GOVERNMENT OF WESTERN AUSTRALIA

Environmental Protection Authority

McPhee Creek Iron Ore Project

Atlas Iron Pty Ltd

Report 1750

October 2023

This assessment report has been prepared by the Environmental Protection Authority (EPA) under s. 44 of the *Environmental Protection Act 1986* (WA). It describes the outcomes of the EPA's assessment of the McPhee Creek Iron Ore Project proposal by Atlas Iron Pty Ltd.

The McPhee Creek Iron Ore Project was determined under the Commonwealth *Environment Protection and Biodiversity Act 1999* to be a controlled action and to be assessed by the EPA under an accredited process. This document is also the result of the EPA's accredited assessment process.

This assessment report is for the Western Australian and Commonwealth Ministers for Environment and sets out:

- what the EPA considers to be the key environmental factors identified in the course of the assessment
- an assessment of the matters of national environmental significance
- the EPA's recommendations as to whether or not the proposal may be implemented and, if it recommends that implementation be allowed, the conditions and procedures, if any, to which implementation should be subject to
- other information, advice and recommendations as the EPA considers fit.

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Proposal

The McPhee Creek Iron Ore Project proposal is for the mining of iron ore from five open cut pits including above water table (AWT) mining from the Crescent Moon pit and below water table (BWT) mining from the Nicholson, Ord, Murray and Avon pits, with a production rate of up to 14 million tonnes per annum (Mtpa) of ore over an expected life of 15 years. The proposal is located approximately 30 kilometres from Nullagine, in the Pilbara region of Western Australia.

The total development envelope for the proposal is 4,465 hectares (ha), which includes clearing of up to 1,912 ha for the development of mine pits and associated infrastructure including crushing and screening facilities, waste landforms, run of mine pad, access roads, solar field, administration, accommodation camp, waste water treatment plant, stockpile and laydown areas, borrow pits, groundwater bores and transfer infrastructure, explosives magazine, fuel storage and landfill.

Management of mine dewatering will require a maximum groundwater abstraction rate of 7.5 gigalitres per annum (GL/a) and an associated dewater discharge to three creeks (McPhee Creek, Branch of McPhee Creek and Lionel Creek) up to a maximum of 6.0 GL/a.

Ore will be transported by truck to the existing Roy Hill Iron Ore Project, currently approved under Ministerial Statement 1189, or other third parties for processing, or may be on sold as direct shipping ore.

Context

The proposal is located within the Chichester subregion of the Pilbara bioregion. The development envelope lies on the catchment divide between the Coongan River and Nullagine River catchments (Thackway and Cresswell 1995). The Nyamal people are the Traditional Owner group relevant to this proposal, with the Nyamal #1 claimant group holding a registered native title claim over the development envelope (WC 1999/008). The closest nature reserve to the proposal is the Ex-Meentheena Station nature reserve, located ~ 15 kilometres (km) to the northeast, with the Bonney Downs Pastoral Lease intersecting the southern portion of the development envelope.

Environmental values

Flora and Vegetation, Terrestrial Fauna, Inland Waters, Subterranean Fauna, Greenhouse Gas Emissions and Social Surroundings (including Aboriginal cultural heritage) are the key environmental factors that may be impacted by the proposal.

Consultation

The Environmental Protection Authority (EPA) published the proponent's referral information for the proposal on its website for seven days public comment (from 2 March 2021 to 8 March 2021). The EPA also published the proponent's environmental review document and supporting information on its website for public

review for six weeks (from 11 July 2022 to 22 August 2022). The EPA considered the comments received during these public consultation periods in its assessment.

Mitigation hierarchy

The mitigation hierarchy is a sequence of proposed actions to reduce adverse environmental impacts and emissions. The sequence commences with avoidance, then moves to minimisation, rehabilitation, and offsets are considered as the last step in the sequence.

The proponent considered the mitigation hierarchy in the development and assessment of its proposal, and as a result will:

- avoid direct disturbance to the *Rosterllularia adscendens* (Priority 3) and the known *Acacia aphanoclada* (Priority 1) individual
- minimise direct disturbance to priority flora, locally significant vegetation types, and important fauna habitat types through setting limits of disturbance, and implementing internal ground disturbance permit procedures for all clearing activities
- avoid the introduction of new weed species and spread of existing weed species through the implementation of hygiene procedures and weed management measures
- minimise potential introduction of new weeds, including targeted control of the declared pest *Calotropis procera* (Rubber Bush) and undertaking a weed monitoring program
- progressively rehabilitate vegetation with native species of local provenance including seed collection prior to/during construction and operations (including the relevant Nyamal Traditional Owners), ensure the removal of temporary infrastructure and re-establishment of natural flow paths and catchments as soon as appropriate.
- avoid direct disturbance to high-value fauna habitat, including one cave (CMPC-25) and five surface water pools (WMPC-21, 18, 19, 20 and 32), through the implementation of a Significant Fauna Exclusion Zone (SFEZ)
- avoid direct impacts to nine caves (CMPC-05, 08, 09, 10, 13, 16, 20, 21 and 25) in the development envelope
- minimise indirect impacts to retained ghost bat caves (CMPC-05, 8, 9, 10, 13, 16, 19, 20 and 21) by implementing measures to mitigate noise, vibration and associated structural impacts to retained caves
- minimise impact to terrestrial fauna by undertaking pre-clearance surveys, engaging fauna spotters, implementing vehicle speed limits, restricting night-time vehicle movement and buffer zones near high value fauna habitat (for example, greater bilby burrows)
- avoid direct impact to surface water pools (WMPC-03, 22 and 29)
- minimise impacts to inland waters by implementing a Water Management Plan to minimise impacts to pools and long-term mounding in alluvial aquifers, and

reduce impacts on the natural function and environmental value of watercourses, water quality and sheet flow downstream of the mine area

- avoid key troglofaunal habitat through the retention of Avon West and 2.2 ha of high suitability habitat within the proposed topsoil stockpile area of the development envelope
- minimise direct disturbance to the Crescent Moon troglofauna habitat through implementation of a mining exclusion zone to conserve 50% of the surface extent within Crescent Moon, until connectivity of Crescent Moon troglofauna habitat to areas outside those to be impacted can be demonstrated
- avoid key heritage sites with ongoing refinement of the mine plan to maximise site avoidance and the salvage of heritage materials undertaken by the relevant Nyamal Traditional Owners supported by the proponent
- ensure ongoing access (when safe to do so) to the development envelope for the relevant Nyamal Traditional Owners during construction and operations with the relevant Nyamal Traditional Owners to be involved in flora, fauna, water and heritage site monitoring.

Assessment of key environmental factors

The EPA has identified the key environmental factors (listed below) in the course of the assessment. For each factor, the EPA has assessed the residual impacts of the proposal on the environmental values and considered whether the environmental outcomes are likely to be consistent with the EPA environmental factor objectives.

Flora and Vegetation

Residual impact or risk to environmental value		Assessment finding
1.	Clearing of up to 1,912 ha of native vegetation in ‘Good’ to ‘Excellent’ condition, including 24 ha of riparian vegetation considered potential groundwater dependent vegetation.	The clearing of ‘Good’ to ‘Excellent’ condition vegetation within the Pilbara bioregion is significant in the context of biological diversity and ecological integrity, as it provides habitat for conservation significant flora and fauna species. The EPA advises that this residual impact is likely to be regulated through reasonable conditions (limitations on extent A1) and including a requirement for offsets (recommended condition B7). The EPA has concluded that the environmental outcome is likely to be consistent with the EPA objective for flora and vegetation.
2.	Indirect impacts associated with dust deposition, the introduction and spread of weeds and altered hydrological regimes.	The EPA advises there is unlikely to be significant residual impacts from dust deposition, or the introduction and spread of weeds subject to reasonable conditions (recommended conditions B1-1(6) and B1- 2) requiring the implementation of

		management measures. The EPA has concluded that the environmental outcome is likely to be consistent with the EPA objective for flora and vegetation. Altered hydrological regimes resulting from mine dewatering and discharge of surplus mine dewater to creek lines has the potential to impact groundwater dependent vegetation (GDV) through groundwater drawdown and groundwater mounding within the extent of the modelled wetting front. Residual impacts to GDV are likely to be regulated through reasonable conditions (recommended conditions B3-1(5) and B3- 3), so the environmental outcome is likely to be consistent with the EPA objective for flora and vegetation.

Terrestrial Fauna

Residual impact or risk to environmental value		Assessment finding
1.	Direct impact to the following habitat types that are of importance to threatened fauna: • 93.6 ha of gorge/gully • 17.0 ha of breakaway/cliff • 55.0 ha of drainage line • 504.6 ha of hillcrest/hillslope • 12.1 ha of spinifex sandplain	Significant residual impacts are likely to be able to be regulated through reasonable implementation conditions (recommended conditions B2-1(1) and B2-3) and counterbalanced by offsets (recommended condition B7), so the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.
2.	Impact to potential short-range endemic (SRE) *Olpiidae* sp. identified within the indicative footprint.	The EPA considers that taxonomic uncertainty remains regarding a number of potential SRE singletons, including *Olpiidae* sp., which represents a potentially new olpiid genus. Residual impacts to this species are likely to be regulated through reasonable conditions (recommended conditions B2-1(4) and B4-4) so the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.
3.	Impacts to ghost bat roosting habitat	Indirect impacts associated with blasting and vibrations have the potential to impact the structural integrity of retained critical habitat caves (CMPC-03, 08, 10, 12, 25 and 26), and potentially affect the viability of these caves as critical ghost bat habitat. The EPA considers that the significant residual impacts to bat roosts can be regulated through reasonable conditions

		(recommended conditions B2-1(2), B2-1(5) and B2-2(2)) so the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.
4.	Loss of grey falcon breeding trees	The proposal will result in the loss of 55 ha of drainage line habitat including potential breeding trees for the species. The EPA considers that the significant residual impacts can be regulated through reasonable conditions (recommended condition B2-3) so the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.
5.	Loss of greater bilby burrows	The proposal includes the disturbance of 12.1 ha of spinifex sandplain habitat representing potential burrowing habitat for greater bilby. The EPA advises that this significant residual impact should be subject to reasonable implementation conditions (recommended condition B2-4) to ensure the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.
6.	Indirect impacts to threatened fauna through feral fauna predation, lighting and noise.	The EPA advises that the significant residual impact can be regulated through reasonable conditions (recommended conditions B2-2(1), B2-2 (3), B2-5, B2-6 and B2-7) requiring implementation of management measures so that the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.

Inland Waters

Residual impact or risk to environmental value		Assessment finding
1.	Loss of pools and catchment area	The proposal will directly impact 12 pools and surface water catchments that provide important fauna habitat and have cultural importance for the relevant Nyamal Traditional Owners. The EPA advises that this residual impact can be regulated through reasonable conditions (recommended conditions B3-1(1)-(4)). The EPA has concluded that the environmental outcome is consistent with the EPA objective for inland waters.

2.	Indirect impacts to potential groundwater dependent vegetation (GDV) due to groundwater drawdown	Up to 58.7 ha of potential GDV is expected to experience groundwater drawdown of more than 2 m. The EPA advises this residual impact should be subject to reasonable implementation conditions (recommended conditions B3-1(5) and B3-2) to ensure the environmental outcome is consistent with the EPA objective for inland waters and flora and vegetation.
3.	Indirect impacts to riparian vegetation and pools as a result of discharge to creeks.	The proposal will involve the discharge of excess water (cumulatively up to 6 GL/a) across McPhee Creek, Branch of McPhee Creek and Lionel Creek, with pool VMPC-77 (Branch of McPhee Creek) predicted to received dewater discharge. Excess water discharge has the potential to impact riparian vegetation and water quality associated with these surface water features. The EPA advises this residual impact should be subject to reasonable implementation conditions (recommended conditions B3-1(3) - (5) and B3-2) to ensure the environmental outcome is consistent with the EPA objectives for inland waters and flora and vegetation.

Subterranean Fauna

Residual impact or risk to environmental value		Assessment finding
1.	Loss of troglofauna habitat	The proposal will result in the loss of medium to high suitability troglofauna habitat mapped within the development envelope. The EPA advises this residual impact should be subject to reasonable implementation conditions (recommended condition B4-1) to limit the extent of habitat loss and to ensure the environmental outcome is consistent with the EPA objective for subterranean fauna.
2.	Indirect impacts to stygofauna and troglofauna habitat	The proposal has the potential to indirectly impact subterranean habitat through surface activities such as topsoil storage and waste rock dumps. The EPA advises this residual impact should be subject to reasonable implementation conditions (recommended condition B4-2) to ensure the environmental

		outcome is consistent with the EPA objective for subterranean fauna.
3.	Impacts to biological diversity through direct impacts to the troglofauna community within the Crescent Moon pit area	The development of the Crescent Moon pit has the potential to result in the loss of biological diversity through the direct loss troglofauna individuals and habitat. The EPA advises this residual impact should be subject to reasonable implementation conditions (recommended condition B4-3, B4-4, B4-5 and B4-6) to provisionally avoid disturbance of the Crescent Moon pit, subject to the demonstration of troglofauna habitat connectivity, and ensure the environmental outcome is consistent with the EPA objective for subterranean fauna.

Greenhouse gas emissions

Residual impact or risk to environmental value		Assessment finding
1.	Greenhouse gas (GHG) emissions for the proposal are estimated to be: • construction scope 1 emissions will be 98,688 t CO_2-e per annum • operational scope 1 emissions will be on average 127,161 t CO_2-e per annum, including haulage of ore • scope 3 emissions will be 20,216,000 t CO_2-e per annum • total scope 1 emissions for the life of the proposal is expected to be 1,964,127 CO_2-e with no mitigation.	The EPA advises that the potential residual impact should be subject to reasonable implementation conditions (recommended condition B5), which imposes limits on GHG emissions reducing over time, and requires the development of a GHG environmental management plan prior to the commencement of operations, for the approval of the Department of Water and Environmental Regulation. The implementation of an approved plan will ensure consistency with the EPA objective for GHG emissions.

Social surroundings

Residual impact or risk to environmental value		Assessment finding
1.	Potential for direct or indirect impact to undiscovered Aboriginal heritage sites and areas of cultural significance.	Up to four heritage sites would be directly and 69 sites potentially indirectly impacted because of the proposal. The EPA has concluded that there is a risk of residual direct and indirect impacts to Aboriginal cultural heritage. The EPA advises that the potential residual impact should be subject to reasonable implementation conditions (recommended condition B6-1) to ensure

		that the proposal avoids, and otherwise minimises impacts to cultural and heritage values within and surrounding the development envelope. This ensures consistency with the EPA objective for social surroundings.
2.	Potential loss of relevant Nyamal Traditional Owner access to country and Aboriginal cultural heritage sites.	Implementation of the proposal has the potential to inhibit the free access of Nyamal Traditional Owners to country for traditional uses or customs. The EPA advises that the potential residual impact should be subject to reasonable implementation conditions (recommended condition B6-1) to ensure ongoing and safe access to country and to Aboriginal cultural heritage sites by the relevant Nyamal Traditional Owners.

Holistic assessment

The EPA considered the connections and interactions between relevant environmental factors and values to inform a holistic view of impacts to the whole environment. The EPA formed the view that the holistic impacts would not alter the EPA's conclusions about consistency with the EPA factor objectives.

Conclusion and recommendations

The EPA has taken the following into account in its assessment of the proposal:

- environmental values which may be significantly affected by the proposal
- assessment of key environmental factors, separately and holistically (this has included considering cumulative impacts of the proposal where relevant)
- likely environmental outcomes which can be achieved with the imposition of conditions
- consistency of environmental outcomes with the EPA's objectives for the key environmental factors
- EPA's confidence in the proponent's proposed mitigation measures
- whether other statutory decision-making processes can mitigate the potential impacts of the proposal on the environment
- principles of the *Environmental Protection Act 1986*.

The EPA has recommended that the proposal may be implemented subject to conditions recommended in Appendix A.

1 Proposal

The McPhee Creek Iron Ore Project (the proposal) is for the mining of iron ore from five open cut pits including above water table (AWT) mining from the Crescent Moon pit and below water table (BWT) mining from the Nicholson, Ord, Murray and Avon pits, with a production rate of up to 14 million tonnes per annum (Mtpa) of ore over an expected life of 15 years. The proposal is located approximately 30 kilometres (km) from Nullagine, in the Pilbara region of Western Australia (Figure 1).

The proposal includes the development of mine pits and associated infrastructure including crushing and screening facilities, waste landforms, run of mine pad, access roads, solar field, administration, accommodation camp, wastewater treatment plant, stockpile and laydown areas, borrow pits, groundwater bores and transfer infrastructure, explosives magazine, fuel storage and landfill (Figure 2). Management of excess dewater is proposed via surface water discharge to three creeks (McPhee Creek, Branch of McPhee Creek and Lionel Creek).

Ore will be transported by truck to the existing Roy Hill Iron Ore Project, or other third parties for processing, or may be on sold as direct shipping ore.

