# SECTION 38 REFERRAL

## SUPPORTING INFORMATION

## CARAVEL COPPER PROJECT

15 November 2022
PREPARED FOR CARAVEL MINERALS LIMITED
BY PRESTON CONSULTING PTY LTD

Document prepared for:

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# ACKNOWLEDGEMENT OF COUNTRY

***Preston Consulting acknowledges the Traditional Owners of the lands on which it works, in particular the Whadjuk people of the Noongar Nation and the Yued and Ballardong people, the Traditional Custodians of the land on which the activity is proposed. Preston Consulting pays its respects to Elders past and present, to emerging community leaders and to all Aboriginal and Torres Strait Islander peoples.***

# DOCUMENT CONTROL

| | | | |
|---|---|---|---|
| **Document Title** | Section 38 Referral Supporting Information – Caravel Copper Project | | |
| **Document Number** | CAR-CAR-S38-01 | | |
| **Revision Number** | 0 | | 21/11/2022 |
| **Status** | FINAL | | |
| **Author** | Chris Stanley-<br>Preston Consulting |  <br>Signature | 21/11/2022 |
| **Checked** | Gavin Edwards – Director<br>Preston Consulting |  <br>Signature | 21/11/2022 |
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# 1 PART A: PROPOSAL DESCRIPTION

## 1.1 SUMMARY OF THE PROPOSAL

**Table 1: Summary of the Proposal**

| | |
|---|---|
| **Proposal title** | Caravel Copper Project |
| **Proponent name** | Caravel Minerals Limited |
| **Short description** | Caravel Minerals Limited is seeking to develop the Caravel Copper Project, located in the Western Australian (WA) Wheatbelt approximately 150 km north of Perth. The Proposal will produce copper concentrate, which will be trucked to port.<br>The Proposal includes mine pits, waste rock landforms, tailings storage, ore processing and transfer infrastructure and associated infrastructure such as workshops, laydown areas, landfill, communications, offices, ablutions, wastewater treatment, fuel storage, renewable energy and water storage, and a remote bore field and pipeline network.<br>A long-term accommodation village will be located on site; however, may be located in a surrounding residential area (outside the scope of this Proposal). A temporary construction village will be required to accommodate early works personnel. |

## 1.2 PROPOSAL DESCRIPTION

Caravel Minerals Limited (Caravel) is seeking to develop the Caravel Copper Project (the Proposal) based on a 30 km porphyry copper mineralisation system located in the WA Wheatbelt approximately 150 km northeast of Perth (Figure 1). The resource the subject of this Proposal is primarily hosted in the Bindi and Dasher deposits which represent 6 km of the overall system. These deposits are a new style of mineralisation for the region and are presently the largest undeveloped copper resources in Australia.

With the accelerating transition to renewables and electrification over the next decade, copper is forecast to become the world's most in-demand metal. The Proposal's large resources, technical simplicity, access to existing infrastructure and location in a sound social, economic, and political setting all contribute to the Proposal being one of very few large undeveloped copper projects globally that can be brought into production in this timeframe.

The mine development plan is based on extensive use of automation and electrification of the mining fleet, with a fully autonomous haulage fleet using electric power from a 'trolley assist' system. The use of Automation, Communication and Electrification (ACE) technologies is a key part of Caravel's planning to maximise safety and efficiency and reduce environmental impacts.

Process plant design is based on traditional crush-grind-float technologies configured in a single processing train delivering a total capacity of 28 million tonnes per annum and producing around 62,000 tonnes per annum of copper metal in concentrate. Concentrate will be trucked on the existing public road network to existing ports at Bunbury or Geraldton. The Proposal includes mine pits, waste rock landforms, tailings storage, ore processing and transfer infrastructure and associated infrastructure such as workshops, laydown areas, landfill, communications, offices, ablutions, wastewater treatment, fuel storage, renewable energy, temporary and permanent accommodation villages and water storage.

Water supply for the Proposal will be via a combination of developing new water resources and purchasing existing allocations. A remote borefield and pipeline network will be developed at



Gillingarra, approximately 60 km west of the mine, to supply water to the Proposal. A long-term operations accommodation village may be located on the MSDE or at Wongan Hills. A temporary construction village will also be required at the mine site to accommodate the construction workforce.

Power supply for the construction of the Proposal will come from diesel generation; however, Caravel is working closely with Western Power to obtain all operational power supply from the existing regional electrical grid adjacent to the site within the Southwest Interconnected Network's North Country subregion. To the extent that Western Power cannot deliver power to site due to network constraints Caravel may at times supplement with onsite diesel and/or renewable energy solutions depending on the capacity and reliability of the grid power. To be conservative, this Proposal includes a worst-case scenario where diesel power is generated on site for all operations until the company confirms grid access with Western Power.

## 1.3 DISTURBANCE AND OPERATIONAL ELEMENTS

The Proposal will include an 8,541 ha Mine Site Development Envelope (MSDE), within which up to 6,547 ha will be disturbed. An initial concept design has produced an indicative disturbance footprint shapefile of 5,868 ha. This indicative footprint shapefile does not include contingency for design changes or miscellaneous items that were not considered during the initial concept design, such as additional mine roads, laydown areas, topsoil storage, workshops etc. As a result, the proposed maximum disturbance has been presented as 6,547 ha, which includes a 10% contingency. There are ongoing design studies being undertaken to further refine the site layout. Caravel will make every effort to avoid using the contingency area and minimise the area of disturbance for the proposed action.

The majority of the area to be disturbed has been previously cleared for grain production (Figure 3), with the remaining areas of native vegetation within the MSDE ranging from highly degraded to pristine condition. The highly degraded areas of native vegetation are generally associated with areas of salinisation which are now dominated by salt tolerant native species.

The extent of native vegetation to be disturbed in the MSDE will be determined by further studies and refined during the course of the assessment. The field surveys conducted to date recorded that approximately:

- 85% of the mine study area was cleared land for cropping;
- 12% was considered to be very good to pristine condition native vegetation; and
- The remaining 3% being degraded, poor or planted vegetation types (Mattiske, 2022a).

The Proposal also includes an 8,257 ha Borefield Development Envelope (BDE) and a 928 ha Pipeline Development Envelope (PDE). It is anticipated that up to 100 ha of disturbance may be required for the BDE and up to 120 ha of disturbance within the PDE. A minor proportion of this disturbance may be native vegetation if it cannot be avoided, however the extent of disturbance will be determined based on further studies and will be refined during the course of the assessment. The boundary of the MSDE and indicative borefield and pipeline corridor locations are shown in Figure 2. An indicative project infrastructure layout within the MSDE is shown in Figure 3.

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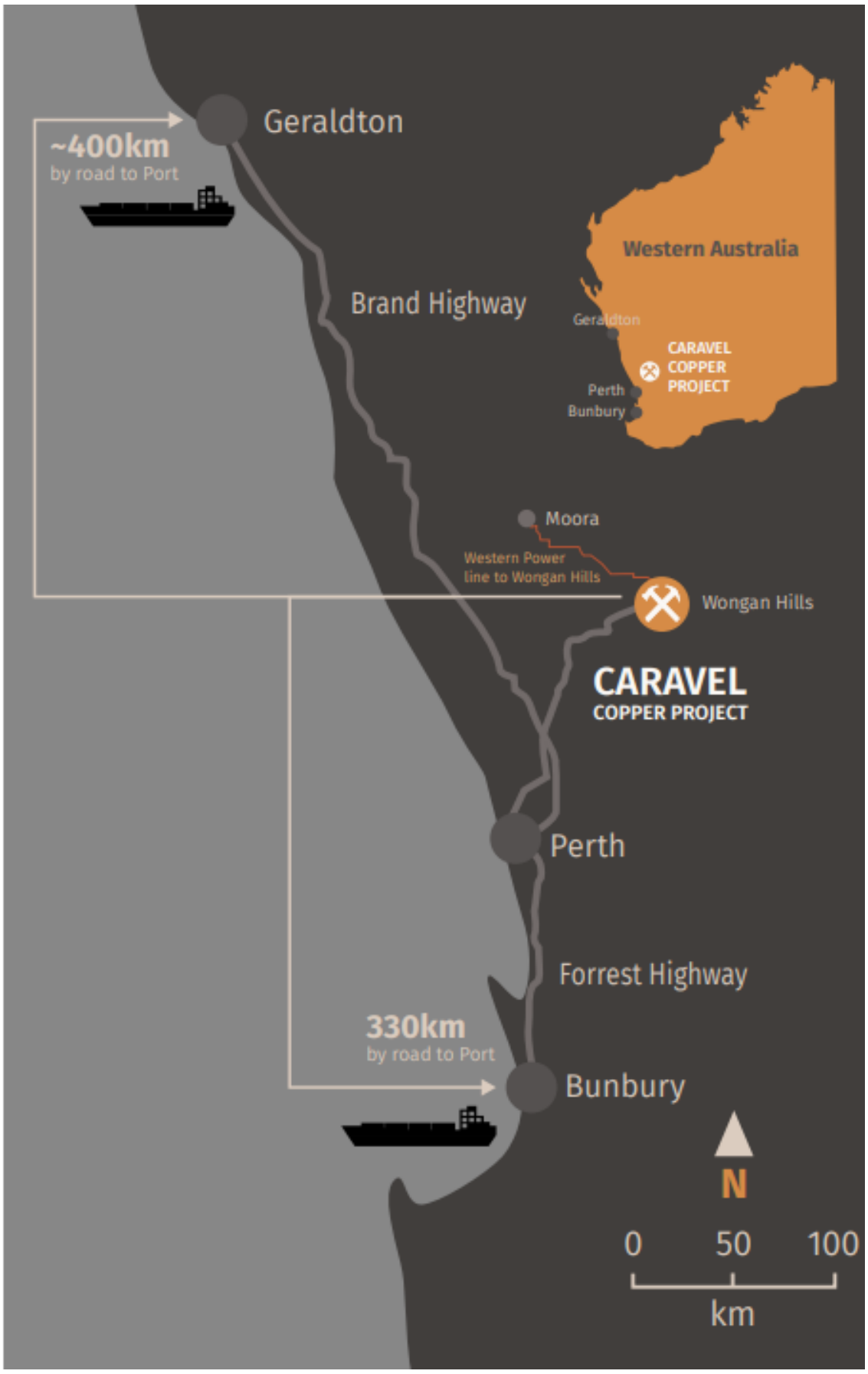



