerable	Y	Y	70	Y
<i>Macronectes giganteus</i> (southern giant petrel)	Migratory	N	N	3	N/A
<i>Macrotis lagotis</i> (bilby, dalgyte, ninu)	Vulnerable	Y	Y	33	Y
<i>Motacilla cinerea</i> (grey wagtail)	Migratory	N	Y	1	N/A
<i>Ninox connivens connivens</i> (barking owl (southwest subpop.))	Priority 3	Y	Y	1	N/A
<i>Pandion haliaetus</i> (osprey)	Migratory	Y	Y	2	N/A
<i>Pezoporus occidentalis</i> (night parrot)	Critically Endangered	Y	Y	1	Y
<i>Plegadis falcinellus</i> (glossy ibis)	Migratory	Y	Y	2	N/A
<i>Pseudomys chapmani</i> (western pebble-mound mouse, ngadji)	Priority 4	Y	Y	240	Y
<i>Rhinonictes aurantia</i> (Pilbara form) (Pilbara leaf-nosed bat)	Vulnerable	Y	Y	1286	Y
<i>Rostratula australis</i> (Australian painted snipe)	Endangered	N	N	2	N/A
<i>Tringa glareola</i> (wood sandpiper)	Migratory	Y	Y	1	N/A
<i>Tringa nebularia</i> (common greenshank, greenshank)	Migratory	Y	Y	6	N/A
<i>Tringa stagnatilis</i> (marsh sandpiper)	Migratory	Y	Y	1	N/A

Species name	Conservation status (WA)	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Number of records (within 50km)	Are surveys adequate to identify? [Y, N, N/A]
<i>Underwoodisaurus seorsus</i> (Pilbara barking gecko)	Priority 2	N	N	12	N/A

Appendix C. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
<p><u>Principle (a):</u> "Native vegetation should not be cleared if it comprises a high level of biodiversity."</p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared does not contain any records of Priority flora taxa, however it contains suitable habitat for several species of Priority flora.</p> <p>Several weed species were recorded within the application area.</p> <p>There are no known PECs present within the application area.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><u>Principle (b):</u> "Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."</p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared contains suitable habitat for conservation significant fauna. Threatened fauna species recorded within the application area are the <i>Macroderma gigas</i> (ghost bat) and the <i>Dasyurus hallucatus</i> (northern quoll). Several short range endemic (SRE) invertebrate species and potential SREs have been recorded in the area (Rapallo, 2022c).</p>	May be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<p><u>Principle (c):</u> "Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."</p> <p><u>Assessment:</u></p> <p>No Threatened flora species have been recorded within the application area or within 50 kilometres of the application area (Rapallo 2021; GIS Database). Therefore the area proposed to be cleared is unlikely to contain habitat for Threatened flora species.</p>	Not likely to be at variance	No
<p><u>Principle (d):</u> "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."</p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared does not contain species representative of any TECs listed under the BC Act or the EPBC Act (GIS Database; Rapallo, 2022a).</p>	Not likely to be at variance	No
Environmental value: significant remnant vegetation and conservation areas		
<p><u>Principle (e):</u> "Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared."</p> <p><u>Assessment:</u></p> <p>The extent of the mapped vegetation type is consistent with the national objectives and targets for biodiversity conservation in Australia (Commonwealth of Australia, 2001). The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area.</p> <p>The extent remaining of the mapped vegetation type is over 99% at both a state and bioregional level (Government of Western Australia, 2019). The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area.</p>	Not at variance	No
<p><u>Principle (h):</u> "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."</p> <p><u>Assessment:</u></p>	Not at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
Given the distance to the nearest conservation area, the proposed clearing will not have an impact on the environmental values of any conservation areas (GIS Database).		
Environmental value: land and water resources		
<p>Principle (f): <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u></p> <p>Given the application intersects the Weeli Wolli Creek in two locations, the proposed clearing will impact on vegetation associated with a watercourse (GIS Database).</p>	At variance	No
<p>Principle (g): <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u></p> <p>The surveyed soils are moderately susceptible to erosion when on steep slopes (RGS, 2022). This risk of erosion is increased when large areas are left undeveloped for long periods of time following clearing. The implementation of a staged clearing condition may prevent impacts of the proposed clearing on land degradation.</p> <p>Clearing native vegetation associated with a watercourse may destabilise the river bank, resulting in an appreciable impact on land degradation. The implementation of a restricted clearing condition to prevent the clearance of large trees within major drainage habitat (Weeli Wolli Creek), and vegetation within the drip line of those trees, will assist with bank stabilisation and prevent land degradation.</p>	May be at variance	No
<p>Principle (i): <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.”</i></p> <p><u>Assessment:</u></p> <p>Given the application area intersects the Weeli Wolli Creek, the proposed clearing may impact surface water quality.</p> <p>Clearing vegetation associated with Weeli Wolli Creek may impact bank stability and increase sediment loads entering the waterway, causing deterioration of surface water quality.</p> <p>The implementation of a vegetation management condition to minimise clearing of riparian vegetation will help prevent impacts to surface water quality. Additionally, the implementation of a restricted clearing condition to prevent the clearance of large trees within major drainage habitat associated with the Weeli Wolli Creek, will assist with bank stabilisation and prevent sedimentation of the waterway.</p>	May be at variance	No
<p>Principle (j): <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</i></p> <p><u>Assessment:</u></p> <p>There is one non-perennial watercourse within the application area and no permanent waterbodies (GIS Database). Temporary, localised flooding may occur briefly following heavy rainfall events, however, the proposed clearing is unlikely to increase the incidence or intensity of natural flooding.</p>	Not likely to be at variance	No