The proponent for the proposal is Atlas Iron Pty Ltd. The proponent referred the proposal to the Environmental Protection Authority (EPA) on 18 February 2021. The referral information was published on the EPA website for seven days public comment. On 22 March 2021, the EPA decided to assess the proposal at the level of Public Environmental Review. The EPA also published the environmental review document (ERD) (Atlas Iron 2022a) on its website for public review for six weeks from 11 July 2022 to 22 August 2022.

The proposal was determined under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to be a controlled action (EPBC no. 2021/8897) and to be assessed by the EPA under an accredited process.

The elements of the proposal which have been subject to the EPA's assessment are included in Table 1.

Table 1: Proposal content document (Atlas 2023a)

Proposal element	Location	Maximum extent or range
Physical elements		
Mine elements including: • Above and below water table mining of five open cut pits • Waste rock dumps • Topsoil stockpiles • Ore stockpile	Within development envelope and outside of the Significant Fauna Exclusion Zone	Clearing of up to 1,912 ha within a development envelope of 4,465 ha including approximately 682.3 ha of high value fauna habitat.

Proposal element	Location	Maximum extent or range
Infrastructure elements including: • accommodation camp • energy supply infrastructure • ancillary buildings (e.g. workshops, communications, offices) • wastewater treatment plant • landfill • hydrocarbon storage • explosive mixing and storage facility • laydown areas • above ground water storage dams to manage supply or disposal of clean or mine water.		
Operational elements		
Groundwater abstraction	Within development envelope	Abstraction of up to 7.5 GL/a groundwater for mine dewatering
Surplus water management	McPhee Creek, branch of McPhee Creek and Lionel Creek	Controlled surface discharge of surplus water to three creek lines within the wetting fronts as shown in Figure 3
Proposal elements with greenhouse gas emissions		
Construction elements: Annual average		
Vegetation clearing	-	Scope 1 – 98,688 t CO_2-e
Operational elements: Annual average for life of mine		
Production, energy production, wastewater emissions	-	Scope 1 – 57,095 t CO_2-e
Haulage of ore to third-party processing facility or direct shipping	-	Scope 1 - 70,450 t CO_2-e[1]
Rehabilitation		
Where practicable, progressive rehabilitation will be undertaken over the life of the mine. Areas disturbed through the implementation of the proposal will be designed to be safe		

[1] Haulage emissions considered scope 1 for the purposes of the EPA assessment, as discussed in section 2.5

Proposal element	Location	Maximum extent or range
and non-polluting and will be constructed so the final shape, size, stability, are comparable with the natural landforms in the area.		
Timing elements		
Proposal timeframe	-	15 years

Units and abbreviations
ha – hectare
GL/a – gigalitres per annum
t CO_2-e – tonnes (t) of carbon dioxide (CO_2) equivalent (e)

Proposal amendments

The original proposal is set out in Attachment A of the proponent's referral, which is available on the EPA website.

During the assessment process, the EPA encouraged the proponent to identify avoidance and mitigation measures for the proposal in addition to those included in the original proposal.

The proponent requested changes to the original proposal under s. 43A during the assessment. The changes were assessed to be unlikely to significantly increase any impacts of the proposal and some reduced potential impacts on the environment. The EPA Chair's notice, of 22 March 2023, consenting to the change is available on the EPA website.

The consolidated and updated elements of the proposal which has been subject to the EPA's assessment is included in Table 1.

Proposal alternatives

Due to the nature of the activity, the location of the proposal was largely constrained by the location of the mineral resource. Therefore, the proponent did not consider alternative locations for the proposal. However, alternative designs were considered, as detailed in section 2.5.3 of the ERD (Atlas Iron 2022a).

Ore processing infrastructure does not form part of the proposal as processing of ore will be undertaken off-site (outside of the development envelope) utilising existing infrastructure associated with other approved proposals (for example, Revised Proposal for the Roy Hill Iron Ore Mine – Ministerial statement 1189).

Proposal context

The proposal is located within the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) region and Chichester subregion which is dominated by scrub steppe on Archaean granite and basalt plains and ranges (Thackway and Cresswell 1995). The proposal is a greenfield iron ore mine on Mining Lease M45/1243-1 and Miscellaneous licences L45/598 and L46/158 in the Pilbara region.

Most of the development envelope is on unallocated crown land, with the southern portion located within the Bonney Downs pastoral station. The development envelope is in an area where Native Title has not been determined. The land is

subject to a registered Native Title claim by the Nyamal People (WC1999/008 – Nyamal #1), registered on 3 June 1999, and a lodged Native Title claim by the Palyku People (WC2018/022 – Palyku #2), filed on 29 October 2018.

Three lower tributaries of the Nullagine River (McPhee Creek, Branch of McPhee Creek and Lionel Creek) intersect the development envelope. There are no mapped Environmentally Sensitive Areas and the closest conservation reserve in proximity to the development envelope is the Ex Meentheena Station nature reserve (15 km northeast).

Figure 1: Project location

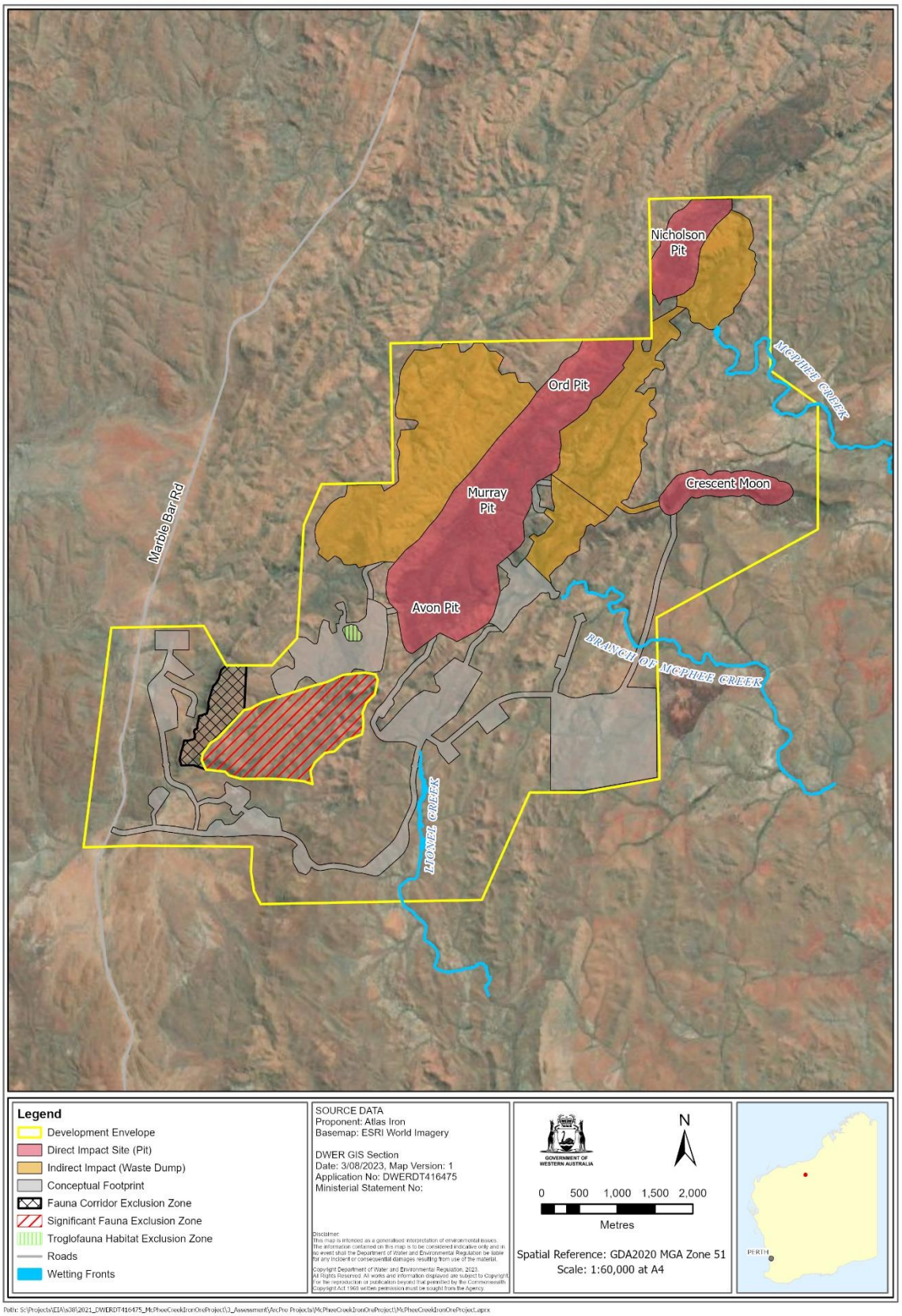

Figure 2: Development envelope and disturbance footprint

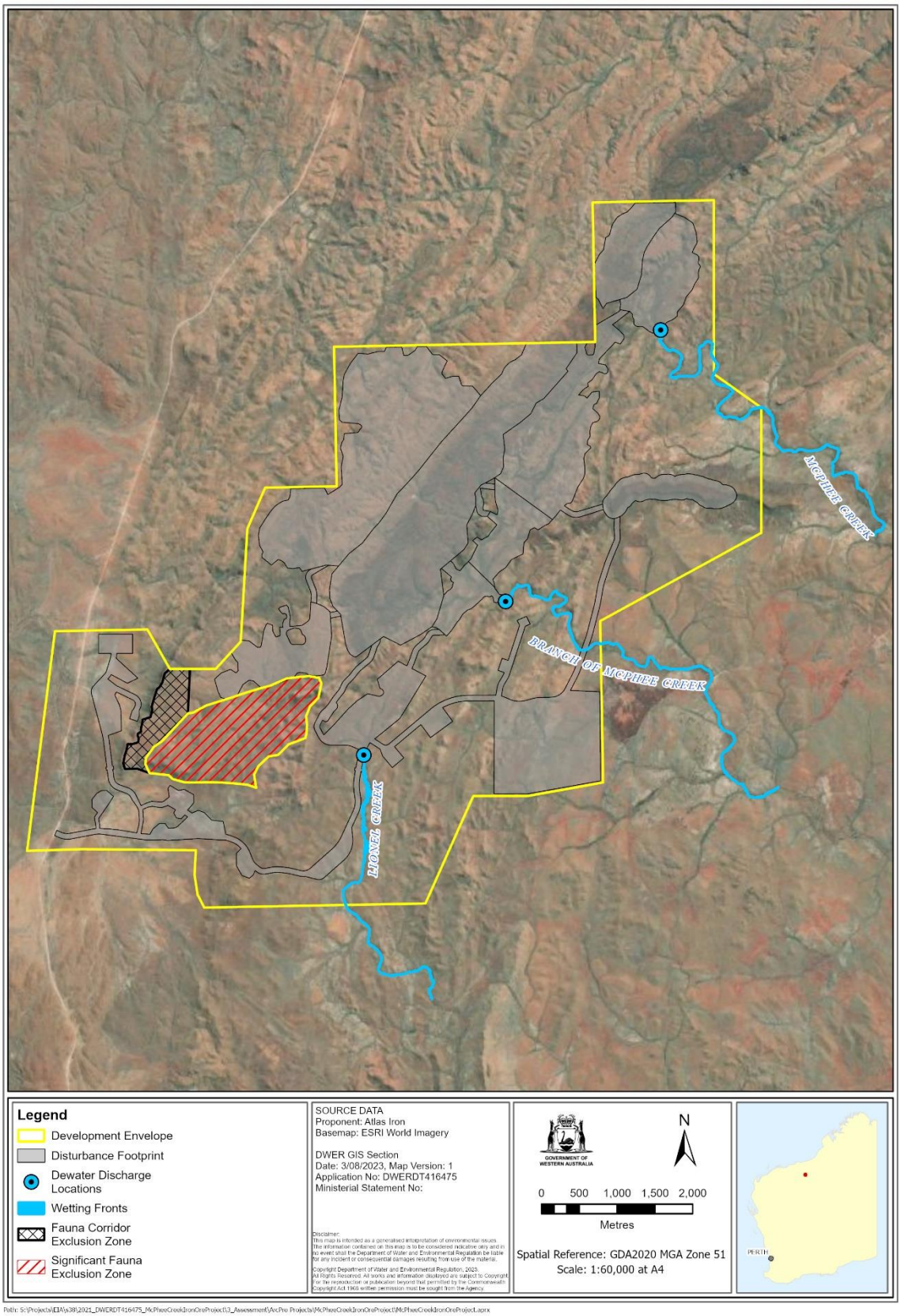

Figure 3: Dewatering discharge locations and maximum extent of the creek line dewatering discharge wetting fronts

2 Assessment of key environmental factors

This section includes the EPA's assessment of the key environmental factors. The EPA also evaluated the impacts of the proposal on other environmental factors and concluded these were not key factors for the assessment. This evaluation is included in Appendix D.

2.1 Flora and Vegetation

2.1.1 Environmental objective

The EPA environmental objective for flora and vegetation is *to protect flora and vegetation so that biological diversity and ecological integrity are maintained* (EPA 2016a).

2.1.2 Investigations and surveys

Flora and vegetation surveys commenced in the area in 2012 as part of a previous development concept. The EPA advises the following surveys were used to inform the assessment of the potential impacts to flora and vegetation:

- McPhee Creek Flora and Vegetation Survey (appendix L of the ERD) (Ecoscape 2020)
- McPhee Creek Flora and Vegetation Survey – Addendum memo response to EPA's Request for Clarifications (appendix L of the ERD) (Ecoscape 2020)

The surveys were undertaken consistent with the *Technical Guidance – Flora and vegetation surveys for environmental impact assessment* (EPA 2016b).

2.1.3 Assessment context – existing environment

The development envelope is located within the Pilbara IBRA, Chichester sub-region. This region typically supports a shrub steppe over plains characterised by *Acacia inaequilatera* over *Triodia wiseana* (formerly *Triodia pungens*) hummock grasslands, and *Eucalyptus leucophloia* tree steppes on ranges (DPAW 2002). There are two vegetation associations (Hummock grasslands 171 and 173) mapped within the development envelope of which more than 99% of the pre-European extent remains within the Chichester subregion (Atlas Iron 2022a).

Within the development envelope, sixteen (16) vegetation types have been recorded across three landform types (hillcrest/hillslopes, stoney plains and drainage lines). Vegetation types are described in Table 7-6 of the ERD (Atlas Iron 2022a). Seven of the vegetation types comprise less than 2% of the development envelope (AoTI, AsTI, ChAiTa, ChAiTw, ElAmTb, ElAmTe and EIGwTe). These vegetation types are not considered to be locally or regionally significant. No Threatened Ecological Communities (TEC) or Priority Ecological Communities (PEC) listed under the EPBC or *Biodiversity Conservation Act 2016* (BC Act) were recorded (Atlas Iron 2022a).

While no surface water dependent vegetation was identified, one vegetation type within the development envelope (EvApyCci, 131.1 ha) may represent groundwater dependent vegetation (GDV) due to the presence of *Eucalyptus victrix* (Ecoscape

2020). In addition, vegetation type EcAPyCci was identified outside of the development envelope along creeklines which is also considered potential GDV due to the presence of *Eucalyptus camaldulensis*.

The mapped vegetation condition ranged from 'Good' (8.4%) to 'Excellent' (91.4%) within the development envelope (Atlas Iron 2022a).

No Threatened flora species listed under the EPBC Act or the BC Act have been recorded within the development envelope. Four Priority flora species have been recorded; *Acacia aphanoclada* (Priority 1), *Rostellularia adscendens var. latifolia* (Priority 3), *Ptilotus mollis* (Priority 4) and *Eragrostis crateriformis* (Priority 3) (Ecoscape 2020; Atlas Iron 2022a).

Sixteen (16) introduced flora species have been recorded in the development envelope, which includes one declared pest species (*Calotropis procera*-Rubber bush) under the *Biosecurity and Agriculture Management Act 2007* (BAM Act 2007). None of the species recorded are Weeds of National Significance (WoNS) on the Western Australian Organism List (WAOL) database (Atlas Iron 2022a).

2.1.4 Consultation

Matters raised during stakeholder consultation and the proponent's responses are provided in the proponent's response to submissions document (Atlas Iron 2023a).

Public consultation on the proposal raised concerns about:

- the loss of high value fauna habitat through the clearing of native vegetation
- the loss of Priority flora and the significance of this loss at a local and regional scale.

The key issues raised during the public consultation on the proposal and how they have been considered in the assessment are described in sections 2.1.6, 2.1.7, 2.1.8 and 2.1.9.

2.1.5 Potential impacts from the proposal

Direct impact

The proposal has the potential to significantly impact on flora and vegetation from:

- clearing up to 1,913 ha of native vegetation, which includes approximately
- 1,783 ha in 'Excellent' condition
- 128.9 ha in 'Good' condition
- 24 ha of vegetation type EvApyCci, riparian vegetation (considered a potential GDV)
- clearing 31 populations (815 individuals) of *Eragrostis crateriformis* species (Priority 3)
- clearing 58 populations (842 individuals) of *Ptilotus mollis* species (Priority 4).