**Figure 1: Proposal Location**

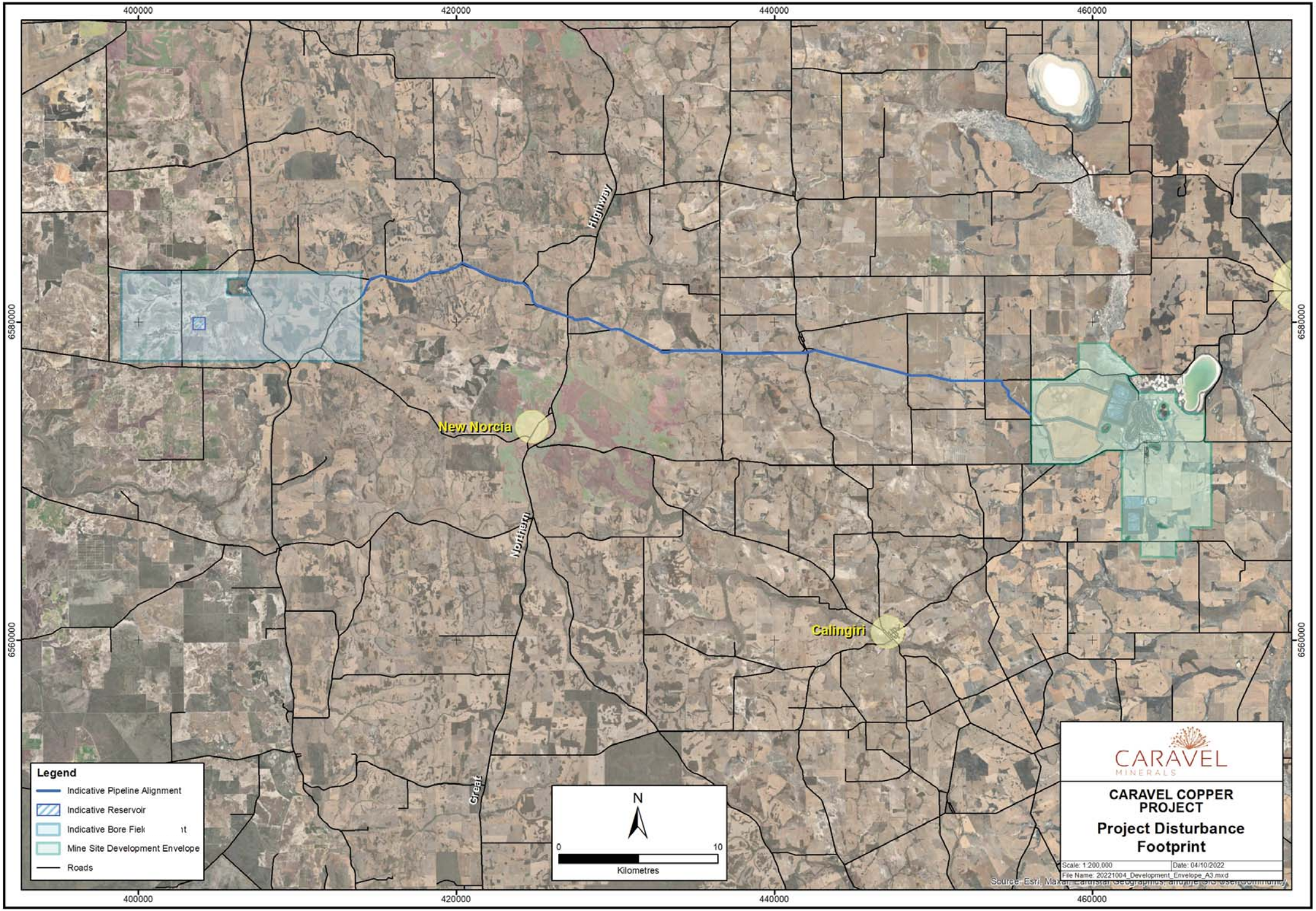
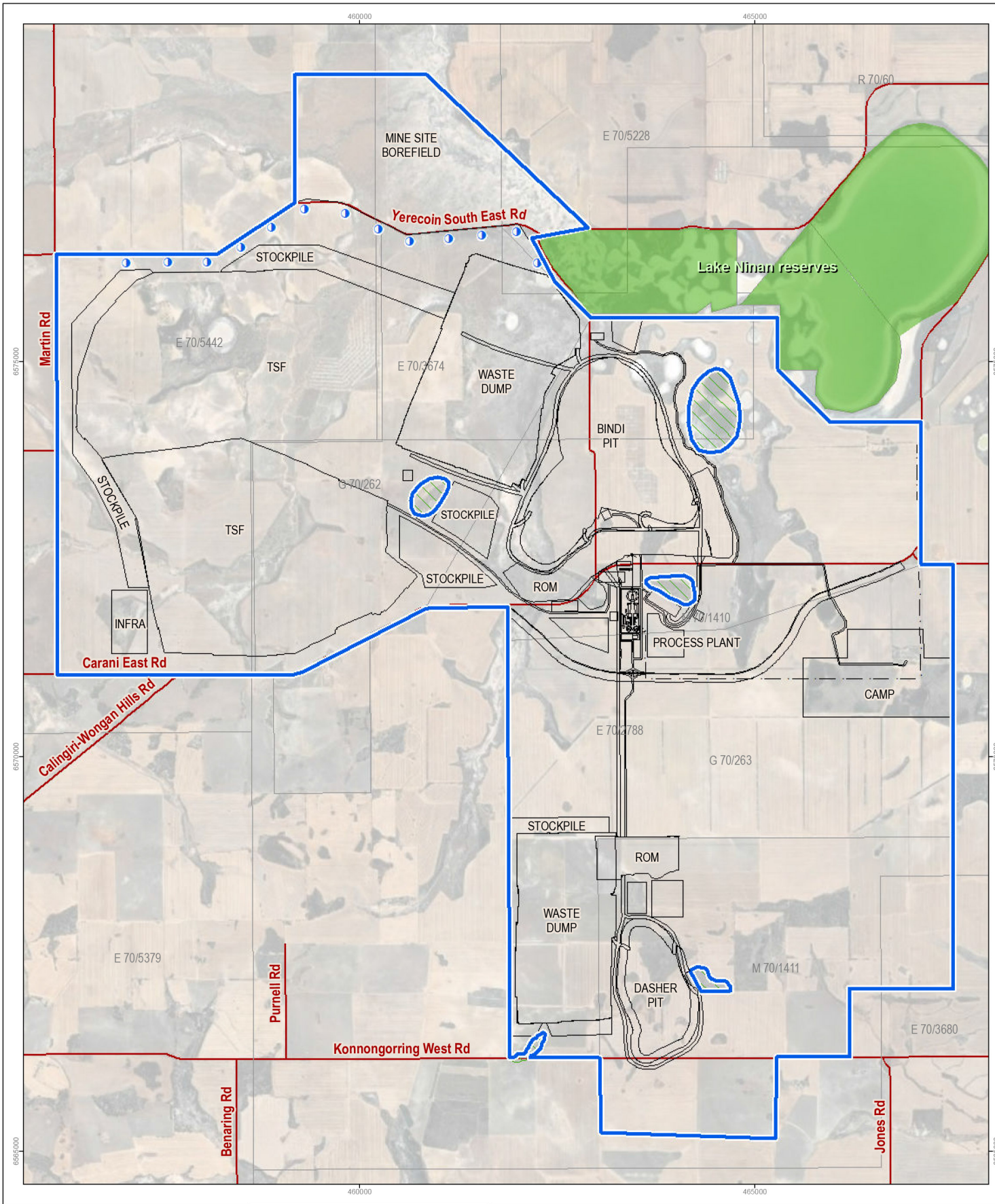



Figure 2: MSDE, BDE and PDE



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| CREATED | JOB | DATE | REVISION |
|---|---|---|---|
| ENVIRONMAPS | PC2900297 | 31/10/2022 | 0 |

**CVV (Caravel Minerals)**

0 0.5 1 2 km

Scale: 1:65,000 @ A4

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS

LOCALITY


Legend

- Mine Site Development Envelope
- Tenement
- Exclusion Zone
- Lake Ninan reserves
- Mine Site Layout
- Powerline
- Monitoring Bore

Source: Orthophoto - Open Source

ENVIRONMAPS Environmental Mapping Solutions | t: 0406 590 006 | www.environmaps.com.au

C:\GIS\Jobs\Preston Consulting\PC2900297 - Caravel Mineral Sands Project\Figures\PC2900297_Mine Site Layout_221031.mxd

**Figure 3: Proposed indicative layout**

# 2 PART B: ENVIRONMENTAL IMPACTS

## 2.1 PRELIMINARY KEY ENVIRONMENTAL FACTORS

The *Statement of Environmental Principles, Factors and Objectives* (Environmental Protection Authority (EPA), 2020) provides a list of potential Key Environmental Factors to consider for Environmental Impact Assessment (EIA). Table 2 – Table 7 lists the preliminary Key Environmental Factors that have been identified as potentially requiring assessment from initial baseline surveys, project planning and consultation processes. Table 2 – Table 7 also identifies the relevant baseline environmental information for the receiving environment, potential impacts, mitigation measures, assessment and significance of residual impacts and environmental outcomes. Information provided in Table 2 – Table 7 have been sourced from reference materials as listed.

Baseline environmental surveys conducted during the planning phase have enabled Caravel to incorporate avoidance and mitigation measures into the Proposal design. This is reflected in the MSDE being configured to exclude higher value habitat areas such as several areas of threatened ecological community, the Lake Ninan Nature and Recreational Reserves, and the Koodjee Nature Reserve from the borefield footprint.

**Table 2: Potential impacts on Flora and Vegetation**

| EPA requirements | Response |
|---|---|
| **Flora and Vegetation** | |
| **EPA Policy and guidance –** What have you considered and how have you applied them in relation to this factor? | **EPA Objective:** To protect flora and vegetation so that biological diversity and ecological integrity are maintained.<br>**Key EPA Documents**<br>Statement of Environmental Principles, Factors and Objectives (EPA, 2021a);<br>Statutory Guidelines for Mine Closure Plans (MCPs) (DMIRS, 2020);<br>EIA (Part IV Divisions 1 and 2) Administrative Procedures (EPA, 2021b);<br>EIA (Part IV Divisions 1 and 2) Procedures Manual (EPA, 2021c); and<br>Instructions on how to prepare *Environmental Protection Act 1986* (EP Act) Part IV Environmental Management Plans (EPA, 2021d).<br>**Relevant EPA Factor Guidelines**<br>Environmental Factor Guideline - Flora and Vegetation (EPA, 2016a).<br>**Relevant EPA Technical Guidance**<br>Technical Guidance – Flora and Vegetation Surveys for EIA (EPA, 2016c); and<br>Guidance Statement 6 – Rehabilitation of Terrestrial Ecosystems (EPA, 2006).<br>**Application of policies and guidance**<br>This Section 38 Referral has been prepared by utilising the advice contained within the 'Key EPA Documents' listed above.<br>EPA technical guidance for Flora and Vegetation has been and will be used during the survey phase of the Proposal. |

| EPA requirements | Response |
|---|---|
| **Receiving environment -** Describe the current condition of the receiving environment in relation to this factor. | • An *Interim Flora and Vegetation Assessment* (comprising both desktop and field studies) was undertaken for the majority of the MSDE (Mattiske 2022a).<br>• An *Interim Threatened and Priority Ecological Communities* survey (comprising both desktop and field studies) was also undertaken for the majority of the MSDE (Mattiske 2022b).<br>• The Caravel Copper Project is situated across three IBRA sub-regions. The mine site is within the Avon Wheatbelt Bioregion (AVW02 – Katanning) and the borefield is within the JAF01 (Northern Jarrah Forest) and SWA01 (Dandaragan Plateau) sub-regions.<br>• The Proposal is situated predominantly within cleared farmland used for cropping.<br>• One species of Threatened Flora taxa pursuant to the *Biodiversity Conservation Act 2016* (BC Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was recorded within the survey area. *Banksia serratuloides* subsp. *serratuloides* was recorded within the Koodjee Nature Reserve (within the bore fields study area) within two quadrats. The current records constitute a range extension for this species. Koodjee Nature Reserve has been excluded from the Proposal footprint therefore the Proposal is not expected to impact this species.<br>• Six priority flora taxa, as listed by the WA Herbarium (WAH) were recorded within the survey area. This included two from the mine site area and four from the Koodjee Nature Reserve. Records from within the study area constitute a range extension for *Eucalyptus arachnaea* subsp. arrecta (P3) and *Petrophile plumosa (P3)*. As above, Koodjee Nature Reserve has been excluded from the Proposal footprint and will not be included in the future development envelope for the borefield and pipeline. The planned pipeline corridor has changed since the above survey was undertaken. The amended pipeline corridor will utilise mostly previously disturbed farmland. Some scattered patches of remnant vegetation will be encountered. All areas of remnant vegetation along the amended pipeline corridor have been surveyed in September 2022, with a finalised report expected by Q1 2023.<br>• Two threatened ecological communities (TEC), as listed under the EPBC Act (both also listed as Priority 3 ecological communities (PEC's) by the Department of Biodiversity, Conservation and Attractions (DBCA) pursuant to the BC Act), either intersect or occur within the current broader study area. These are:<br>  ○ *Eucalypt Woodlands of the Western Australian Wheatbelt*, listed as Critically Endangered; and,<br>  ○ *Banksia Woodlands of the Swan Coastal Plain*, listed as Endangered.<br>• Additional field surveys were undertaken in September 2022, with future surveys also planned for October 2022, with finalised reports expected by Q1 2023.<br>• A total of 50 introduced species were recorded within the mine site study area, including one declared pest organism pursuant to the *Biodiversity and Agriculture Management Act 2007* (BAM Act), *Moraea flaccida* (one-leaf Cape tulip)<br>• The vegetation of the mine site study area ranged from degraded to pristine. Large areas of cropped farmland were considered to be completely degraded. Most of the larger remnant vegetation patches (those greater than 2 ha) had a condition rating of "degraded" to "pristine", with the majority rated as "very good". |
| **Potential Impacts** – Proposal elements that have impacts or effects relevant to each environmental factor, considering direct, indirect impacts and cumulative effects. | • Direct disturbance that includes clearing areas of native vegetation within an 8,541 ha MSDE, and disturbance within the borefield and pipeline corridor, including;<br>  ○ Potential impact to threatened and priority flora species; and<br>  ○ Potential impact to *Eucalypt Woodlands of the WA Wheatbelt* and *Banksia Woodlands of the Swan Coastal Plain* TECs/PECs.<br>• Vehicle traffic and earthmoving equipment may introduce or spread weeds;<br>• Construction and operation activities may generate dust which may impact on vegetation health and condition;<br>• Alterations to surface water and groundwater regimes may result in indirect impacts to the health of downstream groundwater-dependant vegetation (GDV); and<br>• Mining activities may result in indirect impacts such as hydrocarbon spills. |