Appendix D. 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 Trudgen, M.E. (1991) *Vegetation condition scale* in National Trust (WA) 1993 Urban Bushland Policy. National Trust of Australia (WA), Wildflower Society of WA (Inc.), and the Tree Society (Inc.), Perth.

Measuring vegetation condition for the Eremaean and Northern Botanical Provinces (Trudgen, 1991)

Condition	Description
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.

Condition	Description
Very good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Very poor	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

Appendix E. Biological survey information

E.1. SRE category taxa collected across broad fauna habitats in the application area

Table extracted from 'Baseline short-range endemic invertebrate survey of the Phil's Creek haul road realignment' (Rapallo, 2022c).

Taxon	Acacia woodland	Flood-plain	Loamy spinifex plain	Major drainage	Minor drainage	Stony plain	Multiple habitats in survey area
Mygalomorph spiders							
Kwonkan 'MYG006'					X		No
Pseudoscorpions							
Austrohorus 'PCr5'		X		X			Yes
Beierolpium 'PSE173'		X	X	X		X	Yes
Indolpium 'PCr1'					X	X	Yes
Indolpium 'PCr2'	X	X			X	X	Yes
Indolpium 'PCr3'						X	No
Indolpium 'PCr4'				X			No
Oratemnus 'WA1'			X				No
Sundochernes PSE072				X			No
Zygentoma (silverfish)							
Nicoletiinae 'PCr1'	X						No
Isopods (slaters)							
Acanthodillo 'PCr1'			X		X		Yes
Acanthodillo 'PCr2'	X						No
Acanthodillo 'PCr3'						X	No
Buddelundia '10ma'	X				X	X	Yes
Buddelundia '49fm'					X	X	Yes
Buddelundia 'SJ15'				X			No
Buddelundiinae 'ISOP009'	X	X		X			Yes
Buddelundiinae 'PCr4'	X				X		Yes
Buddelundiinae 'PCr5'	X	X	X				Yes
Buddelundiinae 'PCr6'	X					X	Yes
Buddelundiinae sp.	X						No
Gastropods (snails)							
Austropeplea sp.				X			No
Erelopeas interioris	X	X	X	X			Yes
Gastrocopta sp.	X	X		X			Yes
Pupoides sp.	X	X					Yes
Stenopylis coarctata	X	X		X			Yes

F.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)
- Cadastre (LGATE-218)
- Clearing Regulations – Schedule One Areas (DWER-057)
- 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)
- Groundwater Salinity Statewide (DWER-026)
- Hydrographic Catchments – Catchments (DWER-028)
- Hydrography – Inland Waters – Waterlines
- Hydrography, Linear (DWER-031)
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Pre-European Vegetation Statistics
- Regional Parks (DBCA-026)
- RIWI Act, Groundwater Areas (DWER-034)
- 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

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)

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- Government of Western Australia (2019) 2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019. WA Department of Biodiversity, Conservation and Attractions. <https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics>
- Mineral Resources Limited (2022) Phil's Creek Haul Road Realignment Clearing permit Supporting Documentation. Mineral Resources Limited, August 2022.

- Rapallo (2022a) J021225 – Detailed and targeted flora survey of the Phil’s Creek haul road realignment, June 2022.
- Rapallo (2022b) J021054-B – Targeted conservation significant vertebrate fauna survey and habitat assessment of the Phil’s Creek Haul Road realignment, Version 14 February 2022.
- Rapallo (2022c) J021054 – Taxonomy results of short-range endemic invertebrates collected from the Phil’s Creek Haul Road realignment, Version 12 January 2022.
- RGS Environmental Consultants Pty Ltd (RGS) (2022) Technical Report - Soils Assessment Phil's Creek Haul Road, prepared for Mineral Resources Limited, February 2022.
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4. Glossary

Acronyms:

BC Act	<i>Biodiversity Conservation Act 2016</i> , Western Australia
BoM	Bureau of Meteorology, Australian Government
DECA	Department of Biodiversity, Conservation and Attractions, Western Australia
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia
DPIRD	Department of Primary Industries and Regional Development, Western Australia
DPLH	Department of Planning, Lands and Heritage, Western Australia
DWER	Department of Water and Environmental Regulation, Western Australia
EP Act	<i>Environmental Protection Act 1986</i> , Western Australia
EPA	Environmental Protection Authority, Western Australia
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i> (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	<i>Rights in Water and Irrigation Act 1914</i> , Western Australia
SMU	Soil Mapping Unit
TEC	Threatened Ecological Community

Definitions:

{DECA (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.