Indirect impact

The proposal has the potential for significant indirect impacts on flora and vegetationfrom:

- introduction and/or spread of weed species
- degradation or alteration of vegetation as a result of altered surface water flows due to construction of infrastructure
- impacts to groundwater dependent vegetation as a result of groundwater drawdown from mine dewatering
- impacts to riparian vegetation as a result of surplus water discharge to surface water systems (for example, through localised groundwater mounding)
- degradation of vegetation through dust deposition.

2.1.6 Avoidance measures

The proponent has committed to the following flora and vegetation impact avoidance measures (Atlas Iron 2022a):

- avoid clearing of the three recorded individuals of Priority 3 *Rostellularia adscendens* var. *latifolia*
- avoid clearing of the one recorded individual of Priority 1 *Acacia aphanoclada.*

The EPA recommends conditions A1 and B1 to ensure the above commitments are adhered to. The issue raised during the public consultation about impacts to Priority flora has been partially addressed through the proposed avoidance of *Rostellularia adscendens* var. *latifolia* and *Acacia aphanoclada*.

2.1.7 Minimisation measures (including regulation by other DMAs)

The proponent has proposed measures to minimise impacts to flora and vegetation by:

- minimising clearing of vegetation to that necessary for construction and operation (1,913 ha), including minimising the clearing of Priority flora species
- implementing a ground disturbance permit procedure, weed hygiene procedures, and weed management procedures
- minimising the extent of wetting fronts along creek lines caused by discharge of surplus water, and therefore minimising indirect impacts to riparian vegetation
- implementing surface water management measures to reduce impacts to watercourses downstream of the proposal
- implementing a suite of water management measures to reduce impacts to identified riparian and GDV within and outside of the development envelope
- implementing speed limits, regular application of water on unsealed roads and considering meteorological conditions when blasting to minimise dust generation and dispersion.

The issues raised during the public consultation about impacts to high value fauna habitat and Priority flora have been partially addressed through the proposed minimisation measures.

2.1.8 Rehabilitation measures

The proponent has proposed the following progressive rehabilitation measures:

- progressive rehabilitation and revegetation of disturbed areas with native vegetation species and incorporation of fauna habitat niches (for ex use of logs and rocks to simulate specialised fauna habitat)
- rehabilitation of waste rock dumps to create stable landforms capable of being revegetated
- progressive removal of temporary infrastructure to ensure that natural surface water flows are re-established to the extent possible
- ongoing management of weeds during and post mine closure.

In accordance with the *Mining Act 1978* (Mining Act), the proponent would be required to prepare a Mine Closure Plan consistent with the Statutory Guidelines for Mine Closure Plans (DMIRS 2023) which includes requirements for rehabilitation and revegetation of land and closure objectives and criteria.

The issue raised during public consultation about impacts to high value fauna habitat has been partially addressed though the proposed rehabilitation measures described above, including the progressive revegetation of disturbed areas to re-establish fauna habitat.

2.1.9 Assessment of impacts to environmental values

The EPA considered that the key environmental values for flora and vegetation likely to be impacted by the proposal are vegetation in ‘Good’ to ‘Excellent’ condition and priority flora species.

Vegetation

The EPA has assessed the likely residual impacts of the proposal on vegetation to be clearing of up to 1,912 ha of vegetation in ‘Good’ to ‘Excellent’ condition in the Pilbara bioregion (of the total vegetation clearing of 1,913 ha). The EPA recognises that cumulative loss of native vegetation through current and future mining, pastoralism, and infrastructure developments is a key threat to flora and vegetation values within the Pilbara bioregion. The proposal includes the clearing of native vegetation within the Chichester subregion (Atlas Iron 2022a).

Two vegetation associations are represented within the development envelope:

- 171 – Hummock grasslands, low tree steppe; snappy gum over soft spinifex and *Triodia brizoides*
- 173 – Hummock grasslands, shrub steppe; kanji over soft spinifex and *Triodia wiseana* on basalt.

These vegetation associations are well represented throughout the Pilbara bioregion and have more than 99% of their pre-European extent remaining across the Chichester subregion (Atlas Iron 2022a).

One vegetation type (EvApyCci) within the development envelope is considered locally significant and represents potential GDV due to the presence of the deep rooted and moderately groundwater dependent *Eucalyptus victrix* (Ecoscape 2020). An additional potential GDV type (EcApyCci) is present outside of the development envelope along the three creek lines to the south-east of the proposal. The EcApyCci vegetation type supports the moderately groundwater dependent *Eucalyptus camaldulensis*. Mapping of the GDVs can be seen in Figure 4. Potential indirect impacts to GDV as a result of altered hydrological regimes is assessed further in this section (see 'Indirect impacts to vegetation').

Of the 131.1 ha of the EvApyCci vegetation type recorded in the development envelope, the proponent has committed to a maximum clearing extent of 24 ha. As a result, approximately 81.7% of this vegetation type would remain within the development envelope post clearing.

The EPA has assessed the residual impact to vegetation in 'Good' to 'Excellent' condition, including potential GDV, to be significant. The EPA advises that the significant residual impact is likely to be able to be regulated through reasonable conditions limiting extent of clearing and counterbalanced by offsets (refer to section 4) so that the vegetation in 'Good' to 'Excellent' condition, including potential GDV, is protected and the environmental outcome is likely to be consistent with the EPA objective for flora and vegetation.

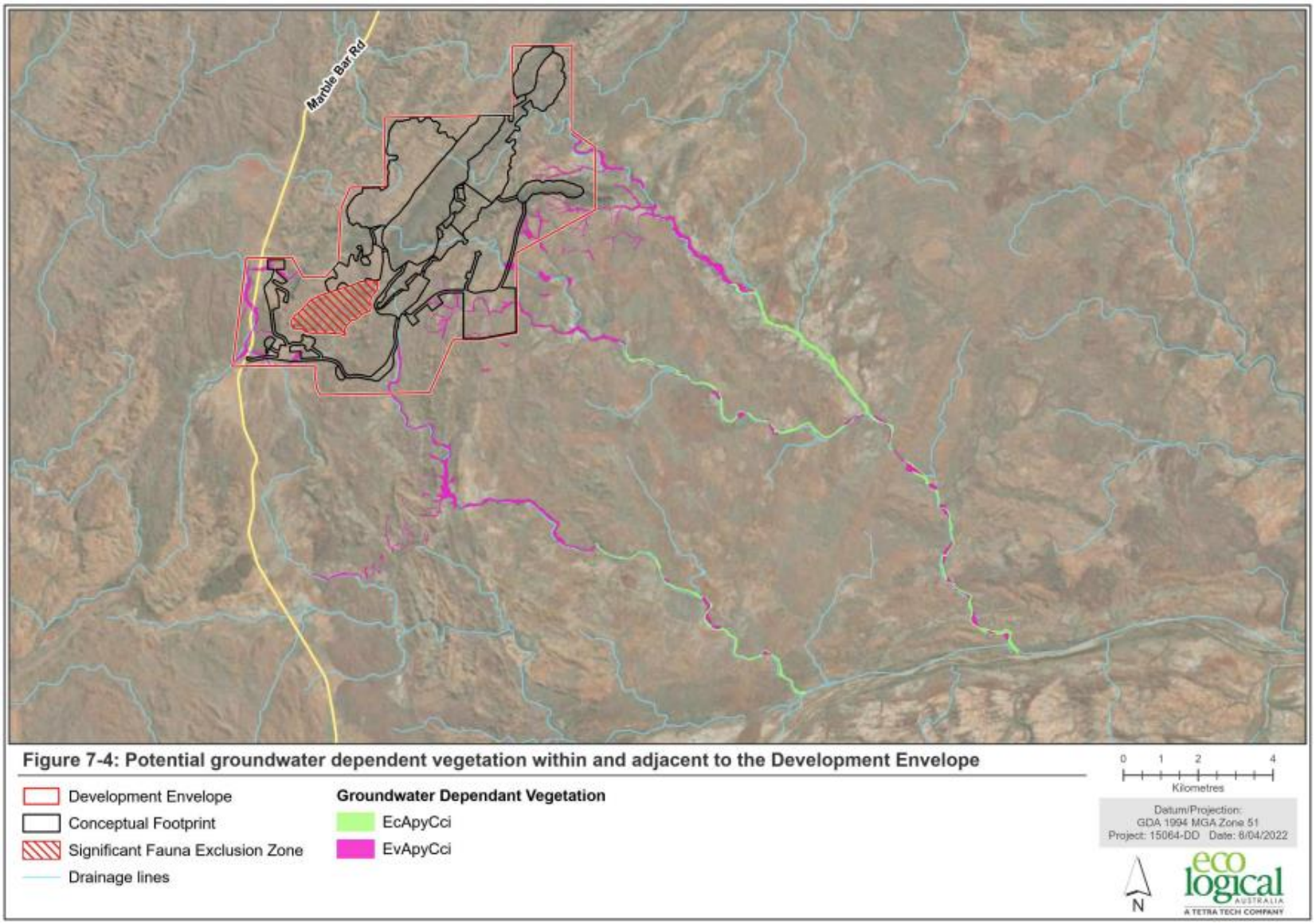

Figure 4: Mapped groundwater dependent vegetation of the McPhee Creek Iron Ore proposal

Priority Flora

Four Priority flora species have been recorded within the development envelope; *Acacia aphanoclada* (Priority 1), *Rostellularia adscendens* var. *latifolia* (Priority 3), *Ptilotus mollis* (Priority 4) and *Eragrostis crateriformis* (Priority 3).

The proponent has committed to avoid the one individual Priority 1 *Acacia aphanoclada* and the three individuals of the Priority 3 *Rostellularia adscendens* var. *latifolia* identified within the development envelope (Atlas Iron 2022a).

The extent of proposed impact to Priority flora species is (Atlas Iron 2022a):

- *Eragrostis crateriformis* (P3) – 815 out of around 1,348 individuals recorded in the development envelope are proposed to be impacted, representing approximately 60.5% of the individuals recorded in the development envelope
- *Ptilotus mollis* (P4) – 842 out of around 5,919 individuals recorded in the development envelope are proposed to be impacted, representing approximately 14.2% of the individuals recorded in the development envelope.

The proposed clearing of Priority flora species is not likely to impact on the conservation status or local or regional extent of the above species based on the following information:

- the proposed extent of impact to each species relative to the extent recorded in the broader development envelope
- these species are known from numerous location records (68 records for *E. crateriformis* and 34 records for *P. mollis*) (Atlas Iron 2022a)
- these species have an extensive range
- these species are represented within conservation tenure
- the records within the development envelope do not represent a range extension for these species.

The EPA therefore considers there is unlikely to be a significant residual impact to Priority flora species. EPA's recommended conditions (B1-1) restrict the clearing of Priority flora to ensure adherence to the proponent's avoidance commitments.

Indirect impacts to vegetation

The EPA has assessed likely residual impacts to flora and vegetation from indirect impacts to be:

- increased dust deposition during construction and operations
- introduction and spread of weeds to adjacent vegetation
- changes to existing hydrological regimes (for example, groundwater mounding due to surplus water discharge).

Increased dust deposition during construction and operations

The proponent has advised that an air quality assessment predicted that dust deposition will be largely limited to the disturbance footprint within the development envelope (Atlas Iron 2022). The proponent has committed to implementing standard dust management measures, as set out in its Significant Species Management Plan (SSMP) (Atlas Iron 2023b) and Dust Management Procedure (950-EN-PRO-0003).

Dust management measures include the use of a water cart, limiting vehicle speeds, and blasting plans that consider meteorological conditions. The EPA notes that potential dust impacts can be managed via the works approval and licence required under Part V of the EP Act. The EPA concluded that the proponent's mitigation measures, in conjunction with the regulatory provisions of the EP Act, can ensure that there are no adverse impacts to flora and vegetation from dust emissions. In addition, the EPA's recommended conditions (condition B2-7 - implementation of the SSMP, and condition B1-1 – no adverse impact to retained Priority flora) will contribute to ensuring the EPA objective for flora and vegetation is met with respect to dust deposition.

Introduction and spread of weeds

Sixteen introduced flora species were recorded within the development envelope, including one recognised pest species (Rubber Bush, *Calotropis procera*). Several introduced species identified are ranked as having 'High ecological impact and rapid invasiveness' for the Pilbara Region (DBCA 2014) and have the potential to colonise and proliferate in post disturbance environments.

Increase in abundance or diversity of introduced flora can potentially impact retained vegetation in 'Excellent' condition. To prevent spreading these weed species, the proponent has committed to implementing weed and hygiene management measures. These measures are outlined in the SSMP (Atlas Iron 2023b) and include the targeted control of one declared weed already present in the development envelope (Rubber bush) as well as management actions to minimise and mitigate impacts to vegetation such as a Ground Disturbance Permit Procedure (950-HSE-EN-PRO-0001), a Flora Management Procedure (950-EN-PRO-0005) and a Weed Hygiene Procedure (950-EN-PRO-0015).

The EPA considered the risk of weeds to impact retained vegetation in 'Excellent' condition. The EPA advises that the indirect impacts to flora and vegetation from the potential introduction and spread of weeds can be regulated through reasonable conditions (recommended conditions B1-2(1) (weed hygiene measures) and B2-7 (SSMP)) such that the environmental outcome will be consistent with the EPA objective for flora and vegetation.

Changes to existing hydrological regimes

The proposal has the potential to indirectly impact flora and vegetation from changes to existing hydrological regimes through groundwater abstraction and dewatering, changes in surface water flows, discharge of excess mine dewater and potential changes to water quality.

Creek lines in the vicinity of the proposal support potential GDV (EcApyCci and EvApyCci). *Eucalyptus victrix*, observed throughout the EvApyCci vegetation type, is a facultative phreatophyte, meaning that it opportunistically utilises groundwater but is also supported by surface water (Ecoscape 2020). *Eucalyptus victrix* is considered to be relatively drought tolerant but is not tolerant of waterlogging that may occur due to discharge of surplus mine dewater (Ecoscape 2020). The potential impact to GDV, including *Eucalyptus victrix*, due to waterlogging or groundwater mounding associated with dewater discharge is discussed further in this section.

The catchments of McPhee Creek, Branch of McPhee Creek and Sandy Creek are expected to have a reduction of approximately 10% due to mine infrastructure. Catchment flows will be partially reinstated at mine closure, with slightly reduced peak flows (see section 2.3; Atlas Iron 2021).

Groundwater drawdown resulting from mine dewatering has the potential to impact GDV. Hydrogeological studies (GHD 2022c) indicate that GDV associated with the creek lines is supported by a shallow, thin (5 m) and discontinuous alluvial aquifer with minimal connection to the underlying aquifer housed in Warrawoona basement. Dewatering is not expected to result in groundwater drawdown within the alluvial aquifer (Atlas Iron 2022a; Atlas Iron 2023c). The proponent conservatively estimates that up to 58.7 ha of GDV is within an area modelled to experience groundwater drawdown of more than two metres (m) in the underlying basement aquifer, of which 50 ha is within the development envelope (Atlas Iron 2023a). The EPA notes that of this 50 ha, 24 ha will be directly impacted and cleared because of the proposal. The EPA's recommended conditions to limit indirect impacts to GDV resulting from groundwater drawdown (conditions B1-1(1) and B3-1(5)) and implementation of monitoring and management measures (condition B3-2 (WMP)) will appropriately mitigate potential indirect impacts to GDV associated with groundwater drawdown.

Disposal of excess mine dewater up to 6 GL/a across McPhee Creek, Branch of McPhee Creek and Lionel Creek will result in wetting fronts of up to 6.9 km (McPhee Creek) and groundwater mounding within the alluvial aquifer. Groundwater mounding along the creek lines within the alluvial aquifer has the potential to impact GDV, including species susceptible to waterlogging (for example, *Eucalyptus victrix*). The proponent notes that long term inundation of soils within localised areas of the creek lines may result in loss of some *Eucalyptus victrix* individuals. However, it is also noted that water discharge will result in increased availability of water in some portions of the creek lines that may increase recruitment of *Eucalyptus victrix* and other species of the EvApyCci vegetation type (Atlas Iron 2023a).

Disposal of excess mine dewater is not expected to have a significant impact to GDV outside of the development envelope along the creek lines as the peak discharges will be temporary and the vegetation associated with the creeks is adapted to variable flow regimes (Atlas Iron 2022a; Atlas Iron 2023c).

The proponent has developed a Water Management Plan (WMP) (Atlas Iron 2023d) that includes provisions to ensure there are no impacts to GDV outside of the development envelope resulting from changes to existing hydrological regimes. The WMP includes:

- management of discharge rates between the three creeks to minimise mounding within the alluvial aquifers
- paired groundwater level monitoring and vegetation health monitoring sites along the creek lines
- water quality monitoring of discharge water
- implementation of contingency actions where GDV health is found to have declined, including altering the dewatering strategy, varying discharge and adjusting the mine dewatering plan.