| EPA requirements | Response |
|---|---|
| **Mitigation –** Describe how the mitigation hierarchy has been applied to reduce the potential environmental impacts of the proposal. | Caravel will mitigate potential impacts to flora and vegetation according to the mitigation hierarchy; avoid, minimise, rehabilitate, offset. The following measures are proposed to manage and mitigate the potential environmental impacts:<br>• The MSDE will be developed to the minimum extent required to ensure safe and adequate construction and operation and will, as much as possible, maximise the usage of previously disturbed areas;<br>• Provide flexibility within the Development Envelopes to allow for, as much as possible, the avoidance of any significant flora.<br>• Koodjee Nature Reserve has been excluded from the Proposal development envelopes;<br>• Modifying the MSDE so as to exclude areas identified as TEC/PEC as much as possible, and potentially undertaking revegetation programs to improve the vegetation condition of existing TECs within the MSDE;<br>• Planting native vegetation windrows along several roadside boundaries of the mine site and road realignment development envelope so as to improve visual amenity and provide fauna connectivity corridors;<br>• Development and implementation of a Flora Management Plan;<br>• Vegetation clearing will be managed through internal ground disturbance procedures/ground disturbance permit system;<br>• Progressive clearing and rehabilitation will be undertaken;<br>• Water or dust suppressants will be applied to disturbed areas, mining areas and product transfer/storage areas as required to minimise dust generation;<br>• Emergency and fire response capabilities will be maintained to respond to fire outbreaks where possible;<br>• Implementation of industry standard measures to minimise the risk and impact of hydrocarbon spills;<br>• Weed hygiene and management measures/procedures will be implemented to prevent spread and introduction of weeds as a result of construction and operation;<br>• Maintain existing surface water flow regimes as much as possible with the installation and maintenance of surface water/drainage infrastructure across the Proposal site;<br>• Groundwater abstraction at bore fields will target sustainable yield thereby ensuring that aquifers are not overdrawn (as defined by groundwater studies described below) in vegetated areas. Abstraction will also target saline groundwater sources and groundwater close to the surface in order to potentially reduce waterlogging in salt-affected areas causing degradation of agricultural land;<br>• Compliance with future approvals including a Ministerial Statement, Works Approval(s) and Mining Proposal;<br>• Implementation of a MCP under the *Mining Act 1978*; and<br>• Inclusion of offsets (as required) to mitigate any significant residual impact from the Proposal. |
| **Assessment and Significance of Residual Impacts –** Identify whether there are any residual impacts after applying the mitigation hierarchy and whether these are significant. | • Vegetation clearing resulting in direct disturbance of native vegetation within the MSDE, and native vegetation disturbance within the bore field and pipeline corridor is likely to be considered significant, including some potential *Eucalypt Woodlands of the Western Australian Wheatbelt* and the *Banksia Woodlands of the Swan Coastal Plain* TECs/PECs.<br>• There may be localised indirect impacts resulting from introduction or spread of weeds, generation of dust or hydrocarbon spills. However, through the implementation of mitigation measures described above, these incidents are expected to be rare and controlled and therefore not result in a significant impact.<br>• Given the widespread, significant impacts of secondary salinisation in the Wheatbelt region, abstraction of groundwater associated with the Proposal intends to target brackish groundwater and groundwater close to the surface in order to potentially reduce waterlogging in salt-affected areas which is causing degradation of agricultural land. |

| EPA requirements | Response |
|---|---|
| **Environmental Outcomes -** Identify likely environmental outcomes and whether these are likely to be consistent with the EP Act principles and EPA objectives for environmental factors. | The MSDE will be developed to the minimum extent required to ensure safe and adequate construction and operation and will, as much as possible, maximise the usage of previously disturbed areas.<br>Known locations of Threatened Flora will be avoided and indirect impacts from groundwater drawdown will be managed to ensure they are not significant. The Proposal may impact priority flora however the extent will not be understood until additional surveys are undertaken.<br>The borefield and pipeline corridor will utilise mostly previously disturbed farm cropland and vegetation disturbance will be minimised as much as possible therefore impacts are not likely to be significant.<br>To the extent possible, Caravel will modify the Proposal MSDE to exclude areas identified as TEC/PEC and will potentially undertake revegetation programs to improve the vegetation condition of existing TECs within the development footprint. In addition, native vegetation will be planted in windrows along several roadside boundaries of the mine site to improve visual amenity and provide fauna connectivity corridors. The planting of trees may also lower rising groundwater levels in the MSDE and create fauna habitat.<br>Offsets may be proposed to counterbalance residual impacts to these TECs/PECs.<br>Where possible, native vegetation disturbed for the Proposal will be progressively rehabilitated.<br>The Proposal can be implemented while being consistent with the EP Act principles and achieving the EPA's objective to protect flora and vegetation so that biological diversity and ecological integrity are maintained. |

**Table 3: Potential Impacts to Terrestrial Fauna**

| EPA Requirements | Response |
|---|---|
| **EPA Policy and guidance –** What have you considered and how have you applied them in relation to this factor? | **EPA Objective:** To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.<br>**Key EPA Documents**<br>Statement of Environmental Principles, Factors and Objectives (EPA, 2021a);<br>Statutory Guidelines for MCPs (DMIRS, 2020);<br>EIA (Part IV Divisions 1 and 2) Administrative Procedures (EPA, 2021b);<br>EIA (Part IV Divisions 1 and 2) Procedures Manual (EPA, 2021c); and<br>Instructions on how to prepare EP Act Part IV Environmental Management Plans (EPA, 2021d).<br>**Relevant EPA Factor Guidelines**<br>Environmental Factor Guideline - Terrestrial Fauna (EPA, 2016e).<br>**Relevant EPA Technical Guidance**<br>Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA, 2020b); and<br>Technical Guidance – Sampling of short range endemic invertebrate fauna (EPA, 2016f).<br>**Application of Policies and Guidance**<br>This Section 38 Referral has been prepared by utilising the advice contained within the 'Key EPA Documents' listed above.<br>Terrestrial fauna surveys have been and will be conducted in accordance with the guidance identified above.<br>Key EPA documents and Factor Guidelines for terrestrial fauna will be used during the refinement of the Proposal design to minimise disturbance of significant fauna habitat and determining mitigation strategies for the Proposal. |
| **Receiving environment -** Describe the current condition of the receiving environment in relation to this factor. | • A *Detailed Vertebrate Fauna Survey* (Western Wildlife, 2022) has been undertaken for the Proposal, including a 15 km buffer area on the mine site.<br>• Thirteen fauna habitats were identified across the mine site study area and five fauna habitats were identified in the Koodjee Nature Reserve. As described above, the Koodjee Nature Reserve and Lake Ninan Nature and Recreational Reserves have been excluded from the footprint therefore the Proposal is not expected to directly impact these habitats. |



| EPA Requirements | Response |
|---|---|
| | • The identified habitats support a predicted faunal assemblage of up to ten frogs, 62 reptiles, 177 birds, 20 native mammals and six introduced mammals. However, the faunal assemblage of the study area is likely to be somewhat depauperate, mainly due to widespread habitat loss and fragmentation, and the impacts of salinity. The observed assemblage on the Western Wildlife 2022 survey included four frogs, 25 reptiles, 98 birds, 12 native mammals and six introduced mammals.<br>• There are 42 vertebrate fauna of conservation significance that potentially occur in the study area. Of these:<br>o Six are identified as *Threatened* under the EPBC Act and BC Act. The study area provides habitat critical for the survival of Carnaby's Cockatoo: potential breeding habitat in eucalypt woodlands and foraging habitat in eucalypt woodlands, banksia woodlands, heath and some planted vegetation such as pines. Although not recorded during this survey (due to the survey timing), the region around Calingiri is known to support a breeding population of the species. 2,504 potential habitat trees were recorded, of which 263 had potential hollows suitable for breeding and 26 showed evidence of use by Carnaby's Cockatoos. The planned pipeline corridor has changed since the above survey was undertaken. The amended pipeline corridor will utilise mostly previously disturbed farmland. Some scattered patches of remnant vegetation will be encountered. All areas of remnant vegetation along the amended pipeline corridor have been surveyed in September 2022, with a finalised report expected by Q1 2023.<br>o The Curlew Sandpiper may occur, but the salt pans and lakes are unlikely to regularly support this species, as it prefers coastal habitats. The Australian Painted Snipe may occur on the lakes, but this species is uncommon in the southwest and these habitats are disturbed by livestock. The Western Spiny-tailed Skink may possibly occur, but the habitats lack the log piles this species uses for shelter and the study area is outside its current known range.<br>The Chuditch and Malleefowl may disperse through the study area but are not likely to be resident as the habitats are too fragmented.<br>o Seven species are identified as *Migratory* in the EPBC Act and BC Act. Although Migratory shorebirds may occur on occasion, the salt pan and lake habitats of the study area are unlikely to regularly support nationally or internationally significant numbers of any species.<br>The Fork-tailed Swift is a Migratory species that is thought to be almost entirely aerial when visiting Australia, so the study area is not likely to provide important habitat for this species.<br>o One species is identified as *Specially Protected* in the BC Act. The Peregrine Falcon (*Falco peregrinus*) is likely to occur, foraging in open habitats including farmland. This species is widespread, and its population is considered secure.<br>o Five listed as *Priority* by DBCA. The Hooded Plover is known to occur in the region and may occur on the salt pans on occasion.<br>The Blue-billed Duck may occur on salt pans or lakes when inundated, but the study area is unlikely to be an important site for this species.<br>Although Western Brush Wallaby and Inland Western Rosella may occur in the study area, the likelihood is low as the habitats in the study area are probably too fragmented to support this species.<br>The Woma is probably locally extinct, as there have been no Wheatbelt records of this species since the 1980s.<br>• An *Aquatic Ecosystem Assessment* (Biologic, 2021) of lakes and claypans was undertaken at nine sites, six within the Proposal area and three reference sites located outside of the Proposal footprint.<br>• The Study Area comprises a number of brackish and salt lakes amongst open *Casuarina* sp. overstorey with samphire (saltbush) shrubs in the middle-storey. Water quality was characterised by brackish to hypersaline waters, with wide ranging dissolved oxygen saturation, circum-neutral to basic pH, and low dissolved metal concentrations. Total nitrogen (total N) and total phosphorus (total P) were variable across sites.<br>• A total of 88 aquatic invertebrate taxa (including invertebrates and micro-crustacea) were recorded during the study. While most aquatic invertebrates were common, ubiquitous species, three species, recorded at sites outside the MSDE, were considered to be of potential conservation or scientific significance including |

| EPA Requirements | Response |
|---|---|
| | ○ The ostracod *Reticypris* sp. (at CP05) is undescribed and likely to be new to science.<br>○ The ostracod *Australocypris* sp. n. (at CP05, LN01 and LH01) is also potentially new to science.<br>○ The fairy shrimp, *Pararternia extracta* (CP05, LH01 and an un-named wetland within the Study Area) is known from only a few populations (nine).<br>• Overall, there was a significant difference in aquatic invertebrate assemblages between saline and brackish sites, but not between the study area and reference sites.<br>• One native freshwater fish species, the western minnow *Galaxias occidentalis*, was recorded from two brackish sites within the Study Area. More than half (52%) of the total fish population recorded were juveniles, indicating that the study area supports conditions conducive to breeding and recruitment. Although not a species of conservation significance, these records from the Wheatbelt are important given there are few populations of freshwater fish remaining in the region.<br>• Eleven species of waterbird were recorded utilising sites within the study area, with the greatest richness at CP03 (eight taxa), followed by CP04. A large (10,000 individuals) feeding flock of banded stilt (*Cladorhynchus leucocephalus*) was also recorded at Lake Ninan. Lake Ninan Nature Reserve have been excluded from the footprint therefore the Proposal is not expected to have direct impacts on this species.<br>• Two sites (CP03 and CP04) supported at least two frog species, including the banjo frog (*Limnodynastes dorsalis*). These sites will not be impacted by the Proposal.<br>• Due to the widescale land clearing in the Wheatbelt, wetlands show varying degrees of salinity and degradation. As such, fresher wetlands and those not impacted by secondary salinisation are of particular ecological significance. The brackish sites sampled in the current study were found to support relatively rich aquatic invertebrate assemblage compared to hypersaline sites, as well as frogs, waterbirds and fish.<br>• This study represents the first comprehensive aquatic ecosystem survey undertaken of the lakes and wetlands within and surrounding the Caravel Copper Project. Results from this survey provide an assessment of the current ecological values and health of aquatic systems within this Study Area.<br>• A detailed *Baseline Short-range Endemic survey* (Alacran, 2022) was also undertaken for the mine site portion of the Proposal.<br>• The short-range endemic (SRE) field survey yielded a total of 292 samples from SRE target groups, representing 46 SRE category taxa. Of these, 22 were potential SREs owing to geographical data deficiency, 24 were potential SRE owing to taxonomic data deficiencies. None of the SRE category taxa sampled were named species.<br>• Further studies are being conducted with the field component completed in October 2022. It is anticipated that these studies and associated reporting will be concluded by Q1 2023. Preliminary results from the September field visit suggest that the majority of the Proposal landscape is highly disturbed and therefore of low value as SRE habitat however some isolated patches (such as a granite outcrop located within the southern portion of the Dasher pit and a laterite outcrop east of this site) may support SRE. Further studies will be undertaken to determine this. |
| **Potential Impacts** – Proposal elements that have impacts or effects relevant to each environmental factor, considering direct, indirect impacts and cumulative effects. | • Vegetation clearing resulting in direct disturbance of native vegetation within an 8,541 ha MSDE, and disturbance within the bore field and pipeline corridor, including potential fauna habitat.<br>• Of the 42 significant vertebrate fauna that potentially occur, only Carnaby's Cockatoo is considered likely to utilise habitat within the MSDE. Direct impact due to clearing of breeding and foraging habitat may occur. If surveys identify breeding or foraging habitat within the Proposal footprint, Caravel will modify the DE to avoid these, to the extent practicable, and will include offsets (as required) to mitigate any significant residual impact from the Proposal.<br>• Vehicle traffic and earthmoving activities may result in death or injury to fauna from vehicle strike.<br>• Clearing of land resulting in favourable conditions for predatory fauna and subsequently, increased predation or competition from introduced fauna.<br>• Vehicle traffic and earthmoving equipment may introduce or spread weeds. |



| EPA Requirements | Response |
|---|---|
| | • Alterations to surface water and groundwater regimes may result in indirect impacts to the health of downstream GDV or direct impacts to aquatic fauna.<br>• Excavations occurring during construction and operations may have a direct impact to aquatic fauna.<br>• Mining activities may result in indirect impacts such as hydrocarbon spills.<br>• Construction and operation activities may generate dust, light or noise emissions resulting in impacts to habitat vegetation health or alterations to fauna behaviours (including feeding or breeding behaviours). |
| **Mitigation -** Describe how the mitigation hierarchy has been applied to reduce the potential environmental impacts of the proposal. | Caravel has mitigated the potential impacts to terrestrial fauna according to the mitigation hierarchy; avoid, minimise, rehabilitate, offset. The following measures are proposed to manage and mitigate the potential environmental impacts:<br>• The MSDE will be developed to the minimum extent required to ensure safe and adequate construction and operation and will, as much as possible, maximise the usage of previously disturbed areas.<br>• Provide flexibility within the development envelopes to allow the avoidance of any significant flora/habitat.<br>• Koodjee Nature Reserve and Lake Ninan Nature Reserve have been excluded from the Proposal footprint so as to eliminate direct impacts to fauna habitat within the Reserves.<br>• Modifying the Proposal MSDE so as to exclude Carnaby's Cockatoo breeding or foraging habitat as much as possible, and potentially undertaking revegetation programs to improve the vegetation condition of existing TECs within the MSDE.<br>• Modifying the Proposal MSDE so as to exclude the two brackish sites found to provide habitat for the western minnow and avoiding impacting the sites where aquatic invertebrate fauna with potential conservation significance where recorded.<br>• A Fauna Habitat Management Plan (FHMP) that addresses the restoration of Carnaby's Cockatoo habitat will be developed and implemented.<br>• Planting native vegetation windrows along several roadside boundaries of the mine site and road realignment development envelope so as to improve visual amenity and provide fauna connectivity corridors.<br>• Vegetation clearing will be managed through internal ground disturbance procedures/ground disturbance permit system.<br>• Progressive clearing and rehabilitation will be undertaken.<br>• Water or dust suppressants will be applied to disturbed areas, mining areas and product transfer/storage areas as required to minimise dust generation.<br>• Emergency and fire response capabilities will be maintained to respond to fire outbreaks where possible.<br>• Implementation of industry standard measures to minimise the risk and impact of hydrocarbon spills.<br>• Weed hygiene and management measures/procedures will be implemented to prevent spread and introduction of weeds as a result of construction and operation.<br>• Maintain existing surface water flow regimes as much as possible with the installation and maintenance of surface water/drainage infrastructure across the Proposal site.<br>• Groundwater abstraction at bore fields will target sustainable yield thereby ensuring that aquifers are not overdrawn to below pre-European disturbance levels (as defined by groundwater studies described below) in vegetated areas eliminating potential impacts to GDV and aquatic fauna.<br>• Compliance with future approvals including a Ministerial Statement, Works Approval(s) and Mining Proposal.<br>• Implementation of a MCP under the *Mining Act 1978*.<br>• Inclusion of offsets (as required) to mitigate any significant residual impact from the Proposal, including offsets to be established for any residual impact to Carnaby's Cockatoo habitat trees that will be impacted by the Proposal. |



| EPA Requirements | Response |
|---|---|
| **Assessment and Significance of Residual Impacts -** Identify whether there are any residual impacts after applying the mitigation hierarchy and whether these are significant. | The impact to fauna habitat is not expected to be significant given the largely disturbed crop farmland upon which the majority of the Proposal is located, avoidance of important habitat to the extent possible (particularly brackish ponds known to support the western minnow and Carnaby's Cockatoo breeding or foraging habitat), the implementation of revegetation programs, the removal of the Koodjee and Lake Ninan Nature Reserves from the development footprint and the inclusion of offsets (as required) to mitigate residual impacts of the Proposal.<br>The faunal assemblage of the MSDE, pipeline corridor and borefield is likely to be depauperate due to widespread habitat loss and fragmentation, and the impacts of salinity.<br>There may be localised indirect impacts resulting from the introduction or spread of weeds, generation of dust or hydrocarbon spills however, through the implementation of mitigation measures described above, these incidents are expected to be rare and controlled and therefore not result in a significant impact.<br>Given the widespread, significant impacts of secondary salinisation in the Wheatbelt region, abstraction of groundwater associated with the Proposal is anticipated to have a positive impact in bore field areas over time as lowering of the water table may halt salt production at the ground surface and allow fresh water to infiltrate the soil, contributing to dilution of the salt in the groundwater. |
| **Environmental Outcomes -** Identify likely environmental outcomes and whether these are likely to be consistent with the EP Act principles and EPA objectives for environmental factors. | The development envelopes will be developed to the minimum extent required to ensure safe and adequate construction and operation and will, as much as possible, maximise the usage of previously disturbed areas.<br>It is expected that the disturbance of important fauna habitat can be avoided by removing the Koodjee and Lake Ninan Nature Reserves from the disturbance footprint. The Proposal may impact important habitat with the development of the pipeline; however the extent will not be understood until additional surveys are undertaken. The pipeline corridor will utilise mostly previously disturbed farm cropland and vegetation disturbance will be minimised as much as possible therefore impacts are not likely to be significant. The pipeline will also be buried, and the development corridor progressively rehabilitated as the pipeline is constructed. This will ensure any impacts will be temporary.<br>To the extent possible, Caravel will modify the development envelopes to exclude areas identified as habitat for the western minnow and Carnaby's Cockatoo breeding or foraging habitat.<br>Native vegetation will be planted in windrows along several roadside boundaries of the mine site and road realignment development envelope to improve visual amenity and provide fauna connectivity corridors.<br>Where possible, disturbed vegetation will be progressively rehabilitated.<br>The Proposal can be implemented while being consistent with the EP Act principles and achieving the EPA's objective to protect terrestrial fauna so that biological diversity and ecological integrity are maintained. |

**Table 4: Potential Impacts to Inland Waters**

| EPA Requirements | Response |
|---|---|
| **EPA Policy and guidance –** What have you considered and how have you applied them in relation to this factor? | **EPA Objective:** To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.<br>**Key EPA Documents**<br>Statement of Environmental Principles, Factors and Objectives (EPA, 2021a);<br>Statutory Guidelines for MCPs (DMIRS, 2020);<br>EIA (Part IV Divisions 1 and 2) Administrative Procedures (EPA, 2021b);<br>EIA (Part IV Divisions 1 and 2) Procedures Manual (EPA, 2021c); and<br>Instructions on how to prepare EP Act Part IV Environmental Management Plans (EPA, 2021d).<br>**Relevant EPA Factor Guidelines**<br>Environmental Factor Guideline – Inland Waters (EPA, 2018).<br>**Application of Policies and Guidance**<br>The Section 38 Referral has been prepared by utilising the advice contained within the 'Key EPA Documents' listed above. |

| EPA Requirements | Response |
|---|---|
| | Groundwater and surface water investigations will be conducted in accordance with the guidance identified above.<br>Key EPA documents and Factor Guidelines for inland waters will be used during the refinement of the Proposal design to minimise impact to inland waters and in determining mitigation strategies for the Proposal. |
| **Receiving environment** - Describe the current condition of the receiving environment in relation to this factor. | A *Hydrogeological Assessment* (Pendragon, 2018a) was undertaken for the Proposal.<br>• The geology of the area comprises paleochannel sediments within and underlain by granite/gneiss bedrock which has been faulted and intruded by dykes of dolerite. The primary aquifers are:<br>  ○ Sediments confined to paleo channels or valleys; and<br>  ○ Weathered/fractured granite-gneiss bedrock, faulted in places and intruded by near-vertical dykes of dolerite.<br>• Groundwater has elevated concentrations of Total Dissolved Solids (between 1,900 mg/L and 5,000 mg/L), predominantly Chloride and Sodium, which often exceed the Australian Drinking Water Guidelines.<br>• The mine will be supplied with water from a bore field located west of the mine site via an approximately 60 km pipeline. The Koodjee Nature Reserve sits within the study area for the proposed bore field but has been excluded from the disturbance footprint. An approximately 60 ha reservoir may be excavated within the borefield to capture winter flood waters and store water abstracted from the bore field.<br>• Due to limited volumes available from mine dewatering, Caravel will target two potential sources of additional water from unnamed aquifers. One is located to the east of the Perth Basin proclaimed area in the Gillingarra Paleochannel. The second is located in an area characterised by DWER as containing fractured rock aquifers between the Muchea and Darling Faults. This location is within the proclaimed area but distinct to the Perth Basin.<br>• In addition, Caravel will consider purchasing existing allocations from other Licensees.<br>• An additional water source to provide approximately 1 GL of hypersaline water per annum from a bore field immediately north of the mine site (within the DE, as indicated in Figure 3) is being investigated, pending further studies).<br>• The Proposal can utilise brackish water therefore drawdown may have the benefit of reducing waterlogging in salt-affected areas.<br>• The final water source will be determined pending further studies. This includes bore field pump testing and further hydrogeological investigations for the mine and bore field areas, including detailed groundwater modelling for the bore field. It is anticipated that these will be concluded by Q1 2023.<br>A *Hydrological (Surface Water) Assessment* (Pendragon, 2018b) was undertaken for the Proposal and Biologic (2022) also describes the hydrology for the Proposal:<br>• The Proposal falls within the Mortlock River North Catchment, a tributary of the Avon River. The Mortlock River system discharges significant flow, salt and nutrients, particularly total phosphorus to the Avon River west of Northam. There are a range of minor creek and perched water bodies across the Project Area; the creek systems remain dry for the majority of the year.<br>• The mine site is located within the proclaimed Avon River Catchment Area (Surface Water Area proclaimed under the *Rights in Water and Irrigation Act 1914*) and Avon River Management Area (*Waterways Conservation Act 1976*).<br>• Agricultural land use within the Wheatbelt has resulted in significant hydrological imbalance as once perennial woodlands and shrubs were converted to annual crops.<br>• The broad landscapes in the Wheatbelt are very flat and often filled with mosaics of saline, seasonally filled claypans/playas.<br>• Water levels are determined by a combination of surface run-off, subsurface flow and groundwater discharge as winter rains recharge aquifers. Most years, rainfall is insufficient to cause systems to flow, and the high rates of evaporation mean that many aquatic habitats are dry for much of the year.<br>• Although wetlands in the Wheatbelt are commonly saline, fresh and brackish wetlands can occur adjacent to highly saline systems. Such fresh systems provide an important refuge for freshwater aquatic fauna in the region. |