The EPA notes that the proponent will require a works approval and licence under Part V of the EP Act, including for the discharge of mine dewater into the environment (Category 6). Potential impacts to GDV associated with changes to water quality resulting from surface water discharge are expected to be addressed through Part V licence conditions.

The EPA's recommended conditions and the required licence under Part V of the EP Act, will appropriately manage impacts from surface water discharge to ephemeral creeks to meet the EPA objective and ensure that:

- dewatering discharge to creek lines (McPhee Creek, Branch of McPhee Creek and Lionel Creek) does not exceed the extent of the modelled wetting front (Figure 3) (limitations and extents in recommended condition A1-1)
- there are no impacts to the surface water quality of each creek line (recommended condition B3-1(4))
- there are no impacts to riparian vegetation along the discharge creek lines (McPhee Creek, Branch of McPhee Creek and Lionel Creek) (recommended condition B3-1(5)).

Cumulative impact assessment

The proponent has assessed the cumulative effects of the proposal by considering this proposal in addition to related projects within 200 km of the development envelope, including:

- existing FMG Christmas Creek Project
- existing Atlas Sanjiv Ridge Project (formerly Corunna Downs)
- proposed Brockman Mining Marillana Iron Ore Project
- existing FMG North Star Hematite Project (Iron Bridge)
- existing Hamersely Iron Yandicoogina Iron Ore Project
- existing BCI Iron Valley Project
- proposed Venturex Resources Sulphur Springs Copper-Zinc Project
- existing BHP Eastern Ridge Project
- existing Atlas Pardoo Iron Ore Project
- existing Atlas Miralga Creek Project

- existing Roy Hill Iron Ore Project.

The EPA concluded that the cumulative impacts to vegetation in a 'Good' to 'Excellent' condition and priority flora are not at a level that would warrant a decision to allow no further clearing of these values for this proposal. However, due to the mining and infrastructure development impact pressures in the region and local area, the EPA must consider and appropriately manage the incremental loss of these values. The detailed assessment of cumulative impacts to these values is presented below.

On a bioregional scale, the proposal, when combined with other approved or referred projects within 200 km, is likely to contribute to the loss of approximately 160,913 ha of vegetation from the Pilbara Bioregion, the majority of which is in 'Good' to 'Excellent' condition. The Pilbara Bioregion contains an estimated 17,731,765 ha of native vegetation (Government of Western Australia 2019). The cumulative impact represents the loss of around 0.9% of vegetation from the Pilbara. Cumulatively, the native vegetation to be impacted is limited to a relatively small extent in comparison to the native vegetation remaining in the Pilbara Bioregion.

There are two priority flora species that are cumulatively impacted by the proposals:

- *Eragrostis crateriformis* (P3) of which 17.7% of known populations will be cleared
- *Ptilotus mollis* (P4) of which 25.6% of known populations will be cleared.

Cumulatively, the native vegetation being impacted is likely to be limited to a small extent in comparison to the native vegetation remaining in the bioregions. The EPA considers the environmental outcomes are likely to be consistent with the EPA objective for flora and vegetation. Should this proposal be approved with EPA's recommendation for offsets (section 4), combined with offset contributions from other projects in the bioregion, it will deliver offset projects through the Pilbara Environmental Offsets Fund and provide environmental benefits within the Pilbara region.

2.1.10 Summary of key factor assessment and recommended regulation

The EPA has considered the likely residual impacts of the proposal on flora and vegetation environmental values. In doing so, the EPA has considered whether reasonable conditions could be imposed, or other decision-making processes can ensure consistency with the EPA factor objective. The EPA assessment findings are presented in

Table 2.

The EPA has also considered the principles of the *Environmental Protection Act 1986* (see Appendix C) in assessing whether the residual impacts will be consistent with its environmental factor objective and whether reasonable conditions can be imposed (see Appendix A).

Table 2: Summary of assessment for flora and vegetation

Residual impact or risk to environmental value		Assessment finding or environmental outcome	Recommended conditions and DMA regulation
1.	Clearing of up to 1,912 ha of native vegetation in 'Good' to 'Excellent' condition, including 24 ha of riparian vegetation considered a potential GDV.	The clearing of 'Good' to 'Excellent' condition vegetation within the Pilbara bioregion is significant in the context of biological diversity and ecological integrity, as it provides habitat for conservation significant flora and fauna species. The EPA advises that subject to limitations on clearing, and recommended conditions requiring progressive rehabilitation and offsets, the significant residual impact can be counterbalanced, so that the environmental outcome is likely to be consistent with the EPA objective for flora and vegetation.	**Condition A1** (Limitations and extent of proposal) **Condition B1** (Flora and Vegetation) Limit disturbance to GVD and ensure implementation of weed hygiene measures and dust management. **Condition B7** (Offsets) Contribution to the Pilbara Environmental Offsets Fund for the clearing of 'Good' to 'Excellent' condition vegetation and riparian vegetation within the Pilbara bioregion. **DMA regulation** The Department of Mines, Industry and Regulation Safety (DMIRS) can regulate rehabilitation, including progressive rehabilitation, through the requirements of mining proposal under the Mining Act.
2.	Indirect impacts associated with dust deposition, the introduction and spread of weeds and altered hydrological regimes.	The EPA advises there is unlikely to be significant residual impacts from dust deposition, or the introduction and spread of weeds, and the environmental outcome is likely to be consistent with the EPA objective for flora and vegetation. Altered hydrological regimes resulting from mine dewatering and discharge of surplus mine dewater to creek lines has the potential to impact GDV through groundwater drawdown and groundwater mounding within	**Condition B2** (SSMP) Implementation and revision of the SSMP including management measures relating to dust and weeds. **Condition B3** (WMP) Implementation and revision of the WMP including management measures relating to groundwater drawdown, mine water discharge and monitoring.

Residual impact or risk to environmental value		Assessment finding or environmental outcome	Recommended conditions and DMA regulation
		the extent of the modelled wetting front. Residual impacts to GDV are likely to be regulated through reasonable conditions, so the environmental outcome is likely to be consistent with the EPA objective for flora and vegetation.	**DMA regulation** Dust emissions can be regulated through the works approval and licence under Part V of the EP Act. Aspects of dust management and weed management can also be regulated through the requirements of the mining proposal under the Mining Act.

2.2 Terrestrial Fauna

2.2.1 Environmental objective

The EPA environmental objective for flora and vegetation is *to protect terrestrial fauna so that biological diversity and ecological integrity are maintained* (EPA 2016c).

2.2.2 Investigations and surveys

The EPA advises the following investigations, surveys and peer reviews were used to inform the assessment of the potential impacts to terrestrial fauna:

- McPhee Creek Project Terrestrial Vertebrate Fauna Baseline Survey (Outback Ecology 2012a)
- East West Rail Spur Project Terrestrial Vertebrate Fauna Baseline Survey (Outback Ecology 2013a)
- McPhee Creek Haul Road Project Terrestrial Vertebrate Fauna Survey (Outback Ecology 2014a)
- McPhee Creek Mine and Rail Project Terrestrial Vertebrate Fauna Survey (MWH 2014a)
- McPhee Creek Consolidated Terrestrial Fauna Report (appendix N of the ERD) (Biologic 2021a)
- McPhee Creek Iron Ore Project Northern Quoll Baseline Monitoring (Outback Ecology 2012b)
- McPhee Creek 2014 Northern Quoll Monitoring Survey (MWH 2014b)
- McPhee Creek Project Targeted Pilbara Leaf-nosed Bat Survey (Outback Ecology 2013b)
- McPhee Creek Mine and Rail Project: Pilbara Leaf nosed Bat and Ghost Bat monitoring 2014 (MWH 2014c)
- McPhee Creek Pilbara Leaf-nosed Bat Review (Bat Call WA 2020)
- McPhee Creek Pilbara Leaf-nosed Bat Survey Results (Bat Call WA 2021a)
- McPhee Creek Targeted Pilbara Leaf-nosed Bat Survey (appendix O of the ERD) (Biologic 2022a)
- McPhee Creek – Bat Caves Geotechnical Assessment (appendix P of the ERD) (PSM Consult 2022)
- McPhee Creek Iron Ore Project Targeted Bilby Survey (Outback Ecology 2014b)
- McPhee Creek 2014 Bilby Monitoring Survey (MWH 2014d)
- Terrestrial SRE Invertebrate Fauna Baseline Survey January 2013 (Outback Ecology 2013c)
- McPhee Creek Project Short-Range Endemic Invertebrate Fauna Desktop Assessment (Biologic 2019a)

- McPhee Creek Short-Range Endemic Invertebrate Fauna Survey (appendix Q of ERD) (Biologic 2019b)
- McPhee Creek Shortrange Endemic Invertebrate Fauna Survey Memo (appendix Q of ERD) (Biologic 2020a)
- Review of McPhee Creek Pilbara Ghost Bat Surveys and Assessment (appendix E of RtS) (Bat Call WA Pty Ltd 2022)
- Clarification of Matters Raised by DCCEEW re Ghost Bat Presence at McPhee Creek (appendix J of RtS) (Bat Call WA 2023).

The surveys have been undertaken consistent with the Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment (EPA 2020); and Technical Guidance – Sampling of short-range endemic invertebrate fauna (EPA 2016d).

2.2.3 Assessment context – existing environment

Fauna habitat

The proponent mapped eight broad terrestrial fauna habitat types across the development envelope.

The most common fauna habitat types recorded within the development envelope were rocky foothills (2,198.4 ha), spinifex stony plain (1,059.4 ha) and hillcrest/hillslope (707.9 ha), which together, account for approximately 89% of the total fauna habitat recorded in the development envelope (Atlas Iron 2022a). High value fauna habitat types for species identified within the area are represented by gorge/gully, breakaway/cliff, hillcrest/hillslope, drainage line and spinifex sandplain.

Habitat assessments identified six potential short-range endemic (SRE) habitat types within the development envelope including gorge/gully, breakaway/cliff, hillcrest/upper hillslope, medium drainage line, undulating low hills and sandy/stony plain. Of these, gorge/gully and breakaway/cliff represent high and moderate suitability for SREs respectively. Hillcrest/hillslope and medium drainage line habitats provide low to moderate value for SRE invertebrate fauna. The remaining habitat types have low suitability as they do not provide shade or shelter and do not have complex microhabitats (Biologic 2020a).

Significant habitat features

In addition to the above-mentioned fauna habitat types, significant habitat features such as caves and pools have been identified within the development envelope.

Twenty caves, including overhangs, have been recorded within the development envelope, with a further six caves outside of the development envelope. Nineteen of the caves are located within the high value habitat types of gorge/gully and breakaway/cliff. Caves provide shelter and stable microclimates that support conservation significant bat species (Pilbara leaf-nosed bat and ghost bat). Figure 5 shows the bat caves identified in and near the development envelope.

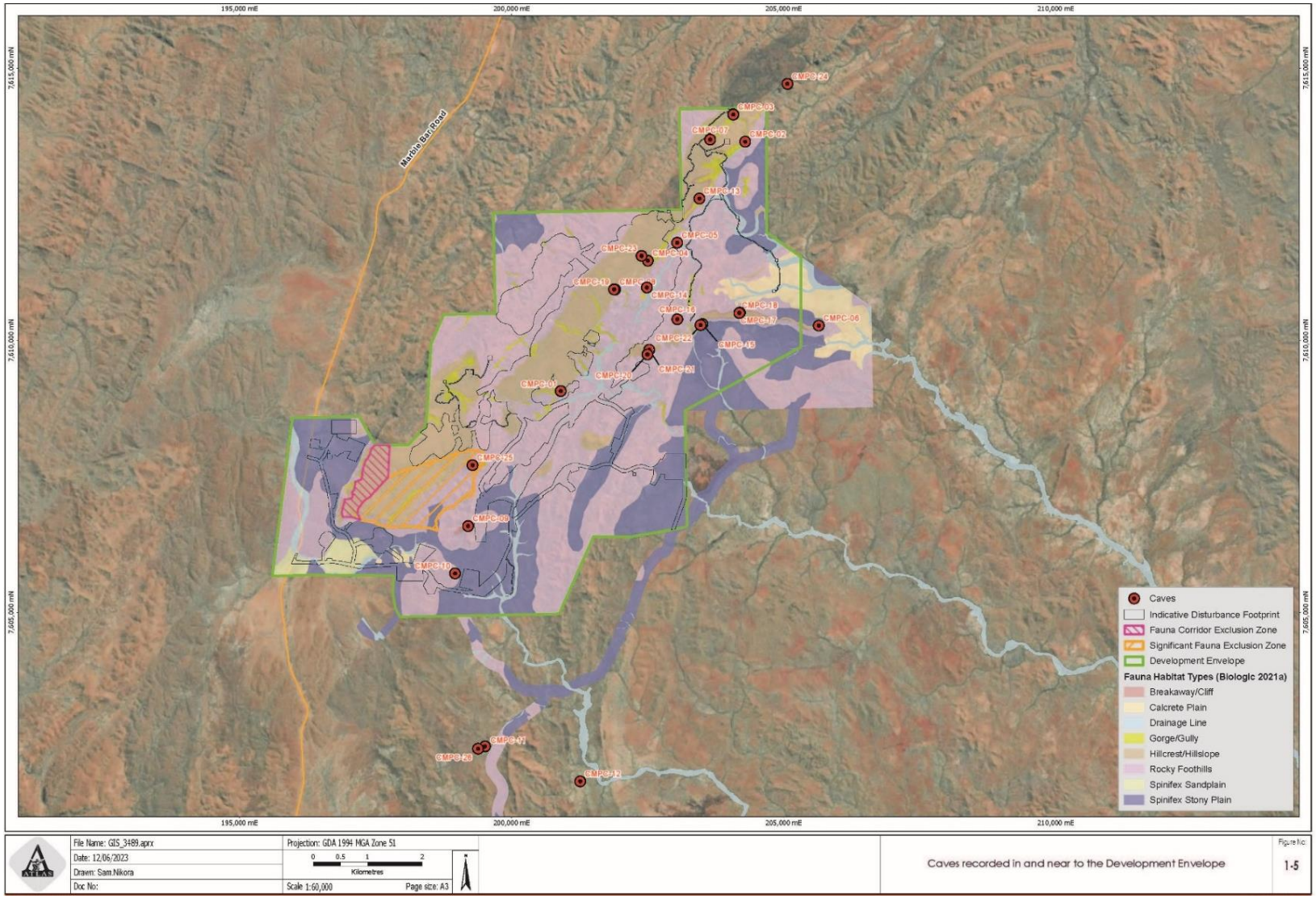

Figure 5: Bat caves identified within and near the development envelope (Atlas 2023b)

Fifteen surface water pools have been recorded within the development envelope, including several permanent and semi-permanent pools that are likely to represent high ecological productivity (Atlas Iron 2022a). A further 23 surface water pools have been recorded outside of the development envelope, particularly along the creek lines of McPhee Cree, Branch of McPhee Creek and Lionel Creek.

Significant fauna

Species of conservation significance that were recorded (or had a high likelihood of occurring) in the development envelope include:

- northern quoll (*Dasyurus hallucatus*) listed endangered under the EPBC Act and BC Act (confirmed)
- Pilbara leaf-nosed bat (*Rhinonicteris aurantia*) listed vulnerable under the EPBC Act and BC Act (confirmed)
- ghost bat (*Macroderma gigas*) listed vulnerable under the EPBC Act and BC Act (confirmed)
- greater bilby (*Macrotis lagotis*) listed vulnerable under the EPBC Act and BC Act (confirmed)
- long-tailed dunnart (*Sminthopsis longicaudata*) listed Priority 4 (DBCA) (confirmed)
- western pebble-mound mouse (*Pseudomys chapmani*) listed Priority 4 (DBCA) (confirmed)
- fork-tailed swift (*Apus pacificus*) listed migratory under the EPBC Act and BC Act (confirmed)
- grey falcon (*Falco hypoleucos*) vulnerable under the EPBC Act and BC Act (likely to occur)
- Pilbara olive python (*Liasis olivaceus barroni*) listed vulnerable under the EPBC Act and BC Act (confirmed)
- Gane's blind snake (*Anilios ganei*) listed Priority 1 (DBCA) (highly likely to occur).

SRE surveys identified more than 439 invertebrate specimens, of which three species represent confirmed SREs and thirteen represent potential SREs. Confirmed SRE species include a millepede (*Antichiropus cunicularis* n. sp. 'DIP026') and two woodlouse (*Buddelundia* sp. 11 and *Buddelundia* sp. 18). Potential SREs identified within the development envelope are presented in Table 8-9 of the proponent's ERD (Atlas Iron 2022a).

Regional threats to terrestrial fauna include predation by feral species, particularly feral cats which are known to predate several of the conservation significant species identified within the development envelope. Feral cats were recorded in the development envelope during a 2021 survey (Biologic 2021a).

2.2.4 Consultation

Matters raised during stakeholder consultation and the proponent's responses are provided in the proponent's response to submissions document (Atlas Iron 2023e).