| EPA Requirements | Response |
|---|---|
| | Further surface water studies will be undertaken for the MSDE. It is anticipated that these will be concluded by Q1 2023. |
| **Potential Impacts** – Proposal elements that have impacts or effects relevant to each environmental factor, considering direct, indirect impacts and cumulative effects. | • Abstraction of 16 GL of groundwater per year from the unnamed aquifers pumped via an approximately 60 km pipeline to the mine site.<br>• Groundwater drawdown due to dewatering at the mine site impacting on aquifers.<br>• Alteration to surface water flow regimes within the MSDE resulting in indirect impacts to Lake Ninan and small claypans/playas downstream of the MSDE.<br>• Changes to surface water flows from the construction of a reservoir within the bore field.<br>• Leaks or spillages of hydrocarbons during construction and operations resulting in groundwater or surface water contamination.<br>• Sedimentation during construction or from pit dewatering resulting in downstream impacts to surface waters.<br>• Seepage, runoff and/or discharge from mine impoundments such as ROM pads, stockpiles, and tailings storage impacting surface and groundwater quality.<br>• Formation of pit lake at closure that impacts on water quality. |
| **Mitigation -** Describe how the mitigation hierarchy has been applied to reduce the potential environmental impacts of the proposal. | The following measures are proposed to manage and mitigate the potential environmental impacts to inland waters:<br>• Groundwater abstraction at the bore field will target sustainable yield thereby ensuring that aquifers are not overdrawn (as defined by groundwater studies) in vegetated areas. Abstraction will also target saline groundwater sources and groundwater which is close to the ground surface which is causing degradation of agricultural land.<br>• Obtaining and complying with Licences issued under the *Rights in Water and Irrigation Act 1914* (WA) for the drilling and abstraction of 16 GL/yr from the unnamed aquifers (if required).<br>• Identification and management of acid sulfate soils (if present).<br>• Lake Ninan Nature Reserve has been excluded from the MSDE.<br>• Maintain existing surface water flow regimes as much as possible with the installation and maintenance of surface water/drainage infrastructure across the MSDE.<br>• The waste landforms and tailings storage facility will be designed in consideration of relevant flood events.<br>• A Surface Water Management Plan will be developed and implemented for the Proposal.<br>• Obtaining and complying with and required Licences/Permits for the Avon River Catchment Area proclaimed under the *Rights in Water and Irrigation Act 1914* and Avon River Management Area under the *Waterways Conservation Act 1976*.<br>• Implementation of industry standard measures to minimise the risk and impact of hydrocarbon spills.<br>• Compliance with future approvals including a Ministerial Statement, Works Approval(s) and Mining Proposal.<br>• Implementation of a MCP under the *Mining Act 1978*. |
| **Assessment and Significance of Residual Impacts -** Identify whether there are any residual impacts after applying the mitigation hierarchy and whether these are significant. | Lake Ninan Nature Reserve has been excluded from the Proposal footprint therefore no Proposal-attributable impact to the lake is anticipated.<br>Surface water regimes will be maintained to the extent possible and groundwater abstraction will target sustainable yield thereby ensuring that aquifers are not overdrawn in vegetated areas.<br>There may be localised indirect impacts resulting from hydrocarbon spills or sedimentation however, through the implementation of mitigation measures described above, these incidents are expected to be rare and controlled and therefore not result in a significant impact. |



| EPA Requirements | Response |
|---|---|
| **Environmental Outcomes -** Identify likely environmental outcomes and whether these are likely to be consistent with the EP Act principles and EPA objectives for environmental factors. | The Proposal will require the abstraction of groundwater. Caravel intends to target brackish groundwater and groundwater close to the surface in order to potentially reduce waterlogging in salt-affected areas which is causing degradation of agricultural land. Furthermore, Caravel will target sustainable yields thereby ensuring that aquifers are not overdrawn and Groundwater Dependent Ecosystems are not adversely impacted<br>Caravel will undertake additional hydrogeological and surface water investigations to determine the most appropriate water source for the Proposal, and to ensure that impacts from abstraction are not significant and may potentially provide some environmental benefit through lowering the water table in salt-affected areas.<br>Existing surface water flow regimes will be maintained to the extent possible via the installation and maintenance of surface water/drainage infrastructure across the site.<br>Contamination of Inland Waters is possible from unintentional discharges to the environment. By implementing the mitigation measures described above, Caravel expects that the Proposal will be appropriately managed and unintentional discharges would be unlikely to result in significant impacts to the environment.<br>The Proposal can be implemented consistent with the EP Act principles and achieving the EPA's objective to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.<br>Mine closure will need to meet DMIRS requirements to be safe, stable and non-polluting including for any pit lakes that are formed. Whilst groundwater abstraction will also be licensed as required under the *Rights in Water and Irrigation Act 1914* within proclaimed areas and for artesian bore abstraction |

**Table 5: Potential Impacts to Terrestrial Environmental Quality**

| EPA Requirements | Response |
|---|---|
| **EPA Policy and guidance –** What have you considered and how have you applied them in relation to this factor? | **EPA Objective:** To maintain the quality of land and soils so that environmental values are protected.<br>**Key EPA Documents**<br>Statement of Environmental Principles, Factors and Objectives (EPA, 2021a);<br>Statutory Guidelines for MCPs (DMIRS, 2020);<br>EIA (Part IV Divisions 1 and 2) Administrative Procedures (EPA, 2021b);<br>EIA (Part IV Divisions 1 and 2) Procedures Manual (EPA, 2021c); and<br>Instructions on how to prepare EP Act Part IV Environmental Management Plans (EPA, 2021d).<br>**Relevant EPA Factor Guidelines**<br>Environmental Factor Guideline – Terrestrial Environmental Quality (EPA, 2016b).<br>**Application of Policies and Guidance**<br>The Section 38 Referral has been prepared by utilising the advice contained within the 'Key EPA Documents' listed above.<br>Surveys, studies, and consultation for this factor are conducted in accordance with the guidance identified above. |
| **Receiving environment -** Describe the current condition of the receiving environment in relation to this factor. | Preliminary soil analyses and geochemical studies have been undertaken.<br>A *Contaminated Sites Desk Study* was undertaken (Pendragon, 2018c) for the Proposal and surrounding area.<br>• Most of the project area, which has known elevated soil and water salinities, supports rural agricultural activity which has been the dominant land use within the region for a period exceeding at least twenty years. There is thus a potential for prolonged agricultural operations to have impacted both soil and water quality by a wide range of contaminants/chemicals of concern including Total Petroleum Hydrocarbons from greases, oils and fuels, carbamates, pesticides, herbicides and insecticides, heavy metals and nutrients.<br>A *Soil and Waste Characterisation Desk Study* (Pendragon, 2018d) was undertaken for the Proposal.<br>• Soils across the Proposal comprise sand and sandy loams having low natural nutrition with induced subsoil acidity and salinity related to rising water tables. |



| EPA Requirements | Response |
|---|---|
| | • The data used contained samples with elevated concentrations of Sulphur with a number of samples exceeding 1.0%. Concentrations in excess of 1% are considered materials with a high potential for acid generation. However, the overall impression is sporadic occurrences of elevated concentrations at varying depths but generally deeper than 50 m within an ore body containing primarily low sulphur concentrations.<br>• The samples contain elevated concentrations of some heavy metals which coupled with elevated concentrations of Sulphur warrant further investigation and assessment.<br>Further soil and geochemical studies will be undertaken for the mine site. It is anticipated that these will be concluded by Q1 2023.<br>As stated above, an *Interim Flora and Vegetation Assessment* (comprising both desktop and field studies) was undertaken for the Proposal and surrounding areas (Mattiske, 2022a).<br>• The vegetation of the mine site area ranged from degraded to pristine. Large areas of crop farmland were considered to be completely degraded. Most of the larger remnant vegetation patches (those greater than 2 ha) had a condition rating of "degraded" to "pristine", with the majority rated as "very good". |
| **Potential Impacts** – Proposal elements that have impacts or effects relevant to each environmental factor, considering direct, indirect impacts and cumulative effects. | Potential impacts to terrestrial environmental quality include:<br>• Erosion associated with vegetation clearing and changes to surface water regimes.<br>• Salinity reducing the likelihood of rehabilitation success at closure.<br>• Impact from acid-forming material in waste rock landforms and tailings storage facility.<br>• Disturbance of acid sulphate soils.<br>• Loss of sediment to the surrounding terrestrial environment during construction.<br>• Hydrocarbon spillage risks.<br>• Ongoing impacts from erosion and contamination associated with mine closure if not carried out properly. |
| **Mitigation -** Describe how the mitigation hierarchy has been applied to reduce the potential environmental impacts of the proposal. | The following measures are proposed to manage and mitigate the potential environmental impacts to terrestrial environmental quality:<br>• Maintain existing surface water flow regimes as much as possible with the installation and maintenance of surface water/drainage infrastructure across the MSDE.<br>• Materials characterisation will be undertaken to understand potential for impact from acid forming materials in tailings and waste rock landforms and tailings storage facilities will be managed in accordance with *Mining Act 1978* approvals.<br>• Identify and manage acid sulfate soils (if present).<br>• Implement industry-standard controls for sedimentation and hydrocarbon storage and handling.<br>• Implementation of a MCP under the *Mining Act 1978*. |
| **Assessment and Significance of Residual Impacts -** Identify whether there are any residual impacts after applying the mitigation hierarchy and whether these are significant. | Implementation of the Proposal will require clearing of vegetation and ground disturbing activities. Lake Ninan Nature Reserve has been excluded from the Proposal footprint therefore no Proposal-attributable impact to this nature reserve is anticipated. The Proposal occurs on predominantly degraded farm cropland and salt affected areas.<br>There may be localised indirect impacts to resulting from hydrocarbon spills or sedimentation however, through the implementation of mitigation measures described above, these incidents are expected to be rare and controlled and therefore not result in a significant impact. |
| **Environmental Outcomes -** Identify likely environmental outcomes and whether these are likely to be consistent with the EP Act principles and EPA objectives for environmental factors. | The Proposal will require clearing of vegetation. Existing surface water flow regimes will be maintained to the extent possible via the installation and maintenance of surface water/drainage infrastructure across the site.<br>Contamination is possible from unintentional discharges to the environment. By implementing the mitigation measures described above, Caravel expects that the Proposal will be appropriately managed and unintentional discharges would be unlikely to result in significant impacts to the environment. |



| EPA Requirements | Response |
|---|---|
| | The Proposal can be implemented while being consistent with the EP Act principles and achieving the EPA's objective to maintain the quality of land and soils so that environmental values are protected.<br>The Proposal is subject to regulation under the *Mining Act 1978* and it is expected that mine closure can be adequately managed through the requirements to prepare a MCP in accordance with the *Statutory Guidelines for MCPs* (DMIRS, 2020b) |

**Table 6: Potential Greenhouse Gas Emissions**

| EPA Requirements | Response |
|---|---|
| **EPA Policy and guidance –** What have you considered and how have you applied them in relation to this factor? | **EPA Objective:** To reduce net greenhouse gas (GHG) emissions in order to minimise the risk of environmental harm associated with climate change.<br>**Key EPA Documents**<br>Statement of Environmental Principles, Factors and Objectives (EPA, 2021a);<br>Statutory Guidelines for MCPs (DMIRS, 2020);<br>EIA (Part IV Divisions 1 and 2) Administrative Procedures (EPA, 2021b);<br>EIA (Part IV Divisions 1 and 2) Procedures Manual (EPA, 2021c); and<br>Instructions on how to prepare EP Act Part IV Environmental Management Plans (EPA, 2021d).<br>**Relevant EPA Factor Guidelines**<br>Environmental Factor Guideline – Greenhouse Gas Emissions (EPA, 2020c).<br>**Application of Policies and Guidance**<br>The Section 38 Referral has been prepared by utilising the advice contained within the 'Key EPA Documents' listed above.<br>Surveys, studies and consultation for this factor are conducted in accordance with the guidance identified above. |
| **Receiving environment -** Describe the current condition of the receiving environment in relation to this factor. | Not applicable to this factor. |
| **Potential Impacts** – Proposal elements that have impacts or effects relevant to each environmental factor,<br>considering direct, indirect impacts and cumulative effects. | Proposal GHG emissions may be produced as a result of:<br>• Energy produced from the SWIS<br>• Energy produced from onsite power generation<br>• Vehicle fuel usage<br>• Clearing of vegetation (land use change).<br>The Proposal will generate GHG emissions predominantly from energy consumed from the Western Power grid and supplementary fuel combustion and power generation should Western Power supply be inadequate:<br>• GHG emissions during the Proposal construction phase were estimated at 38,152 t $CO_2$-e by Ausenco.<br>• The planned operating model is to use ACE technologies to maximise safety and efficiency and significantly reduce GHG emissions. The ACE model is the current preferred operating model subject to feasibility studies and appropriate commercial agreements.<br>• GHG emissions for the Proposal operations phase have been estimated at a worst case average of 129,000 t $CO_2$-e per year, peaking at 170,000 t $CO_2$-e at peak operating capacity. The *worst-case* model has been utilised as Caravel has not secured final energy supply agreements with Western Power and assumes utilisation of fossil fuel powered fixed and mobile equipment and power generated by onsite diesel generators during operations.<br>Under the preferred operating model, where power supply is sourced from the existing regional electrical grid, the GHG emissions will include Scope 2 GHG emissions.<br>Caravel will continue to refine predicted GHG emissions during ongoing feasibility studies for the Proposal. |

| EPA Requirements | Response |
|---|---|
| **Mitigation -** Describe how the mitigation hierarchy has been applied to reduce the potential environmental impacts of the proposal. | The following measures are proposed to manage and mitigate the potential environmental impacts from GHG emissions:<br>• Utilisation of ACE operating model;<br>• Use of renewable sources of energy;<br>• A GHG Management Plan will be developed and implemented to enable the Proposal to achieve its objectives of net-zero GHG emissions by 2050;<br>• Caravel will mitigate potential impacts from GHG emissions according to the mitigation hierarchy; avoid, reduce and offset. Where carbon emissions cannot be avoided or reduced to enable Caravel to achieve its objectives, carbon offsets will be acquired.<br>• Caravel will investigate opportunities to offset carbon (as required) through revegetation projects on farmlands both within the MSDE, and in surrounding areas. |
| **Assessment and Significance of Residual Impacts -** Identify whether there are any residual impacts after applying the mitigation hierarchy and whether these are significant. | Implementation of the Proposal will generate GHG emissions, however through implementation of the ACE operating model, use of renewable energy sources, and carbon offsets as required, these will be significantly reduced and will enable Caravel to achieve its objective of Net Zero GHG emissions by 2050.<br>Therefore, the GHG emissions generated by the Proposal are not expected to have a significant impact. |
| **Environmental Outcomes -** Identify likely environmental outcomes and whether these are likely to be consistent with the EP Act principles and EPA objectives for environmental factors. | The Proposal will be implemented to achieve an outcome of Net Zero GHG emissions by 2050 as will be demonstrated by a GHG Management Plan.<br>The Proposal can be implemented while being consistent with the EP Act principles and achieving the EPA's objective to reduce net GHG emissions in order to minimise the risk of environmental harm associated with climate change. |

**Table 7: Potential Impacts to Social Surroundings**

| EPA Requirements | Response |
|---|---|
| **EPA Policy and guidance –** What have you considered and how have you applied them in relation to this factor? | **EPA Objective:** To protect social surroundings from significant harm.<br>**Key EPA Documents**<br>Statement of Environmental Principles, Factors and Objectives (EPA, 2021a);<br>Statutory Guidelines for MCPs (DMIRS, 2020b);<br>EIA (Part IV Divisions 1 and 2) Administrative Procedures (EPA, 2021b);<br>EIA (Part IV Divisions 1 and 2) Procedures Manual (EPA, 2021c); and<br>Instructions on how to prepare EP Act Part IV Environmental Management Plans (EPA, 2021d).<br>**Relevant EPA Factor Guidelines**<br>Environmental Factor Guideline – Social Surroundings (EPA, 2016g).<br>**Application of Policies and Guidance**<br>The Section 38 Referral has been prepared by utilising the advice contained within the 'Key EPA Documents' listed above.<br>Surveys, studies and consultation for this factor are conducted in accordance with the guidance identified above. |
| **Receiving environment -** Describe the current condition of the receiving environment in relation to this factor. | An archaeological and ethnographic *Aboriginal heritage survey* was undertaken for the MSDE (Dortch Cuthbert, 2022).<br>• The Proposal lies within the former Yued native title claim boundaries (WAD6192/1998), now referred to as the Yued Indigenous Land Use Agreement Area (Yued ILUA, WI2015/009). |



| EPA Requirements | Response |
|---|---|
| | • The survey was undertaken with consultation between Yued representatives, the South West Aboriginal Land and Sea Council (SWALSC) and Caravel, as well as an archaeologist and an anthropologist from Dortch Cuthbert.<br>• Although archaeological and anthropological studies of the region surrounding the MSDE are very limited, they indicate considerable antiquity of land use and retention of cultural and environmental knowledge among Yued People. Investigation of records held by Department of Planning, Lands, and Heritage for the area surrounding the MSDE revealed relatively few heritage sites, due to the limited amount of heritage survey work. Nevertheless, available reports indicated the importance of waterways, which were created and maintained by the Noongar Spirit Ancestor, the Waugal. Other sites in the region included stone structures, an artefact scatter, and a scarred tree.<br>• Archaeological survey of selected areas within the MSDE revealed seven archaeological sites, all comprising concentrations of stone artefacts indicating past use of these places by ancestors of the Yued people. Three of these places (CP2201, CP2204, CP2207) contained sandy deposits which might cover more artefacts, and one of these, CP2201, contains a 2 m high dune which is likely to contain numerous artefacts, possibly deriving from repeated occupation over many millennia. This site is of potential archaeological interest.<br>• As agreed with SWALSC, an archaeological survey of vegetated areas within the bore field will be conducted once hydrological surveys are completed and the bore field DE is determined.<br>• The PDE may impact one registered site (Moore River crossing) and therefore any disturbance of this site will require approval under Section 18 of the *Aboriginal Heritage Act 1972* (AH Act) or Part 4 of the *Aboriginal Cultural Heritage Act 2021* (ACH Act).<br>• A social impact assessment, noise assessment, and visual impact assessment will be undertaken for the Proposal. It is anticipated that these will be concluded by Q1 2023.<br>• There are several freehold farming properties within the MSDE. Caravel is engaging in ongoing negotiations with landowners regarding the purchase of all freehold land required for the Proposal. Caravel has land access agreements in place with all landowners underlying *Mining Act 1978* tenure for the MSDE. Caravel has been granted a Mining Lease and General Purpose Lease under the *Mining Act 1978* over the Dasher Deposit and associated infrastructure, satisfying the conditions of consent from the landowner. Caravel also has land access agreements with some of the landowners for the bore field area and is in active discussions with the other landowners with a view to forming agreement in 2023. |
| **Potential Impacts** – Proposal elements that have impacts or effects relevant to each environmental factor, considering direct, indirect impacts and cumulative effects. | • The Proposal will require the clearing of native vegetation and ground disturbance which may result in potential disturbance to Aboriginal Heritage sites or artifacts that have not yet been discovered or recorded (additional surveys required), although the Proposal is likely to be able to avoid impacting the integrity of all significant sites.<br>• Mining operations, processing and haulage of product has to potential to emit noise, light and dust.<br>• Impacts to visual amenity from mine infrastructure and waste rock landforms. |
| **Mitigation -** Describe how the mitigation hierarchy has been applied to reduce the potential environmental impacts of the proposal. | The following measures are proposed to manage and mitigate the potential environmental impacts to social surroundings:<br>• Results of Aboriginal Heritage surveys have been, and will be, utilised to design the DE's so as to minimise impact to recorded areas of Aboriginal heritage significance.<br>• Additional Aboriginal Heritage surveys will continue to be conducted in the DE's during the Part IV EP Act assessment process.<br>• Provide flexibility within the DE's to allow the avoidance of any significant cultural heritage sites.<br>• Approval will be sought under Section 18 of the AH Act or Part 4 of the ACH Act for the Moore River crossing and any registered Aboriginal Heritage sites that cannot be avoided.<br>• Caravel will investigate potential construction options for the pipeline crossing that do not involve disturbing the Moore River crossing, in consultation with the Yued People. |

| EPA Requirements | Response |
|---|---|
| | • Continued consultation with the Traditional Owners regarding the minimisation of impacts to traditional uses of the area.<br>• A Social, Cultural and Heritage Management Plan (SCHMP) will be developed.<br>• Vegetation clearing will be managed through internal ground disturbance procedures/ground disturbance permit system.<br>• Obtaining and complying with a Mining Proposal issued under the *Mining Act 1978*.<br>• Implementation of a MCP under the *Mining Act 1978*.<br>• The Proposal will be designed so as to minimise impacts to dust, noise, light and visual amenity.<br>• Implement industry-standard controls for dust, noise and light.<br>• Native vegetation will be planted in windrows along several roadside boundaries of the mine site and road realignment development envelope to improve visual amenity and provide fauna connectivity corridors.<br>• Ongoing stakeholder consultation.<br>• Potential property acquisition with access and amenity agreements with landowners. |
| **Assessment and Significance of Residual Impacts -** Identify whether there are any residual impacts after applying the mitigation hierarchy and whether these are significant. | Implementation of the Proposal will require clearing of vegetation and ground disturbing activities. No registered Aboriginal Heritage sites have been identified within the MSDE however one site considered to be of potential archaeological interest has been identified. Additional surveys are planned during the assessment process. A Section 18 of the AH Act or Part 4 approval under the ACH Act will be obtained for the Moore River crossing and any registered Aboriginal Heritage sites that cannot be avoided. It is likely that any significant heritage sites or areas of high cultural value that are discovered will be able to be avoided through flexibility in the Proposal development footprint and via the use of Caravel's ground disturbance permitting process.<br>There may be localised indirect impacts to resulting from dust, noise, or light however, through the implementation of mitigation measures described above, these incidents are expected to be rare and controlled and therefore not result in a significant impact. |
| **Environmental Outcomes -** Identify likely environmental outcomes and whether these are likely to be consistent with the EP Act principles and EPA objectives for environmental factors. | No registered Aboriginal Heritage sites have been identified within the MSDE. One site considered to be of potential archaeological interest has been identified. Additional surveys are planned during the assessment process. A Part 4 approval under the ACH Act will be obtained for the Moore River crossing and any registered Aboriginal Heritage sites that cannot be avoided. It is likely that any significant heritage sites or areas of high cultural value that are found in future surveys will be able to be avoided. An SCHMP will also be developed to demonstrate that the Proposal can meet the EPA's objectives for Social Surroundings.<br>Implementation and operation of the Proposal will require clearing of vegetation, ground disturbing activities, mining activities, processing activities and waste management activities which will result in emissions of noise, light and dust. The Proposal is not expected to significantly impact any sensitive receptors, given the strategy of acquiring properties located in proximity to (or within) the Proposal site.<br>The Proposal can be implemented while being consistent with the EP Act principles and achieving the EPA's objective to protect social surroundings from significant harm. |

## 2.2 OTHER ENVIRONMENTAL IMPACTS

Caravel has determined that the Proposal is unlikely to significantly impact the following Key Environmental Factors (noting that Sea theme factors were not included):

- Landforms;
- Subterranean Fauna;
- Air Quality; and
- Human Health.



**Landforms**: the MSDE does not contain any significant landforms and the water pipeline and borefield are unlikely to traverse significant landforms. The Landforms factor is therefore not relevant to the Proposal.

**Subterranean Fauna**: The Proposal may impact subterranean fauna through excavation and groundwater abstraction however the impact to the overall availability of habitat is not expected to be significant. Groundwater abstraction at bore fields will target sustainable yield thereby ensuring that aquifers are not overdrawn (as defined by groundwater studies) in vegetated areas, and will target saline groundwater sources. A Subterranean Fauna Assessment comprising of a desktop troglofaunal and field stygofauna assessment was conducted (Bennelongia, 2022) which concluded that it is unlikely the Proposal will adversely impact subterranean fauna conservation values given the limited suitable habitat for subterranean fauna with the Proposal footprint.