Public consultation on the proposal raised concerns about:

- the loss of high value fauna habitat
- management of feral cats
- impacts, including cumulative impacts, to conservation significant species such as northern quoll, Pilbara olive python, greater bilby, ghost bat and Pilbara leaf-nosed bat
- the value and function of the proposed Significant Fauna Exclusion Zone.

The key issues raised during the public consultation on the proposal and how they have been considered in the assessment are described in sections 2.2.7, 2.2.8 and 2.2.9.

2.2.5 Potential impacts from the proposal

The proposal has the potential to significantly impact on terrestrial fauna from:

- clearing of 1,913 ha of terrestrial fauna habitat, including thirteen caves and twelve surface water pools
- habitat fragmentation and barriers to fauna movement
- vehicle strike (machinery movements) or other interactions during construction or operational activities
- habitat degradation due to construction and/or increased human activities, altered hydrological regimes, formation of pit lakes, introduced weed and feral species and dust
- blasting, vibration, light and/or noise from construction or operational activities affecting fauna habitat and possible displacement of fauna (Atlas Iron 2022a).

The EPA considers that changes in groundwater and hydrological regimes may affect foraging and dispersal of terrestrial fauna habitat. Impacts to inland waters are considered in section 2.3.

2.2.6 Avoidance measures

The proponent has designed the proposal to avoid impacts to terrestrial fauna through the avoidance of (Atlas Iron 2022a):

- direct impacts to eight ghost bat roosting caves
- direct impacts to two permanent surface water pools (WMPC-03 and WMPC-22) and one temporary/seasonal pool (WMPC-29).

The proposal as referred was designed to avoid a 195.8 ha area of high value fauna habitat in the south-western portion of the proposal area. The Significant Fauna Exclusion Zone (SFEZ) is surrounded by, but excluded from, the development envelope (Figure 2). The SFEZ was reportedly excluded from mine planning early in the project conceptualisation phase in recognition of the high habitat value of the gorge system including five surface water pools, one bat cave and several records of conservation significant terrestrial fauna species. The SFEZ includes 104.3 ha of

high value hillcrest/hillslopes habitat, 10.7 ha of high value gorge/gully habitat, 0.2 ha of high value breakaway/cliff habitat, and 72.5 ha of moderate value rocky foothills habitat. Following feedback from the EPA, the proponent has committed to establishing a 'Fauna Corridor Exclusion Zone' to facilitate the dispersion of fauna from the SFEZ to the north. The exclusion zone includes hillcrest/hillslope, gorge/gully and rocky foothills habitat that may be utilised by terrestrial fauna to enter and exit the SFEZ without traversing mine-related infrastructure or cleared areas (Atlas Iron 2023a).

The SFEZ and the Fauna Corridor Exclusion Zone achieve the avoidance of 247.7 ha of potential fauna habitat, equivalent to 13% of the indicative disturbance footprint.

2.2.7 Minimisation measures (including regulation by other DMAs)

The proponent has proposed measures to minimise impacts to terrestrial fauna:

- set limits of disturbance for important fauna habitat types so that disturbance of high value fauna habitat does not exceed 682.3 ha (breakaway/cliff, drainage line, gorge/gully, hillcrest/hillslopes and spinifex sandplain)
- implement vehicle speed limits to minimise interactions with vertebrate fauna
- implementing management measures to minimise the potential for fauna entrapment with mine infrastructure:
    - fencing around operational water sources and/or installation of fauna egress mats
    - solid waste contained or fenced
- planning vegetation clearing to encourage mobile fauna to naturally relocate to adjacent areas
- avoid use of barbed wire fencing or install reflectors to minimise impacts to bats
- restricting access to critical diurnal ghost bat roosting caves during breeding season
- record interactions/sightings of significant fauna species to identify and manage fauna hotspots
- implementing a suite of management measures to minimise indirect impacts to terrestrial fauna associated with altered hydrological regimes
- minimising the use of direct lighting to limit indirect disturbance of fauna
- implementing management measures to minimise the impact of blasting on bat caves
- implementing management measures to minimise indirect impacts to fauna associated with dust generation, introduction and spread of weeds, and increased feral fauna species.

The issues raised during the public consultation regarding impacts to terrestrial fauna from increased predation by feral species have been partially addressed through the proposed minimisation measures.

2.2.8 Rehabilitation measures

The proponent has proposed the following progressive rehabilitation measures:

- progressive rehabilitation and revegetation of disturbed areas with native vegetation species and incorporation of fauna habitat niches (for example, use of logs and rocks to simulate specialised fauna habitat)
- rehabilitation of waste rock dumps to create stable landforms capable of being revegetated
- progressive removal of temporary infrastructure to ensure that natural surface water flows are re-established to the extent possible
- ongoing management of weeds during and post mine closure.

In accordance with the Mining Act, the proponent would be required to prepare a Mine Closure Plan consistent with the Statutory Guidelines for Mine Closure Plans (DMIRS 2023) which includes requirements for rehabilitation and revegetation of land and closure objectives and criteria.

The issue raised during public consultation about impacts to high value fauna habitat has been partially addressed though the proposed rehabilitation measures described above, including the progressive revegetation of disturbed areas to re-establish fauna habitat.

2.2.9 Assessment of impacts to environmental values

The EPA considered that the key environmental values for terrestrial fauna likely to be impacted by the proposal are conservation significant fauna including northern quoll, ghost bat, Pilbara leaf-nosed bat, Pilbara olive python and greater bilby. The potential impact to terrestrial fauna is likely to be a significant residual impact for the proposal and is assessed further in this section.

Fauna habitat

The fauna habitats found in the development envelope are presented in Table 3 and shown in Figure 6. All habitats within the indicative footprint are also mapped within the development envelope. Based on the indicative footprint, implementation of the proposal will result in the loss of 682.3 ha of high value habitat comprising breakaway/cliff, drainage line, gorge/gully, hillcrest/hillslopes and spinifex sandplain. Fauna habitat mapping has also been completed across more than 1000 ha outside of the development envelope that identified a further 427.2 ha of high value habitat outside of the development envelope. In addition, 115.2 ha of high value habitat has been recorded within the SFEZ that will not be impacted by the proposal. The identification of more than 540 ha of high value fauna habitat outside the development envelope, despite a relatively low survey effort, is indicative of the widespread occurrence of fauna habitat outside of the proposal area.

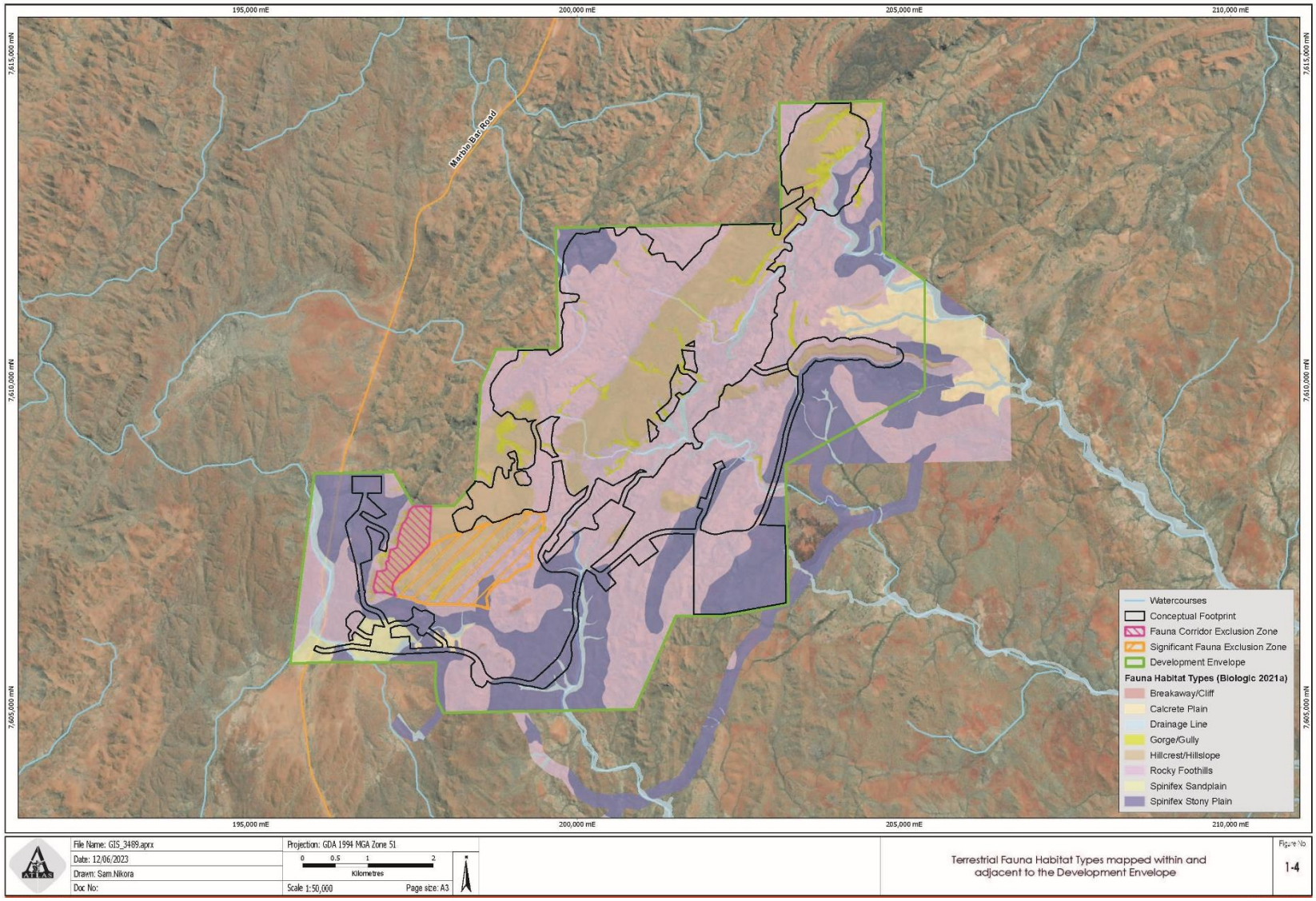

Figure 6: Fauna habitat types within and near the development envelope (Atlas 2023b)

Potential impacts to fauna habitat with high to moderate value within the development envelope are provided in Table 3.

Table 3: Fauna habitats impacted by the proposal (Atlas Iron 2022a; Atlas Iron 2023e)

Habitat	Fauna habitat value	Extent in indicative footprint (ha)	Extent in development envelope (ha)	Percentage loss in development envelope
Gorge/Gully	High	93.6	141.5	66.1%
Breakaway/Cliff	High	17.0	26.3	64.7%
Drainage line	High	55.0	182.2	30.2%
Hillcrest/Hillslope	High	504.6	707.9	71.3%
Spinifex sandplain	High	12.1	67.0	18.0%
Rocky foothills	Moderate	900.0	2,198.4	40.9%
Spinifex stony plain	Low	321.6	1,059.4	30.3%
Calcrete plain	Low	9.1	82.3	11.0%

In the absence of regional-scale fauna habitat mapping outside the development envelope, the proponent has used land system mapping within the region to evaluate the local and regional significance of the fauna habitat loss resulting from the proposal. The fauna habitat types within the development envelope are associated with four land systems: Capricorn, Robe, Rocklea and Taylor. High value fauna habitat types within the development envelope are primarily associated with the Capricorn land system (hillcrest/hillslope, gorge/gully, rocky foothills and breakaway/cliff habitat). The Capricorn land system is well represented locally and regionally, with 25,158 ha mapped within 20 km of the development envelope, and 482,779 ha mapped within the broader Chichester subregion (Atlas Iron 2022a). Based on the analysis of the correlation between land systems and fauna habitat values, the EPA concluded that high value fauna habitat types impacted through the proposal are likely to be well represented outside of the development envelope.

The proposal will result in the direct loss of 670.2 ha of potential SRE invertebrate fauna habitat. SRE habitat to be lost includes 93.6 ha of high value gorge/gully SRE habitat in which several confirmed and potential SRE species were recorded. The EPA notes that the identified species were also recorded in other habitats and do not appear to be restricted to the gorge/gully habitat types. As noted above, SRE habitat types (including gorge/gully) are predominantly associated with the Capricorn land system which is well represented locally and regionally. The main ridgeline running southwest to northeast within the development envelope contains several features characteristic of moderate to high SRE habitat. This ridgeline extends well beyond the development envelope (at least 10 km) to the northeast with a high degree of habitat connectivity (Biologic 2022c). The EPA therefore concluded that SRE habitat impacted through the proposal is well represented beyond the development envelope.

Several significant fauna habitat features such as caves and pools are located within the disturbance footprint and will be directly impacted by the proposal. Twenty caves have

been recorded in the development envelope, with a further six caves outside of the development envelope, including one within the proposed SFEZ. Caves provide high value, and in some instances 'critical' habitat for conservation significant bat species. Impacts to caves are discussed separately as they relate to habitat loss for the ghost bat and Pilbara leaf-nosed bat. The proposal will result in the direct loss of 12 of the 15 surface water pools identified within the development envelope, including two permanent, two semi-permanent and seven temporary/seasonal pools (Biologic 2022b) (see section 2.3).

The EPA considers that the high value habitat types and key habitat features (such as caves and pools) in the retained SFEZ and the Fauna Corridor Exclusion Zone ensure that these avoided areas will be utilised by terrestrial fauna and contribute to the mitigation of significant impacts to conservation significant species. Recommended condition B2-1(3) requires the proposal to be implemented without adversely impacting fauna habitat values of the SFEZ and the fauna corridor exclusion zone.

The EPA considers that the significant residual impact from habitat loss can be regulated through recommended condition A1 (setting limits to the extent of clearing for fauna habitat), recommended condition B2 (terrestrial fauna, including revision and implementation of the SSMP) and counterbalanced by offsets (recommended condition B7) (see section 4) to ensure the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.

Conservation significant fauna

Northern quoll

The northern quoll has been recorded in high densities in the area, with surveys yielding 66 records within the development envelope (Biologic 2021a). One record included a female carrying pouch young, indicating that the local habitat supports breeding and denning. The survey results indicate that the local population is consistent with the definition of an important population for the survival of the species for the purposes of the EPBC Act (Department of the Environment 2016). Previous surveys also identified 22 records from outside of the development envelope, including along the creek lines extending to the south-east (Biologic 2021a).

Within the development envelope high-quality breeding/shelter and foraging habitat for the species is found inside the gorge/gully and breakaway/cliff habitats and foraging/dispersal habitat is found in the hillcrest/hillslope and drainage line habitats. A total of 875.7 ha of critical habitat has been identified within the development envelope, represented by:

- gorge/gully – 141.5 ha
- breakaway/cliff – 26.3 ha
- hillcrest/hillslope – 707.9 ha.

Microhabitat features, such as rocky terrain, caves, crevices and overhangs, are present within the above habitat types and are likely to provide important denning sites for northern quoll.

The proponent has designed the proposal to minimise the direct impacts to high value habitat, including retaining 115.1 ha of high value habitat within the SFEZ. However, the proposal will result in the direct loss of 615.2 ha of high value habitat that is reasonably expected to reduce the long-term carrying capacity of the area, and subsequently cause a long-term decrease in the size of the local population (Atlas Iron 2022a).

Pilbara leaf-nosed bat

Pilbara leaf-nosed bats have been recorded on multiple occasions within the development envelope through echolocation call recordings (Atlas Iron 2022a). A study in 2012 (Biologic 2022a) indicated that a diurnal roost may be present within the development envelope. A subsequent targeted survey in 2021 (Biologic 2022a) found that the roost was unlikely to be a diurnal roost. There are no confirmed or potential diurnal or breeding roosts within the development envelope.

All habitat types mapped within the development envelope represent potential foraging habitat for the small insectivorous bat. High value habitat within the development envelope is represented by the gorge/gully, breakaway/cliff and drainage line habitat. The vast majority of caves within the development envelope are located within the gorge/gully and breakaway/cliff habitats.

There are 20 caves within the development envelope that are considered a confirmed or potential nocturnal refuge for the species. The availability of permanent surface water sources is known to be important to the persistence of the species, with the majority of permanent roosts being located within 5 to 7 km of a permanent water source (Bat Call WA Pty Ltd 2021a). Five permanent pools are located within the development envelope, and an additional six are located outside of the development envelope, including one within the SFEZ.

The proposal will result in the loss of 165.6 ha of high value potential roosting and foraging habitat within the gorge/gully, breakaway/cliff and drainage line habitat, representing 47.5% of the high value habitat mapped within the development envelope. The proposal will result in the loss of 11 roost sites, including seven confirmed nocturnal refuges. The loss of 11 surface water pools within the development envelope may also pose an indirect impact (see section 2.3).

The EPA has assessed that the proposal will result in a reduction in available roosting and foraging habitat for the species, including loss of potentially important surface water pools, and nocturnal refuges. However, the retention of 184.4 ha of high value habitat within the development envelope, including five surface water pools and nine potential or confirmed nocturnal refuges, and the absence of diurnal/breeding roosts within the development envelope means that the proposal is unlikely to result in a significant impact to the species.