**Air Quality**: health issues associated with dust emissions are likely to be minimal given the composition of the ore and the implementation of controls required by Works Approvals and Licences issued under Part V of the EP Act to minimise airborne dust. Impacts to amenity from dust emissions will be assessed under the Social Surroundings factor.

The Proposal may result in air emissions from power generation and vehicle exhaust but this will likely be reduced through the adoption of the ACE operating model and use of renewable energy sources. Impacts will be further reduced through Caravel's strategy of acquiring properties located in proximity to (and within) the Proposal footprint. As a result, this factor is unlikely to be a Key Environmental Factor for the Proposal.

**Human Health**: The Proposal does not pose any foreseeable risk to Human Health.

## 2.3 HOLISTIC IMPACT ASSESSMENT

The Proposal lies within an area known to provide critical breeding habitat for the Carnaby's Cockatoo (Endangered; BC Act and EPBC Act) and TECs/PECs. Threatened and significant flora species may also be found within the Proposal DEs.

Given the above, Caravel has incorporated extensive avoidance and minimisation measures into the Proposal design and operational processes, the key measures being:

- The final footprint will, as much as possible, maximise the usage of previously disturbed areas;
- Flexibility within the development envelope to allow for, as much as possible, the avoidance of any significant flora;
- The exclusion of Koodjee Nature Reserve from the Proposal footprint so as to eliminate disturbance to threatened flora species within the nature reserve; and
- Inclusion of offsets (as required) to mitigate any significant residual impact from the Proposal.

There are some potential impacts that require management and monitoring to ensure that the impacts are not significant. Many of these potential impacts are adequately regulated under other legislation:

- Mine process plant emissions will be regulated under Part V of the EP Act;
- Mine pit design, and general environmental management will be regulated through a Mining Proposal assessed under the *Mining Act 1978*; and



- Closure and rehabilitation will be regulated through a MCP assessed under the *Mining Act 1978*.
- Abstraction of groundwater will be regulated through the *Rights in Water and Irrigation Act 1914*.

There are some potential impacts however that are expected to require limits or conditions in the Ministerial Statement, including:

- Limits on total permanent and temporary disturbance within the development envelope;
- A limit on groundwater abstraction volumes;
- The implementation of Flora and Vegetation Management Plan to ensure that impacts to flora and vegetation are minimised as far as practicable;
- The implementation of a Fauna Habitat Management Plan to ensure that impacts on terrestrial fauna habitats (in particular Carnaby's Cockatoo breeding and foraging habitat) are strictly monitored and managed to provide the best possible habitat quality during rehabilitation; and
- The implementation of a GHG Management Plan to enable the Proposal to achieve its objectives of Net Zero GHG emissions by 2050.

During EIA, Caravel will consider and assess all potential direct and indirect impacts from the Proposal to relevant, interconnected key environmental factors. The mitigation hierarchy (avoid, minimise, rehabilitate, and offset) will be applied to the Proposal to address each potential impact. The significance of the impacts will be assessed once the mitigation hierarchy has been applied, significant residual impacts will be addressed through management (the preparation and implementation of Environmental Management Plans) or counterbalanced with offsets.

## 2.4 CUMULATIVE IMPACT ASSESSMENT

In preparation of the EIA, Caravel will include a cumulative impact assessment to assess the Proposal's contribution to impacts on relevant environmental values. The activities, boundaries and values relevant for the cumulative impact assessment in relation to each relevant Key Environmental factor are summarised in Table 8.

**Table 8: Cumulative Impact Assessment**

| Activities | Environmental values | Relevant factors | Boundaries |
|---|---|---|---|
| Clearing of native vegetation | Native vegetation | Flora and Vegetation | Cumulative impacts on native vegetation will be assessed by reviewing the remaining extent of each affected pre-European vegetation association, and broader IBRA sub-regions. In addition, the remaining native vegetation extents within various buffers from the Proposal boundary (10 km, 15 km, and 20 km) will be reviewed |
| | State-wide Pre-European extent | Flora and Vegetation | |
| | Priority flora and Significant flora habitat | Flora and Vegetation | |
| | Significant fauna habitat | Terrestrial Fauna | |
| | Carnaby's Black Cockatoo Breeding and Foraging Habitat | Terrestrial Fauna | As above, plus a review of impacts from other proposals and historic clearing within a 12 km radius of the Proposal boundaries (likely maximum local range of breeding Carnaby's Cockatoo) |
| Abstraction of groundwater from the unnamed aquifer | The unnamed aquifers | Inland Waters | A review of impacts from other proposals within the unnamed aquifers will be conducted. |



| Activities | Environmental values | Relevant factors | Boundaries |
|---|---|---|---|
| and Gillingarra Paleochannel | | | |
| Mining (excavation, ore handling, processing and export) and power production from the combustion of fossil fuels | Amenity (Dust, Noise and Light) | Social Surroundings | If the Proposal is likely to result in air pollution, noise, or light pollution above background levels at the nearest sensitive receptors then an assessment will be conducted to determine what other air pollution, noise or light impacts could be affecting that receptor. The Proposal's contribution to those cumulative impacts will then be assessed. |
| | GHG | GHG | GHG emissions will be reviewed against the cumulative emissions within WA to determine the contribution made by the Proposal. |

Caravel has performed a high-level review of the past, present, and reasonably foreseeable future activities in proximity to the Proposal. There are no known proposed/likely significant proposals within 20 km of the Proposal boundaries.

## 2.5 CONSULTATION

Caravel has a Consultation Strategy which identifies key external stakeholders and determines how they will be impacted by the Proposal and what influence they have over its implementation.

Caravel has held pre-referral meetings with the Department of Climate Change, Energy, The Environment and Water (DCCEEW), EPA Services, and Industry Regulation and Water Licencing at the Department of Water and Environmental Regulation (DWER) regarding the Caravel Copper Project, and their comments have been incorporated into this Section 38 Referral where applicable.

Caravel has also consulted with the Local, State and Commonwealth Governments, Aboriginal groups with a connection to the Proposal lands, existing landholders and other community stakeholders.

In preparation of this referral, Caravel has consulted with environmental consultants regarding the potential impacts to the Key Environmental Factors. The outcomes of this consultation have led to the current design of the Proposal, which provides flexibility to minimise direct impacts to this factor.

# 3 PART C: OTHER APPROVALS AND REGULATION

The relevant Decision-Making Authorities (DMAs) identified by the Caravel are listed in Table 9. Additional decision-making authorities may be identified during the EPA's assessment of the Proposal.



**Table 9: Decision Making Authorities**

| DMA and department (if relevant) | Legislation or agreement regulating the activity | Approval required and relevant proposal element | Whether and how statutory decision-making process can mitigate impacts on the environment? (Yes/No and summary of reasons Include a separate line item for each relevant impact, and discuss how the EPA's factor objective will be met) | | |
|---|---|---|---|---|---|
| | | | **Relevant Impact** | **Relevant Key Environmental Factor and Objective** | **Can the DMA mitigate impacts and how will the EPA's factor be met** |
| Minister for Environment<br>DWER | EP Act Part V | **Works Approval** - required for the construction and commissioning of the Processing Plant<br>**Licence** - required for the operation of the Processing Plant | Noise emissions | **Social Surroundings**<br>EPA's objective: *To protect social surroundings from significant harm.* | Yes<br>While not expected to be significant, the primary source of noise emissions from the Proposal is the Processing Plant and the design of the plant will be assessed under Part V of the EP Act to ensure noise emissions are minimised and do not result in significant impacts to any sensitive receptors.<br>Noise emissions from other aspects of the site are not expected to be significant and are unlikely to require additional regulation under Part IV of the EP Act in order to meet the objective for this factor. |
| | | | Dust emissions | **Flora and Vegetation**<br>EPA's objective: *To protect flora and vegetation so that biological diversity and ecological integrity are maintained*<br>**Social Surroundings**<br>EPA's objective: *To protect social surroundings from significant harm.* | Yes<br>While not expected to be significant, a primary source of dust emissions from the Proposal is the Processing Plant and the design of the plant will be assessed under Part V of the EP Act to ensure dust emissions are minimised and do not result in significant impacts to any sensitive receptors.<br>In addition to regulation under Part V of the EP Act, dust emissions from all aspects of the site are regulated under the *Mining Act 1978* (refer below) and are not expected to be significant. These emissions are unlikely to require additional regulation under Part IV of the EP Act in order to meet the objective for this factor. |

| DMA and department (if relevant) | Legislation or agreement regulating the activity | Approval required and relevant proposal element | Whether and how statutory decision-making process can mitigate impacts on the environment? (Yes/No and summary of reasons Include a separate line item for each relevant impact, and discuss how the EPA's factor objective will be met) | | |
|---|---|---|---|---|---|
| | | | **Relevant Impact** | **Relevant Key Environmental Factor and Objective** | **Can the DMA mitigate impacts and how will the EPA's factor be met** |
| Minister for Mines and Petroleum<br>Executive Director, Resource and Environmental Compliance Division (Department of Mines, Industry Regulation and Safety (DMIRS))<br>State Mining Engineer (DMIRS) | *Mining Act 1978* (WA)<br>*Mines Safety and Inspection Act 1994* (WA) | **Mining Proposal and MCP**<br>Required for any mining-related disturbance within tenements. | Changes to the stability of the landscape | **Terrestrial Environmental Quality**<br>EPA's objective: *To maintain the quality of land and soils so that environmental values are protected*<br>**Inland Waters**<br>EPA's objective: *To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.*<br>**Flora and Vegetation**<br>EPA's objective: *To protect flora and vegetation so that biological diversity and ecological integrity are maintained*<br>**Terrestrial Fauna**<br>*To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.* | Yes.<br>A Mining Proposal will be submitted to DMIRS prior to any disturbance at the Proposal and will include auditable outcomes for key DMIRS factors (Biodiversity, Water Resources, Land and Soils). These outcomes will be defined and approved by DMIRS to ensure that the impacts on the key DMIRS factors are mitigated to an acceptable level. In the context of landscape stability this will include an auditable outcome that the landscape will be safe and stable during mining to prevent slumps or collapsed walls which could have environmental impacts.<br>An MCP will be submitted to DMIRS with the Mining Proposal prior to any disturbance at the Proposal and will be revised every 3 years. It will include auditable closure and rehabilitation outcomes and criteria which will be defined and approved by DMIRS to ensure that impacts on key DMIRS factors are mitigated to an acceptable level. The MCP will include an auditable outcome that the landscape will be safe and stable post-closure to prevent slumps or collapsed pits which could have environmental impacts.<br>The implementation of the Mining Proposal and MCP under the *Mining Act 1978* is considered suitable to mitigate this impact such that the EPA's objectives can be met.<br>By meeting DMIRS's Factors, the Proposal will also meet the EPA's objectives for the relevant factors. Additional regulation under Part IV of the EP Act is therefore unlikely to be required for this potential impact. |
| | | | Clearing of native vegetation | **Flora and Vegetation**<br>EPA's objective: *To protect flora and vegetation so that biological diversity and ecological integrity are maintained*<br>**Terrestrial Fauna**<br>*To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.* | Partially.<br>A Mining Proposal will be submitted to DMIRS prior to any disturbance at the Proposal and will include auditable outcomes for the key DMIRS factor: Biodiversity. These outcomes will include requirements for best-practice topsoil stripping and storage, rehabilitation, minimising the clearing footprint and taking accurate records.<br>A MCP will be submitted to DMIRS with the Mining Proposal prior to any disturbance at the Proposal and will be revised every 3 years. It will include auditable closure and rehabilitation outcomes and criteria |