Ghost bat

Ghost bats have been recorded on multiple occasions within or proximal to the development envelope through direct observation, scats and echolocation call recordings (Atlas Iron 2022a). The age of scats from caves was variable and indicative of long-term occupation of caves within the development envelope.

Ghost bats have been confirmed as roosting, or potentially roosting in 18 of the 20 caves located within the development envelope, and in one cave within the SFEZ (CMPC-25). A further five caves have been identified outside of the development envelope. No potential maternity roosts were identified within the development envelope. Ghost bat roosting caves are primarily located within gorge/gully or breakaway/cliff type habitats.

The proposal will result in the loss of 110.6 ha of high value potential roosting and foraging habitat within the gorge/gully and breakaway/cliff habitat, representing 66% of the high value habitat mapped within the development envelope. A further 1,459.6 ha of other suitable foraging and dispersal habitat, including drainage line, hillcrest/hillslope and rocky foothills will also be lost.

The EPA notes that implementation of the proposal will result in the loss of 13 out of 18 caves within the development envelope that represent confirmed or potential ghost bat roosts. Of these 13 caves, nine are potential or confirmed night roosts only (category 3) and not considered critical habitat (Bat Call WA Pty Ltd 2021). An expert review (Bat Call WA 2022) of the ghost bat survey information found that there are five caves within or proximal to the development envelope that are consistent with isolated category 2 roosts and therefore represent critical ghost bat roost sites. Table 4 provides a summary of critical ghost bat roosts.

Table 4: Critical ghost bat roosts (Atlas Iron 2022a; Bat Call WA 2022; Atlas Iron 2023e)

Cave	Category	Habitat value	Location	Impact
CMPC-08	2	Day roost	Within development envelope	Retained
CMPC-10	2	Day roost	Within development envelope	Retained
CMPC-12 (historic mine shaft)	2	Potential maternity/day roost	Outside development envelope – 3,820 m from disturbance footprint	Retained
CMPC-25	2	Day roost	Outside development envelope – 290 m from disturbance footprint (within SFEZ)	Retained
CMPC-26	2	Potential maternity/day roost	Outside development envelope – 2,780 m from disturbance footprint	Retained

The EPA considers that there remains some uncertainty regarding the categorisation of cave CMPC-03 (category 3) and whether the cave represents critical ghost bat habitat. Isolated Category 3 roost caves are not considered critical habitat, unless adjacent to Category 2 caves and part of an ‘apartment block’ (Bat Call WA Pty Ltd 2021b). Inspection of cave CMPC-03 in 2020 did not encounter any bats, however, approximately 400 ghost bat scats were observed, estimated to be between 6 months and 3 years old

(Biologic 2021a). The presence of a large number of scats compared to similar caves in the area suggests that cave CMPC-03 may be of higher significance to the local ghost bat population than determined by the 2022 expert review (Bat Call WA Pty Ltd 2022).

The EPA has assessed that the loss of cave CMPC-03 may result in a significant residual impact to the local ghost bat population. The EPA therefore has recommended that conditions B2-1(2) and B2-1(5) be applied to require the avoidance of cave CMPC-03, and the application of appropriate mitigation and management in relation to indirect impacts to the structural stability and viability of the cave.

The EPA has assessed that bats roosting in category 2 caves that are being retained may be indirectly impacted by dust, light and noise and vibration from blasting, which can lead to abandonment. Ghost bats are expected to be able to successfully relocate temporarily during mining-related disturbance and recolonise once the disturbance has ceased (Bat Call WA 2023). The proponent's SSMP (required by recommended condition B2-7) includes measures for the protection of ghost bats utilising the three critical roosts that may be indirectly impacted by operations (CMPC-08, -10 and -25), including the consideration of closure of these caves during the breeding season (October to December) to avoid disturbance of pregnant or gravid female bats.

The EPA notes that closure of caves will be subject to authorisations under section 40 of the BC Act. Ghost bats excluded from closed caves, and those displaced from destroyed non-critical habitat roosts within the disturbance footprint, are expected to be able to relocate to other non-impacted diurnal roosts (CMPC-12 and CPMC-26) located within 5 km of the development envelope (Atlas Iron 2023e; Bat Call WA 2023). In addition, displaced ghost bats are also expected to be able to utilise the nearby Warrawoona and Nullagine ghost bat hubs located within 40 km of the proposal.

The EPA has also considered the impact of blasting and vibrations on the structural integrity of retained critical roosts. A cave geotechnical assessment was undertaken in 2022 (PSM 2022) for retained caves, with a further assessment in 2023 for cave CMPC-8, that was not planned to be retained at the time of the 2022 assessment. The results of these assessments were used to establish blast criteria with thresholds for vibration levels with the objective to avoid structural damage that would alter the microclimate within the caves and potentially result in permanent abandonment. The proposed blast criteria were reviewed (Bat Call WA 2023) and incorporated into the SSMP as outcome-based management provisions. The SSMP also includes provisions for ground disturbance buffers around retained caves and monitoring of cave structural integrity before and after blasting activities. The EPA has recommended conditions B2-7, C2 and C4 to require the update and implementation of SSMP.

The EPA has also recommended condition B2-1(5) to require no ground disturbing activities within bat cave buffer zones specified in recommended condition A1-1 (limitations and extents). The recommended buffer zones reflect the proponent's commitments set out in the SSMP. However, as geotechnical assessment and blast modelling had not been completed for cave CMPC-03 at the time of the EPA's assessment, the EPA has recommended a provisional buffer of 500 m be applied, consistent with the advice of the Department of Climate Change, Energy, the Environment and Water (DCCEEW) and relevant guidance for the species (Bat Call WA Pty Ltd 2021). The EPA notes that the proponent may request that the bat cave buffers

(particularly for cave CMPC-03) be reduced post assessment. Such a request would need to be accompanied by adequate technical information (for example, geotechnical assessment and blast modelling) to demonstrate that the reduced buffer would achieve the objective of avoiding structural damage that could potentially alter the microclimate within the caves and result in permanent abandonment.

Greater bilby

Previous targeted surveys in 2013 and 2014 confirmed the presence of low numbers (up to two individuals) of greater bilby in spinifex sandplain habitat within the development envelope. Further surveys in 2021 failed to record the species and it was theorised that a previous fire in 2015 had driven the species away from the area due to the loss of suitable vegetation (spinifex and *Acacia*) (Biologic 2021a). Based on the home range size of the greater bilby, and the numerous records in proximity to the development envelope, it is possible that individuals will return once vegetation recovers in the spinifex sandplain habitat to provide suitable foraging and shelter habitat (Biologic 2021a).

There is 67 ha of spinifex sandplain habitat within the southwest portion of the development envelope that is considered high value greater bilby habitat. The indicative disturbance footprint in this area was altered to minimise disturbance of this habitat type (Atlas Iron 2023a). The proponent has committed to limiting clearing of spinifex sandplain habitat to 12.1 ha (previously 24.5 ha).

The proponent's Significant Species Management Plan (SSMP) (Atlas Iron 2023b) includes various mitigation measures relevant to the greater bilby, including:

- implementing a feral cat control program to reduce predation pressures
- undertaking a pre-clearance survey for burrows within spinifex sandplain habitat and avoiding clearing of any identified greater bilby burrows.

The EPA considers that the residual impact to this species is unlikely to be significant subject to recommended conditions A1 and B2-4, including requiring a pre-clearance survey for greater bilby burrows, feral cat control, and the retention of high value habitat. In addition, the loss of significant habitat can be counterbalanced by offsets (recommended condition B7) (section 4). These conditions would ensure the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.

Pilbara olive python

Pilbara olive python has been recorded five times within the development envelope and once in the SFEZ (Biologic 2021a). Given the difficulty in detecting the Pilbara Olive Python, the six records from surveys indicates that a permanent breeding population is present within or proximal to the development envelope that is likely to act as a source population for the surrounding area.

Within the development envelope, high-quality breeding and foraging habitat for the species is associated with the gorge/gully, breakaway/cliff, drainage line and hillcrest/hillslope habitats. A total of 1057.9 ha of high value habitat has been identified within the development envelope, represented by:

- gorge/gully – 141.5 ha
- breakaway/cliff – 26.3 ha
- drainage line – 182.2 ha
- hillcrest/hillslope – 707.9 ha.

The species has been recorded at the locations of surface water pools on the McPhee Range and along McPhee Creek beyond the development envelope. These pools, and others associated with the Branch of McPhee Creek and Lionel Creek are likely to support the species (Biologic 2021a).

The proposal will result in the direct loss of 670.2 ha of high value (critical) habitat that has the potential to cause a long-term decrease in the size of the local population (Atlas Iron 2022a). In addition, 900 ha of moderate value (supporting) foraging and dispersal habitat will be lost associated with the rocky foothills habitat. The proposal will also result in direct impacts to up to 11 surface water pools within the development envelope and potential indirect impacts to a further three retained permanent pools (Atlas Iron 2023a). The localised loss of high value habitat and surface water pools is likely to result in a long-term decrease in the size of the regional population of the species.

The EPA considers that the residual impact to this species is unlikely to be significant subject to recommended condition B2, including limits on habitat loss and implementation of fauna and habitat management measures through the SSMP. The loss of significant habitat can be counterbalanced by offsets (recommended condition B7) (section 4). These conditions would ensure the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.

Grey falcon

This species commonly occurs in low densities on lightly wooded plains and along major watercourses where it breeds within taller trees. The grey falcon was recorded in one instance approximately 1 km south of the development envelope (Biologic 2021a). The eucalyptus-fringed drainage line habitat type is considered potential breeding habitat for the species, while the spinifex stony plain habitat type represents potential foraging habitat. Both habitat types are well represented beyond the development envelope and widespread throughout the region.

The proposal will result in the clearing of 55 ha of drainage line habitat, being 30% of that within the development envelope. Due to the presence of potential breeding trees within this habitat type, there is a there is a risk of impact to breeding grey falcons should clearing occur within the nesting season between 1 June to 30 November (TSSC 2020).

The EPA considers that the residual impact to this species is unlikely to be significant, subject to recommended condition B2-2, requiring a pre-clearance survey of suitable grey falcon breeding trees, and if identified, avoid clearing until the tree is no longer occupied. This condition, along with conditions B2-1 (limits on habitat disturbance) and B7-3 (offsets) would ensure consistency with the EPA objective for terrestrial fauna.

Long-tailed dunnart, western pebble-mount mouse, Gane's blind snake and fork-tailed swift

The presence of long-tailed dunnart and western pebble-mound mouse (Priority 4) were both confirmed through a survey conducted within the development envelope (Biologic 2021a). The Gane's blind snake (Priority 1) was not recorded within the development envelope during surveys, however, one individual was recorded approximately 0.7 km to the south in 2014 (Biologic 2021a). These species are considered widespread and relatively abundant throughout the Pilbara region and the impact to these species from the proposal is unlikely to be significant (Atlas Iron 2022a). Impacts to these species from loss of suitable habitat will be mitigated through the retention of habitat types within and outside of the development envelope.

The fork-tailed swift (listed migratory species) occurs sporadically across large areas of the state, including throughout the Pilbara region. The species was recorded opportunistically within the development envelope during 2013 (Biologic 2021a). The species may periodically fly across the development envelope; however, the species is unlikely to be dependent on habitats within the development due to its foraging range, aerial foraging habits and its non-breeding status in Australia (Atlas Iron 2022a).

Significant residual impact

The EPA has assessed the likely significant residual impacts of the proposal on threatened fauna to be:

- loss of up to 615.2 ha of critical habitat that supports a high-density population of northern quoll (denning/breeding and foraging habitat)
- loss of up to 670.2 ha of critical habitat for Pilbara olive python (breeding/ shelter and hunting/ foraging habitat)
- loss of up to 12.1 ha of critical habitat for greater bilby (breeding/ shelter, foraging and dispersal habitat)
- loss of up to 110.6 ha of critical habitat for ghost bat (potential roosting and foraging habitat)
- loss of up to 165.6 ha of critical habitat for Pilbara-leaf nosed bat (potential roosting and foraging habitat)
- loss of up to 900 ha of supporting habitat for northern quoll (rocky foothills)
- loss of up to 900 ha of supporting habitat suitable for Pilbara olive python (rocky foothills).

The EPA considers that the significant residual impact to threatened fauna can be regulated through recommended condition B2, which includes but is not limited to setting the limit of disturbance to high value fauna habitat types that provide critical foraging and dispersal habitat for threatened fauna, implementation of the Significant Fauna Exclusion Zone, pre-clearance surveys, and that the loss of important habitat can be counterbalanced by offsets (see section 4) to ensure the environmental outcome is consistent with the EPA objective for terrestrial fauna.

Other impacts to threatened terrestrial fauna

There are potential indirect impacts on terrestrial fauna such as alterations to foraging behaviour, reproduction, migration, and communication from the generation of artificial light spill from construction and operational activities. The proposal will be in operation on a 24-hour basis with installation of mobile lighting in the active mine pit and operational areas. The proponent has proposed measures to minimise the potential indirect impacts of artificial lighting, including the use of directional lighting.

Vibrations resulting from blasting are expected to be brief and sporadic and not result in long-term or ongoing disturbance (Atlas Iron 2022a). The implications of blasting-related vibrations to caves and subsequent impacts to bat species is discussed above in relation to the ghost bat and Pilbara leaf-nosed bat.

The proposal may increase the risk of predation of terrestrial fauna by feral species such as feral cats which are known to occur in the development envelope (Biologic 2021a). The proponent has committed to implementing appropriate waste management to prevent feral fauna attraction and to undertake feral fauna control in response to sightings within the development envelope and SFEZ, as per the proponents Pest and Invasive Species Procedure (950-EN-PRO-0009).

Indirect impacts to terrestrial fauna due to degradation or alteration of habitat through changes to hydrological regimes and formation of pit lakes is discussed in section 2.3.

SRE invertebrate fauna

Confirmed and potential SRE species were recorded in multiple locations and habitat types and do not appear to be limited to unique habitat types. A significant portion of high value SRE habitat within the development envelope (approximately 36%) will be retained, along with a further 115.2 ha within the SFEZ.

Two confirmed SRE's, *Buddelundia* sp. 11 and *Buddelundia* sp. 18, were recorded within and outside of the development envelope in multiple locations and varied habitat types. Given the presence of these species outside of the development envelope and in diverse habitats, the impact to these species is unlikely to be significant.

A further confirmed SRE (*Antichiropus cunicularis* n. sp. 'DIP026') is known only from records found within the development envelope and the SFEZ in multiple locations and varied habitat types. Given the presence of this species within the SFEZ and in diverse habitats, the impact to this species is unlikely to be significant.

Three potential SREs (*Beierolpium*' sp. 8/4 lge', *Buthidae* sp. indet. and *Armadillidae* sp. Indet) were recorded within the development envelope but outside of the indicative disturbance footprint. Four further potential SREs (*Indolpium* AES01, *Indolpium* AES03, *Xenolpium*' PSE063' and *Austrohorus* AES03) were recorded within the development envelope both within and outside of the indicative disturbance footprint. Records occur from multiple locations and varied habitat types.

Three potential SREs (Genus' 7/4' sp. nov., *Indolpium*' AES02' and *Olpiidae* gen. nov.) were recorded as singletons but specimens were all juvenile and not able to be identified

to species level. Records were from habitat types that are widespread within and outside of the development envelope.

Three potential SREs (*Paradoxosomatidae* sp. indet., *Euryolpium* sp. indet., and *Idiopidae* sp. indet.) were also recorded as singletons with juvenile specimens not able to be identified to species level. Records were limited to within the breakaway/cliff habitat.

The proponent commissioned molecular systematics analysis (DNA barcoding) of 30 specimens (Biologic 2023) to resolve taxonomic uncertainty associated with SRE species. The results indicate that *Euryolpium* sp. indet. is consistent with records previously collected from the Newman area, and is a widespread species not restricted to the proposal area.

DNA barcoding of the singleton *Idiopidae* sp. indet identified it as within the genus *Conothele*, from the family *Halonoproctidae*. The EPA notes that *Conothele* species are generally short ranging in distribution and the species remains a potential SRE. This specimen was collected from breakaway/cliff habitat, of which 0.9 ha will remain undisturbed in the location where the specimen was collected, and a further 9.3 ha of breakaway/cliff habitat retained across the development envelope. Given the retention of suitable habitat the impact to this species is unlikely to be significant.

Olpiidae gen. nov. has been described as a potential new olpiid genus, which is significant in the context of the extent of SRE sampling undertaken throughout the Pilbara region (Biologic 2022c). DNA barcoding of this specimen was attempted but was unsuccessful (Biologic 2023) and there remains uncertainty over the significance of this species and its SRE status. In recognition of this, the proponent has committed to broadening the purpose of the Provisional Mining Exclusion Zone (PMEZ) at the Crescent Moon pit to include consideration of SRE species, in particular, the singleton *Olpiidae* sp., in addition to troglofauna species. The EPA recommends through condition B4-4 that mining activities are not undertaken within the Crescent Moon pit area until it is demonstrated that suitable troglofaunal habitat extends beyond the impact area (refer to section 2.4). The EPA recommends, consistent with the proponent's commitment, that the provisional mining exclusion in this area also apply until such time as further information on the taxonomy and/or distribution of *Olpiidae* sp. can be collected and it can be demonstrated that the loss of SRE habitat within the Crescent Moon pit area would not result in a significant impact to *Olpiidae* sp.

DNA barcoding of the remaining 25 pseudoscorpion specimens allowed the designation of the specimens into four operational taxonomic units (OTUs). However given the absence of DNA matches to regional sequences, the four OTUs are considered potential SREs. Consistent with the risk-based approach outlined in the EPA's guidance (EPA 2016e), the proponent has considered habitat types and availability as a surrogate for potential SRE preservation.

The EPA has considered that the habitats from which potential SREs were recorded are sufficiently represented outside of the impact areas such that the proposal is not likely to have a significant impact on SREs and likely to be consistent with the EPA objective for terrestrial fauna. However, the EPA considers it appropriate to recommend conditions B2-1(4), B4-4 and B4-5(5) to mitigate impacts to the potential new olpiid genus *Olpiidae* sp.

Cumulative impact assessment

The proponent has assessed the cumulative effects by considering the impacts of the proposal and additional projects within 200 km. The proponent considered the cumulative impact to terrestrial fauna in the context of loss of fauna habitat.

The proponent identified a number of predominantly iron ore proposed or implemented projects within 200 km of the proposal that have or will contribute to a significant loss of fauna habitat through clearing of native vegetation, including those projects listed in section 2.1.9.

In the absence of detailed fauna habitat mapping for the Pilbara region, the proponent considered the cumulative impact using land systems as a surrogate for fauna habitat. Cumulatively, the impact to fauna habitat across the Chichester subregion is low for the Capricorn, Rocklea and Taylor land systems, with the cumulative clearing estimated at less than 5% of the current extent. However, the cumulative impact to the Robe land system was estimated to be approximately 28% of the current extent in the Chichester subregion.

The EPA notes that on a bioregional scale, implementation of this proposal would contribute to cumulative impacts to threatened fauna species, including northern quoll, ghost bat, Pilbara leaf-nosed bat, greater bilby and Pilbara olive python, through habitat loss. As assessed in this section, the proposal is likely to constitute a significant residual impact to fauna habitats.

Cumulatively, the impacts are not to a level that would alter the likely environmental outcomes of this proposal. The EPA considers that implementation of this proposal should be subject to its recommendation for offsets (see section 4). Combining the proponent's offsets with offset contribution from other projects in the bioregion, offset projects can be delivered through the Pilbara Environmental Offsets Fund (PEOF) to provide environmental benefits within the Pilbara region.

2.2.10 Summary of key factor assessment and recommended regulation

The EPA has considered the likely residual impacts of the proposal on terrestrial fauna environmental values. In doing so, the EPA has considered whether reasonable conditions could be imposed, or other decision-making processes can ensure consistency with the EPA factor objective. The EPA assessment findings are presented in Table 5.

The EPA has also considered the principles of the *Environmental Protection Act 1986* (see Appendix C) in assessing whether the residual impacts will be consistent with its environmental factor objective and whether reasonable conditions can be imposed (see Appendix A).

Table 5: Summary of assessment for terrestrial fauna

Residual impact or risk to environmental value		Assessment finding or Environmental outcome	Recommended conditions and DMA regulation
1.	Direct impact to the following habitat types that are of importance to threatened fauna: • 93.6 ha of gorge/gully • 17.0 ha of breakaway/cliff • 55.0 ha of drainage line • 504.6 ha of hillcrest/hillslope • 12.1 ha of spinifex sandplain.	Significant residual impacts are likely to be able to be regulated through reasonable conditions and counterbalanced by offsets, so the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.	**Condition A1** (Limitations and extent of proposal) **Condition B2** (Terrestrial Fauna) Sets limits of disturbance to important fauna habitat types. No disturbance activities or infrastructure within the Fauna Corridor Exclusion Zone. **Condition B7** (Offsets) Contribution to the Pilbara Environmental Offsets Fund for clearing threatened fauna habitat.
2.	Impact to potential and confirmed SREs identified within the development envelope and within the indicative footprint.	The EPA considers that there remains taxonomic uncertainty regarding a number of potential SRE singletons, including *Olpiidae* sp., which represents a potentially new olpiid genus. The EPA considers that suitable habitat for other confirmed or potential SRE species is represented both locally and regionally. Residual impacts to this species and other potential SREs are likely to be regulated through reasonable conditions so the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.	**Condition B2** (Terrestrial Fauna) No adverse impact to potential short-range endemic *Olpiidae* sp. Sets limits of disturbance to important fauna habitat types. **Condition B4** (Subterranean Fauna) Establishment of the Provisional Mining Exclusion Zone at the Crescent Moon pit, with the commencement of mining operations contingent on the consideration of additional information being obtained relating to the taxonomy and/or distribution of *Olpiidae* sp.
3.	Impacts to ghost bat roosting habitat.	Indirect impacts associated with blasting and vibrations have the potential to impact the structural integrity of retained critical habitat caves CMPC-08, CMPC-10, CMPC-12, CMPC-25 and CMPC-26, and potentially affect the	**Condition A1** (Limitations and extent of proposal) **Condition B2** (Terrestrial Fauna) Avoidance and management of retained critical habitat caves,

Residual impact or risk to environmental value		Assessment finding or Environmental outcome	Recommended conditions and DMA regulation
		viability of these caves as critical ghost bat habitat. Cave CMPC-03 is likely to represent critical habitat for the ghost bat and the EPA advises that it should also be retained. The EPA considers that the significant residual impacts can be regulated through recommended conditions, so the environmental outcome is likely to be consistent with the EPA objective for terrestrial fauna.	including the avoidance of cave CMPC-03. Minimising indirect impacts to bat roosts through imposing ground disturbance buffers around each cave. Implementation and revision of the SSMP including management measures relating to monitoring and mitigation of impacts to bat caves.
4.	Loss of grey falcon breeding trees	The proposal will result in the loss of 55 ha of drainage line habitat including potential breeding trees for the species. The EPA considers that the significant residual impact can be regulated through recommended conditions, so the environmental outcome is likely to be consistent with the EPA's objective for terrestrial fauna.	**Condition B2** (Terrestrial Fauna) Including pre-clearance survey of suitable grey falcon breeding trees required by condition B2-3.
5.	Loss of greater bilby burrows	The proposal includes the disturbance of 12.1 ha of spinifex sandplain habitat representing potential burrowing habitat for greater bilby. The EPA considers that the significant residual impact can be regulated through recommended conditions, so the environmental outcome is likely to be consistent with the EPA's objective for terrestrial fauna.	**Condition B2** (Terrestrial Fauna) Including the pre-clearance survey for greater bilby burrows in spinifex sandplain habitat required by condition B2-4.
6.	Indirect impacts to threatened fauna through feral fauna predation, lighting and noise.	With the implementation of the management measures, the EPA advises that the significant residual impact can be regulated through reasonable conditions and counterbalanced by offsets so that the environmental outcome is likely consistent with the EPA's objective for terrestrial fauna.	**Condition B2** (Terrestrial Fauna) Implementation and revision of the SSMP including management measures relating to feral cat monitoring and control, fauna monitoring and shielded/directional lighting.

2.3 Inland Waters

2.3.1 Environmental objective

The EPA's environmental objective of the inland waters is *to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected* (EPA 2018).

2.3.2 Investigations and surveys

The EPA advises the following investigations, surveys and peer reviews were used to inform the assessment of the potential impacts to inland waters:

- Waste Rock Characterisation Assessment (appendix C of the environmental review document) (Mine Earth 2021)
- McPhee Creek Aquatic Wet Season Survey (appendix D of the environmental review document) (Biologic 2020c).
- Water Balance Assessment (appendix E of the environmental review document) (GHD 2021b).
- Pit Lake Water Quality Review (appendix F of the environmental review document) (GHD 2022a).
- H3 Groundwater Report (appendix G of the environmental review document) (GHD 2021a).
- Surface Water Assessment (appendix H of the environmental review document) (GHD 2021d).
- Hydrological Assessment of Excess Mine Dewater Discharge (appendix I of the environmental review document) (GHD 2022b).
- McPhee Creek Aquatic Dry Season Survey (appendix J of the environmental review document) (Biologic 2022b).
- McPhee Creek Water Model Peer Review (appendix F of the s. 43A amendment to proposal) (AQ2 2022a)
- McPhee Creek Dewatering Memo (appendix G of the s. 43A amendment to proposal) (AQ2 2022b)
- McPhee Surface Water Hydrology Memo (appendix H of the s. 43A amendment to proposal) (GHD 2022c)
- McPhee Creek Discharge Assessment Memo (appendix I of the s. 43A amendment to proposal) (GHD 2022d)
- McPhee Creek Conceptual Hydrology and Hydrogeology (revised RtS Appendix M) (AQ2 2023)

2.3.3 Assessment context – existing environment

Climate and rainfall

The recent mean annual rainfall (average over 2000-2020 period) for the proposal (based on the Marble Bar Bureau of Meteorology (BoM) weather station (Station ID 004106)) is 393 mm, ranging from 195 mm to 705 mm, illustrating the high inter-annual variability (Atlas Iron 2022a). The 30-year moving average shows a steady increase in annual rainfall since 1975 (GHD 2021a; Atlas Iron 2022a). Climate change models indicate that groundwater recharge is not expected to change significantly in the region (GHD 2021a). August has the lowest monthly rainfall, and January experiences the highest monthly rainfall (Atlas Iron 2022a). Regional evaporation is considerably higher (~ 3,200 mm/a) than precipitation resulting in limited permanent surface water pools (Atlas Iron 2022a).

Surface hydrology

In the Pilbara, the movement and distribution of surface waters predominantly occurs in direct response to rainfall and therefore the occurrence and movement of surface water has a similar seasonality and variability to rainfall patterns in the region (GHD 2021d).

Surface water features

The proposal is located at the top of the catchment of four creeks, McPhee Creek and tributary (referred to as Branch of McPhee Creek), Spinaway Creek, Sandy Creek and Lionel Creek (Figure 7). Drainage from the McPhee Creek ridge iron ore deposits at the centre of the development envelope is characterised by steep slopes and rocky well-defined channels, which level out to shallow, undefined channels on the plains. Drainage from the development envelope flows to either the Nullagine or Coongan Rivers (tributaries of the De Grey River (Atlas Iron 2022a)). Flows to the southeast occur via McPhee Creek, Branch of McPhee and Lionel Creek catchments entering the Nullagine River. Whereas flows to the northwest drain via Spinaway and Sandy Creek catchments to the Coongan River (Biologic 2020c; GHD 2021e).
Several semi-permanent and permanent pools occur along McPhee Creek, with pools located downstream of the confluence with Branch of McPhee Creek being potentially connected to groundwater. Lionel Creek is highly ephemeral and has several semi-permanent pools along the most downstream stretch of the creek.

Fifteen pools are recorded within the development envelope, including five permanent, two semi-permanent and eight temporary/seasonal (Biologic 2022b). A further five pools occur within the SFEZ, including one permanent, one semi-permanent and three temporary/seasonal (Figure 7). Range pools (within the development envelope) do not interact with groundwater, whereas the permanent pools in the lower catchments are likely to be groundwater dependent (Biologic 2021c; GHD 2021a).

Water quality of the pools in the development envelope supports fresh to saline ecosystems, with a wide-ranging electrical conductivity (EC), from 96 to 10,667 µS/cm (Biologic 2020c). Water quality in semi-permanent pools along creek lines recorded EC values in excess of 250 µS/cm, whereas data from pools on the ridge averaged 150 µS/cm, consistent with that of fresh rainwater (200 µS/cm) (Biologic 2020c).

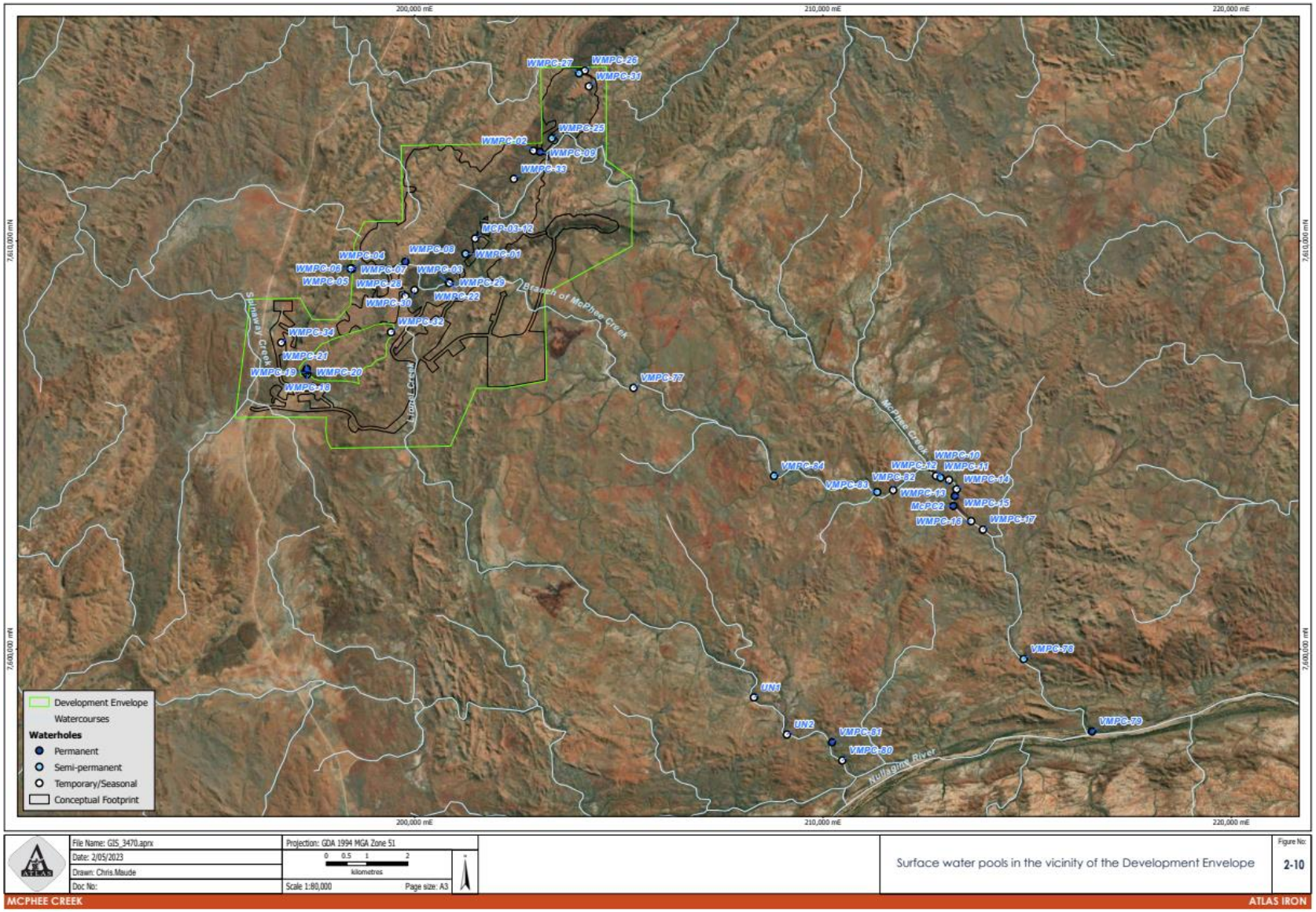

Figure 7: Major creek lines and pools of the McPhee Creek proposal development envelope (Atlas 2023a)

Surface water flow regime

The flow of creeks intersecting the development envelope are inferred to be principally driven by cyclonic rainfall events creating ephemeral flows with negligible flow outside such events (GHD 2021e). Modelled stream flows under different rainfall frequencies (GHD (2021d) suggest the maximum water depths along McPhee Creek and Branch of McPhee Creek can exceed 2.5 m for the 10% Annual Exceedance Probability (AEP) and 3.5 m for the 1% AEP events (GHD 2021e; GHD 2021e). Flows are predominantly restricted to main channels, however, can spread across the flood plain in high flood events.

Groundwater hydrology

The development envelope and surrounding areas are located within the Pilbara Fractured Rock Aquifer (GHD 2021a), which is within the Pilbara Groundwater Area proclaimed under the *Rights in Water and Irrigation Act 1914* (RiWI Act).

Groundwater features

The orebody of the mine area exists in a transmissive banded iron formation (BIF) zone within the Paddy Market Formation geological unit. An aquitard is formed by the Footwall Shale of the Paddy Market Formation and quartzite of the underlying Corboy Formation, which isolates the Paddy Market Formation in the mine area that acts as an unconfined elongated basin aquifer approximating the McPhee Creek ridge (GHD 2021a). Groundwater is fresh within the orebody aquifer (median Total Dissolved Solids (TDS) 211 mg/L) while beyond the development envelope it is characterised by a median TDS value of 700 mg/L (GHD 2021a).