| DMA and department (if relevant) | Legislation or agreement regulating the activity | Approval required and relevant proposal element | Whether and how statutory decision-making process can mitigate impacts on the environment? (Yes/No and summary of reasons Include a separate line item for each relevant impact, and discuss how the EPA's factor objective will be met) | | |
|---|---|---|---|---|---|
| | | | **Relevant Impact** | **Relevant Key Environmental Factor and Objective** | **Can the DMA mitigate impacts and how will the EPA's factor be met** |
| | | | | | which will be defined and approved by DMIRS to ensure that cleared areas are rehabilitated to an acceptable level. In the context of vegetation clearing this will include an auditable outcome that the rehabilitated areas will meet specific closure criteria designed to ensure flora, vegetation and fauna values are reinstated.<br>The implementation of the Mining Proposal and MCP under the *Mining Act 1978* is considered suitable to mitigate rehabilitation and impacts during clearing however it is not considered suitable to mitigate impacts associated with the loss of vegetation. This is expected to require assessment under Part IV of the EP Act to ensure that the EPA's objectives can be met. |
| | | | Introduction and spread of weeds | **Flora and Vegetation**<br>EPA's objective: *To protect flora and vegetation so that biological diversity and ecological integrity are maintained* | Yes.<br>The approved Mining Proposal and MCP will define outcomes to ensure that the Factors defined in DMIRS's Environmental Objectives - Policy and Mining (DMIRS, 2020) are met for the Proposal. The DMIRS Factor: Biodiversity, is relevant to this impact: DMIRS's objective for this factor is:<br>*Maintain representation, diversity, viability and ecological function at the species, population and community level.*<br>These outcomes will be defined and approved by DMIRS to ensure that impacts associated with weeds are mitigated to an acceptable level. This will include an auditable outcome to prevent the introduction or spread of any new weed species or populations during construction, operation or closure.<br>By meeting these outcomes and the objective of DMIRS's Biodiversity Factor, the Mining Proposal and MCP will ensure that the EPA's objective for flora and vegetation is met. Therefore, further regulation for the impact of the introduction and spread of weeds is not required to be assessed by the EPA. |
| | | | Alteration to the post mining land use | **Social Surroundings**<br>EPA's objective: *To protect social surroundings from significant harm.* | Yes.<br>Approval of a Mining Proposal and MCP will ensure that the Factors defined in DMIRS's Environmental Objectives - Policy and Mining (DMIRS, 2020) are met for the Proposal. The DMIRS Factor: |

| DMA and department (if relevant) | Legislation or agreement regulating the activity | Approval required and relevant proposal element | Whether and how statutory decision-making process can mitigate impacts on the environment? (Yes/No and summary of reasons Include a separate line item for each relevant impact, and discuss how the EPA's factor objective will be met) | | |
|---|---|---|---|---|---|
| | | | **Relevant Impact** | **Relevant Key Environmental Factor and Objective** | **Can the DMA mitigate impacts and how will the EPA's factor be met** |
| | | | | | Rehabilitation and Mine Closure, is relevant to this impact. DMIRS's objective for this factor is:<br>*Mining activities are rehabilitated and closed in a manner to make them physically safe to humans and animals, geo-technically stable, geo-chemically non-polluting/non-contaminating, and capable of sustaining an agreed post-mining land use, and without unacceptable liability to the State.*<br>By meeting the objective of DMIRS's Rehabilitation and Mine Closure Factor, the Proposal will also meet the EPA's objectives for social surroundings that are relevant to this impact. Additional regulation under Part IV of the EP Act is therefore unlikely to be required for this potential impact. |
| Minister for Mines and Petroleum<br>Chief Dangerous Goods Officer (DMIRS) | *Dangerous Goods Safety Act 2004* (WA) | **Dangerous Goods (DG) Licence**<br>May be required for the bulk storage of fuel if above specified limits (unlikely) | Contamination of soils, groundwater and surface water (hydrocarbon spills)<br>Fire (combustion of stored fuel) | **Terrestrial Environmental Quality**<br>EPA's objective: *To maintain the quality of land and soils so that environmental values are protected*<br>**Inland Waters**<br>EPA's objective: *To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.*<br>**Flora and Vegetation**<br>EPA's objective: *To protect flora and vegetation so that biological diversity and ecological integrity are maintained*<br>**Terrestrial Fauna**<br>EPA's objective: *To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.* | Yes.<br>The storage and management of hydrocarbons will already be regulated under Part V of the EP Act and the Mining Proposal/MCP however the DG Licence provides additional mitigation for the design and storage of larger volumes of dangerous goods (if large volumes of hydrocarbons (>100,000 L) are required to be stored on site).<br>A DG Licence sets standards for the way in which DGs are stored on site. These standards are aimed at ensuring DGs are stored safely and in such a way that will not result in impacts to the environment. Having a DG Licence ensures potential spills and combustion risks from the Proposal are mitigated. A DG Licence (in combination with the Part V and *Mining Act 1978* approvals) will meet the objectives of the EPA for both factors by minimising the risk of contamination of soils and water, and protecting flora and vegetation, and terrestrial fauna by minimising the risk of fire.<br>Regulation of the potential impacts on the environment from the storage of DG is therefore not expected to be required under Part IV of the EP Act. |

| DMA and department (if relevant) | Legislation or agreement regulating the activity | Approval required and relevant proposal element | Whether and how statutory decision-making process can mitigate impacts on the environment? (Yes/No and summary of reasons Include a separate line item for each relevant impact, and discuss how the EPA's factor objective will be met) | | |
|---|---|---|---|---|---|
| | | | **Relevant Impact** | **Relevant Key Environmental Factor and Objective** | **Can the DMA mitigate impacts and how will the EPA's factor be met** |
| Minister for Lands<br>Minister for Planning<br>Chief Executive Officer (Shire of Wongan-Ballidu, Shire of Goomalling and Shire of Victoria Plains) | *Local Government Act 1995* (WA)<br>*Planning and Development Act 2006* (WA) | **Planning / Development Approval** - required for the development of works outside of *Mining Act 1978* tenements | Noise emissions<br>Dust emissions | **Social Surroundings**<br>EPA's objective: *To protect social surroundings from significant harm.* | No.<br>A development approval is only required for works outside of *Mining Act 1978* tenure. This process considers the impacts from small portions of the Proposal to an extent but does not regulate emissions from the Proposal.<br>Potential impacts including emissions of noise and dust are regulated under Part V of the EP Act and are discussed further in the section above. |
| Chief Executive Officer (DWER)<br>Minister for Water | *Rights in Water and Irrigation Act 1914* (WA) | **26D licence**<br>Required for the construction of a bore to abstract groundwater<br>**5C licence**<br>Required for the abstraction of groundwater<br>**Bed and Banks Permit**<br>Required if taking, storing or diverting water. | Abstraction of groundwater from the unnamed Aquifers.<br>Alteration of surface water flows | **Inland Waters**<br>EPA's objective: *To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.* | Yes.<br>A 26D Licence ensures that bores are drilled, constructed, and maintained appropriately to ensure the aquifer and the groundwater resource is not compromised. A 5C Licence regulates the taking of water and assesses the impacts of the abstraction on the environment and other users. A 5C Licence is only granted if the impacts from the abstraction are shown to be sustainable with minimal environmental impacts or impacts to other users. 26D licences for the Proposal have been issued.<br>Licence holders are obligated to comply with their resource allocation and any conditions included in the licence. Licence holders are also required to use water efficiently and responsibly, minimising impacts to the water resource.<br>These Licences will ensure the Proposal meets the EPA's objective for Inland Waters by maintaining the hydrological regime of groundwater. Regulation of the potential impacts on the environment from the drilling and abstraction of groundwater is therefore not expected to be required under Part IV of the EP Act.<br>A Bed and Banks Permit is required on a mining lease within a proclaimed surface water area for the taking, storing or diverting of water. Depending on the final footprint a Bed and Banks Permit may be required for the Proposal. The Bed and Banks Permit will allow the obstruction or interference with the bed and banks of a watercourse. |

| DMA and department (if relevant) | Legislation or agreement regulating the activity | Approval required and relevant proposal element | Whether and how statutory decision-making process can mitigate impacts on the environment? (Yes/No and summary of reasons Include a separate line item for each relevant impact, and discuss how the EPA's factor objective will be met) | | |
|---|---|---|---|---|---|
| | | | **Relevant Impact** | **Relevant Key Environmental Factor and Objective** | **Can the DMA mitigate impacts and how will the EPA's factor be met** |
| Minister for Aboriginal Affairs | *Aboriginal Heritage Act 1972* (WA); or *Aboriginal Cultural Heritage Act 2021* (WA) | **Application for a permit under Section 18 of the AH Act or Part 6 of the ACH Act.** Required for consent to impact any Aboriginal Heritage sites (if not able to be avoided) | Disturbance of Aboriginal Heritage Sites | **Social Surroundings** EPA's objective: *To protect social surroundings from significant harm.* | Yes. Given the flexibility available to the Proposal the disturbance of Aboriginal Heritage sites is unlikely to be required. However, an application for a permit under Section 18 of the AH Act or Part 6 of the ACH Act will assess the significance of the proposed disturbance and determine what mitigation measures are required to obtain consent for any disturbance to an Aboriginal Heritage Sites. This consultation and assessment process will meet the EPA's objective for Social Surrounds by protecting registered Aboriginal Heritage sites from significant harm. |
| | | | Disturbance or indirect impacts to areas or artefacts of Aboriginal cultural value | **Social Surroundings** EPA's objective: *To protect social surroundings from significant harm.* | No (if avoidance is not possible). Given the flexibility available to the Proposal areas or artefacts of significant Aboriginal cultural value are expected to be able to be avoided. However, if disturbance or indirect impacts within these areas cannot be avoided then assessment and potential regulation under Part IV of the EP Act may be required. |
| Minister for the Environment (Cth) | *Environment Protection and Biodiversity Conservation Act 1999* (Cth) | **s.133 Approval** - required for the assessment of the Proposal's impacts on Matters of National Environmental Significance (MNES) | Direct impacts to Threatened Fauna (Vehicle Strike) | **Terrestrial Fauna** EPA's objective: *To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.* | No. While there is likely to be significant overlap in regulation, the EPBC Act is a Commonwealth Act and as such cannot be relied upon to regulate impacts under WA legislation. |
| | | | Clearing of potential Threatened Flora or Fauna habitat | **Flora and Vegetation** EPA's objective: *To protect flora and vegetation so that biological diversity and ecological integrity are maintained* **Terrestrial Fauna** EPA's objective: *To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.* | |

# 4 GLOSSARY

| Term | Definition |
|---|---|
| ACE | Automation, Communication and Electrification |
| ACH Act | *Aboriginal Cultural Heritage Act 2021* |
| AH Act | *Aboriginal Heritage Act 1972* |
| Alacran | Alacran Environmental Science |
| AHD | Australian Height Datum |
| BAM Act | *Biodiversity and Agriculture Management Act 2007* (WA) |
| BC Act | *Biodiversity Conservation Act 2016* (WA) |
| Bennelongia | Bennelongia Environmental Consultants |
| Biologic | Biologic Environmental Survey |
| Caravel | Caravel Minerals Limited |
| DBCA | Department of Biodiversity, Conservation and Attractions |
| DCCEEW | Department of Climate Change, Energy, the Environment and Water |
| DG | Dangerous Goods |
| DMA | Decision Making Authorities |
| DMIRS | Department of Mines, Industry Regulation and Safety |
| Dortch Cuthbert | Dortch Cuthbert Heritage Futures |
| DWER | Department of Water and Environmental Regulation |
| DE | Development Envelope |
| EIA | Environmental Impact Assessment |
| EP Act | *Environmental Protection Act 1986* (WA) |
| EPA | Environmental Protection Authority |
| EPBC Act | *Environment Protection and Biodiversity Conservation Act 1999* (Cth) |
| ESA | Environmentally Sensitive Area |
| FHMP | Fauna Habitat Management Plan |
| GDE | Groundwater Dependant Ecosystem |
| GDV | Groundwater Dependant Vegetation |
| GHG | Greenhouse Gas |
| GL | Gigalitres |
| ha | Hectares |
| IBRA | Interim Biogeographical Regionalisation for Australia |
| km | Kilometres |
| kt | Kilotonnes |
| m | Metres |
| Mattiske | Mattiske Consulting Pty Ltd |
| MCP | Mine Closure Plan |
| MNES | Matters of National Environmental Significance |
| MSDE | Mine Site Development Envelope |
| N | Nitrogen |
| P | Phosphorus |

| Term | Definition |
|---|---|
| PEC | Priority Ecological Community |
| Pendragon | Pendragon Environmental Solutions |
| Proposal | Caravel Copper Project |
| ROM | Run Of Mine |
| SRE | Short Range Endemic |
| SWALSC | South-West Aboriginal Land and Sea Council |
| tCO2-e | Tonnes of Carbon Dioxide Equivalent (emissions) |
| TEC | Threatened Ecological Community |
| TSF | Tailings Storage Facility |
| WA | Western Australia |
| WAH | Western Australian Herbarium |
| Western Wildlife | Western Wildlife Environmental Consultants |

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