Groundwater flow regime

The depth of groundwater across the development envelope ranges between five to 100 m below ground level (bgl) which is related to the topography of the main range (rising ~ 60m above the surrounding plains). Groundwater throughflow is considered minor (equivalent to received recharge, estimated to be 0.2 to 0.6 GL/a), and flows radially from the development envelope in all directions due to the elevation of McPhee Creek ridge. Regional recharge are estimated to be 4 - 11 mm/a (1 to 3% of annual rainfall) based on the groundwater chloride content (GHD 2021a). Discharge occurs beyond the development envelope in low lying areas through evapotranspiration in creeks and pools near the Nullagine River.

Aquatic fauna and flora

Aquatic habitats surrounding the proposal and within the development envelope, have a wide range of water quality, flora and in-stream habitat (Biologic 2020c; Biologic 2022b). A high diversity of macroinvertebrate taxa was recorded across all surface water sampling sites (234 taxa), as well as four species of freshwater fish, two species of frog, the flat-shelled freshwater turtle (*Chelodina steindachneri*), and a Matter of National Environmental Significance (MNES) reptile (Pilbara olive python; *Liasis olivaceus barroni*). Pools within the development envelope had generally lower overall macroinvertebrate richness and are significantly different to

macroinvertebrate assemblages outside the development envelope, associated with the difference in pool water quality and habitat availability (Biologic 2020c; Biologic 2022b). Two macroinvertebrate species (Cyprididae 'sp. Biologic-OSTR035' and Cyprididae 'sp. Biologic-OSTR038') were only recorded from pools located within the proposal's indicative footprint. Pools within the development envelope do not support fish, likely due to their lack of connection with other surface water systems, however, provide habitat for frogs and the Pilbara olive python (Biologic 2020c; Biologic 2022b).

Riparian and Groundwater Dependant Vegetation

A description of riparian vegetation and Groundwater Dependant Vegetation (GDV) within the development envelope is provided in section 2.1.3 of this report. Indirect impacts to these values are inherently linked to inland waters, with impacts to riparian vegetation and GDVs assessed in section 2.1.9.

2.3.4 Consultation

Matters raised during stakeholder consultation and the proponent's responses are provided in the proponent's response to submissions document (Atlas Iron 2023c).

Public consultation on the proposal raised concerns regarding the direct impacts from the loss of surface water pools and catchment area.

DCCEEW identified the following key issues when consulted on the proposal:

- various improvements required for the proposal's Water Management Strategy and Plan to better define baseline data, as well as monitoring locations, monitoring frequency and analytes for surface and groundwater regimes
- concerns regarding the hydrogeological model, including the consideration of future climate change and improvements to reduce model uncertainty
- water quality impacts for surface water flows associated with creek line discharge, surface pools, surface runoff and mine closure pit lakes.

The key issues raised during the public and DCCEEW consultation on the proposal and how they have been considered in the assessment are described in sections 2.3.6, 2.3.7, 2.3.8 and 2.3.9.

2.3.5 Potential impacts from the proposal

Direct impact

The proposal has the potential to have significant direct impacts on inland waters from:

- reduction in catchment area and direct loss of 11 surface water pools due to clearing
- abstraction of groundwater and alteration of groundwater aquifers
- alteration to surface water flow regimes, including creek lines and surface pools from dewater discharge.

Indirect impact

The proposal will result in the following indirect impacts on inland waters from:

- a reduction in quality of groundwater and surface water as a result of the post closure formation of permanent or ephemeral pit lakes, surface water discharge and alteration of surface water quality from mine runoff
- potential contamination due to the storage and handling of hazardous materials, hydrocarbons and waste
- potential reduction in GDV due the abstraction of groundwater (discussed in section 2.1)
- potential reduction in stygofauna habitat from groundwater drawdown (refer to section 2.4 for discussion of impacts)
- impacts to social and cultural values as a result of the loss of surface water pools for relevant Nyamal Traditional Owners (refer to section 2.6).

2.3.6 Avoidance measures

The proponent has designed the proposal to avoid impacts to inland waters by:

- excluding the 195.7 ha Significant Fauna Exclusion Zone (SFEZ) from the development envelope, removing direct impact to five surface water pools (WMPC-21, 18, 19, 20, 32)
- avoiding direct impacts to five surface pools (that is, WMPC-01, 03, 22, 29, and MCP-03-12) within the development envelope (Atlas Iron 2022a; Atlas Iron 2023).

2.3.7 Minimisation measures (including regulation by other DMAs)

The proponent has proposed the following measures to minimise impacts to inland waters:

- limit alteration of hydrological regimes as a result of surplus water discharge to the modelled peak flow. This will ensure the length of discharge wetting fronts do not exceed those modelled and minimise impacts to pools and long-term mounding in the alluvial aquifer
- no contamination of surface water resulting from mining and associated activities. Storage, handling and disposal of hazardous materials, waste and hydrocarbons will be in accordance with the proponents Hydrocarbon Management Procedure (950-EN-PRO-0008), Hydrocarbon (and Chemical) Spill Management Procedure (950-EN-PRO-0007) and Bioremediation Management Procedure (950-EN-PRO-0001)
- commence early dewatering (subject to approvals) to minimise peak dewatering rates, reducing the volume of surplus water and associated discharge to creek lines
- utilise surplus water in operational water supply where possible
- discharge locations will be constructed with scour and erosion protection
- potentially acid forming (PAF) shales will be segregated and encapsulated within the waste dump.

Rights in Water and Irrigation Act 1914

Abstraction of groundwater for use during construction and operation is implemented through DWER licences/permits issued under the *Rights in Water and Irrigation Act 1914* (RiWI Act), specifically:

- Section 5C licence to take water
- Section 26D licence to construct or alter a well
- Permit to interfere with the bed or banks of a watercourse.

Currently groundwater abstraction within the development envelope is licenced under groundwater licence (GWL) 175352 with an approved annual abstraction rate of 95 ML/a. An application to amend this licence, up to an annual abstraction rate of 7.5 GL/a, is currently under assessment by the DWER. The proponent has also developed and committed to implementing a Water Management Strategy (Atlas Iron 2022a; Atlas Iron 2023c) to compliment any approvals under the RiWI Act.

Part V, Division 3 of the EP Act

To manage the emissions and discharges during construction and operation of the proposal, the proponent is required to obtain a works approval and licence under Part V of the EP Act (Atlas Iron 2022a; Atlas Iron 2023d)). The licences would relate to the following prescribed activities that may impact on inland waters:

- Category 6 – mine dewatering
- Category 12 – screening of material
- Category 64 – class II or III putrescible landfill site
- Category 73 – bulk storage of chemicals etc.

Mining Act 1978

The proponent is required to obtain approval of the mining proposal and mine closure plan which sets out completion criteria to ensure hydrological regimes and the quality of groundwater and surface water resources (for example, associated with PAF) are suitable so that environmental values for inland waters are maintained post closure.

Dangerous Goods Safety Act 2004

The proponent is required to have necessary approvals and procedures in place to ensure they adhere to the related subsidiary regulations regarding the handling, transporting, storage, and use of Hazardous and Dangerous goods to ensure no significant and unreasonable damage or harm to the environment occurs. The proponent has also committed to mitigation measures for water quality which are included in the proponent's Hydrocarbon Management Procedure (950-EN-PRO-0008), Hydrocarbon (and Chemical) Spill Management Procedure (950-EN-PRO-0007) and Bioremediation Management Procedure (950-EN-PRO-0001).

2.3.8 Rehabilitation measures

The proponent has committed to progressively rehabilitate during the life of the proposal by removing temporary infrastructure and restore natural flow paths and catchments. Vegetation will also be established on waste dumps to minimise erosion and associated impacts to inland waters.

2.3.9 Assessment of impacts to environmental values

The EPA considered that the key environmental values for inland waters likely to be impacted by the proposal are the:

- loss of surface water pools, catchment reduction and reduced surface water quality
- dewatering discharge to ephemeral creeks
- groundwater drawdown.

Surface water pools, catchment reduction and surface water quality

Surface water pools generally represent areas of high ecological productivity, particularly in arid environments and support species which require continuous access to water. Fifteen pools occur within the development envelope, with 11 pools being lost because of mining activities (two permanent, two semi-permanent and seven temporary/seasonal pools). The EPA considers impacts to surface water pools to be significant due to their importance as terrestrial and aquatic habitat, and cultural association for relevant Traditional Owners.

Five pools (permanent pools WMPC-01, 03, 22; temporary/seasonal pools WMPC-29, MCP-03-12) will be retained. While mining activities will reduce the catchment area for these pools, the proponent advises that post mining annual inflows to the pools are substantially greater than the pool volumes and the pools are likely to retain water (Atlas Iron 2023c). The proponent has also advised that indirect impacts from changes to catchment and surface water flow regimes are not expected for key rock hole cultural sites (MCP-02-12 and MCP-04-12) as these pools are in a high gradient and low alluvium area, and any significant rainfall event will allow for the replenish the temporary/seasonal rock hole sites (impacts to Aboriginal cultural heritage sites and mitigation measures are discussed in section 2.6).

The establishment of the Significant Fauna Exclusion Zone (SFEZ), which is surrounded by, but excluded from the development envelope, will result in the avoidance of impacts to an additional five surface water pools (WMPC-21, 18, 19, 20, 32).

The surface pools (within development envelope) were characterised by lower habitat diversity and lacking complex habitat types and dominated by detritus and open inorganic substrate compared to pools outside the development envelope (Biologic 2020c; Biologic 2022b). Aquatic fauna associated with surface pools was predominantly macroinvertebrates, with most taxa recorded considered to be common across the Pilbara. The EPA notes for the pools being directly impacted, the proponent's surveys did not record any species listed by the International Union

for Conservation of Nature's Red List of Threatened Species (IUCN) (Biologic 2020c; Biologic 2022b). One potentially restricted ostracod (*Cyprididae* sp. 'Biologic-OSTR035) was collected from two pools (WMPC-08 and WMPC-09) which are to be impacted, and the EPA recognises the loss of these pools represents a significant residual impact for the recorded restricted ostracod species.

Due to the limited connectivity of the pools with other surface water systems, the surface water pools do not support fish species but provide habitat for two species of frog (the Pilbara toadlet *Uperoleia saxatilis* and Main's frog *Cyclorana mainii*), and the Pilbara olive python (*Liasis olivaceus barroni*), a species that is a matter of national environmental significance (MNES) (Biologic 2020c; Biologic 2022b). Both frog species are widely distributed across the Pilbara and consequently the loss of surface water pools is not expected to result in a significant impact to aquatic invertebrates. However, the surface water pools are considered to be critical habitat for the Pilbara olive python, as a result, there is likely to be a significant residual impact to the Pilbara olive python from clearing of high value (or critical) potential shelter/denning and foraging habitat. The EPA considers that the environmental outcome is likely to be consistent with the EPA objective for Inland Waters, subject to the implementation of recommended conditions B2 (see section 2.2).

Noting the above, the proponent is to undertake monitoring and management through the implementation of a Water Management Plan, required under the EPA's recommended condition B3, to ensure that:

- there is no direct impact to pools WMPC-01, 03, 22, 29, and 36
- there is no impact to pools WMPC-21, 18, 19, 20, 32 within the SFEZ.

The implementation of this proposal will result in a reduction in catchment (~10%) across McPhee Creek, Branch of McPhee Creek and Sandy Creek. However, the EPA recognises that the generally short episodic Pilbara rainfall patterns with short periods of runoff is unlikely to impact peak creek flows, and implementation of the project is likely to be consistent with the EPA objective for Inland Waters.

Permanent pit lakes are expected to form in the Murray and Avon pits at closure (GHD 2021a; GHD 2022a). Pit lake water is likely to be acidic, but the proponent advises that due to the impermeability of the shale layer that separates the orebody aquifer from the surrounding hydrogeological regime, no transport of pit water to the surrounding aquifer is expected to occur. (GHD 2022a). Water balance analysis indicated that inflow volumes during operations are expected to be minimal, and discharge of pit water will not be required (GHD 2021b). The EPA notes that the proponent commits to minimising surface water inflow into pits by implementing diversion drainage structures included in environmental management planning required under recommended condition B3 (Inland Waters).

The EPA recognises that the proponent is required under the Mining Act to prepare a Mine Closure Plan consistent with DMIRS' Statutory Guidelines for Mine Closure Plans (DMIRS 2023). Consistent with the objectives identified in the Environmental Objectives Policy for Mining (DMIRS 2020), the guidelines consider biodiversity, water resources and land and soils and would generally be consistent with aspects of the EPA environmental factor objective of Inland Waters. As part of the

recommended mine closure plan, the proponent will regularly update the pit lake and groundwater models, and any material impacts clearly highlighted in future updates. The proponent has also committed to, as part of mine closure planning, to develop at least two surface water features suitable for fauna use to replace lost surface water features (Atlas Iron 2023f).

Discharge to ephemeral creeks

The groundwater quality in the aquifer to be dewatered is fresh with neutral pH and has a water quality similar or with lower concentrations of metals, and similar pH, to the surface water pools surveyed along each of the three creek lines. The EPA recognises discharge water quality is unlikely to impact ephemeral creeks receiving discharge waters. The proponent expects that discharge of excess dewater into the creeks is likely to elevate groundwater levels within the alluvium and creek subsurface, and result in groundwater to exist in areas and during periods where it is not normally present. Prolonged soil inundation is likely to impact riparian vegetation (for example, GDV such as *E. victrix*) (Grierson 2010), resulting in changes in species assemblage and diversity, and potential changes in vegetation condition (see section 2.1 for further discussion on impacts to riparian vegetation).

The EPA notes that aquatic fauna (for example, frogs and fish) are likely to receive short-term benefits from the increased spatial and/or temporal extent of inundation, with a return to baseline conditions and populations at the cessation of discharge.

The EPA's recommended condition B3 and licence under Part V of the EP Act, will appropriately manage impacts from surface water discharge to ephemeral creeks to meet the EPA objective and ensure:

- dewatering discharge to creek lines (McPhee Creek, Branch of McPhee Creek and Lionel Creek) does not exceed the modelled wetting front extent (Figure 3)
- no impacts to the surface water quality of each creek line
- no impacts to riparian vegetation along the discharge creek lines (McPhee Creek, Branch of McPhee Creek and Lionel Creek)
- no impacts to surface water pools occurring along each creek line.

The EPA notes that there are significant cultural links between the relevant Nyamal Traditional Owners and the terrestrial fauna and flora, surface water pools and the three major creek lines of the area (namely, McPhee Creek, Branch of McPhee Creek and Lionel Creek) (Atlas Iron 2022c; Atlas Iron 2022a; see section 2.6). The EPA recognises impacts to Aboriginal cultural heritage are expected and recommends condition B6 to ensure consistency with the EPA objective for social surroundings. Indirect impact to Aboriginal cultural heritage associated with the creek lines beyond the development envelope is also noted by the EPA, however, the EPA considers the recommended conditions for inland waters are appropriate to ensure consistency with the EPA objective for social surroundings beyond the development envelope.

Groundwater drawdown

Dewatering over the life of the proposal is expected to create a south-west to north-east trending depression in the water table primarily along the Avon and Murray Pits extending further northeast into the Ord and Nicholson Pits (consistent with the extent of the main range deposit (MRD) aquifer (
Figure 8). The greatest drawdown is predicted in the immediate mine area, with the vertical extent of drawdown decreasing with increased distance from the pit edges (AQ2 2022b; Atlas Iron 2023a). The post closure residual drawdown footprint (>2 m drawdown in fractured rock aquifer) is predicted to extend to 58 km^2 approximately 250 years post closure (GHD 2021a).

The proponent advises that dewatering drawdown in the MRD aquifer is unlikely to result in a detectable influence on the identified surface water pools of the main range or downstream along the creek lines. This is due to the disconnection between the main range aquifer and the main range pools, and the limited connectivity between the main range aquifer (being dewatered) and the broader Warrawoona basement underlying the alluvial aquifer (hosting the downstream pools) (Atlas Iron 2022a; Atlas Iron 2023a; Atlas Iron 2023f). The EPA considers it appropriate to condition the implementation of the proponent's groundwater monitoring and management measures (recommended Condition B3) for minimising impacts to inland waters and ensure the EPA objective for this factor can be met.

The EPA recognises that groundwater drawdown has the potential to impact GDV. A discussion of the impacts to riparian and GDV and the EPA's recommendations are detailed in section 2.1.

The proposal's iron-bearing formations are known to contain habitat for subterranean fauna, with troglofauna and stygofauna documented in the development envelope (Biologic 2021d; Biologic 2021e). Impacts to subterranean fauna associated with groundwater drawdown are discussed in section 2.4.

The EPA advises that the proposal impacts to groundwater can be regulated through reasonable conditions (recommended condition B3 – inland waters) so that the environmental outcome is consistent with the EPA objective for inland waters.

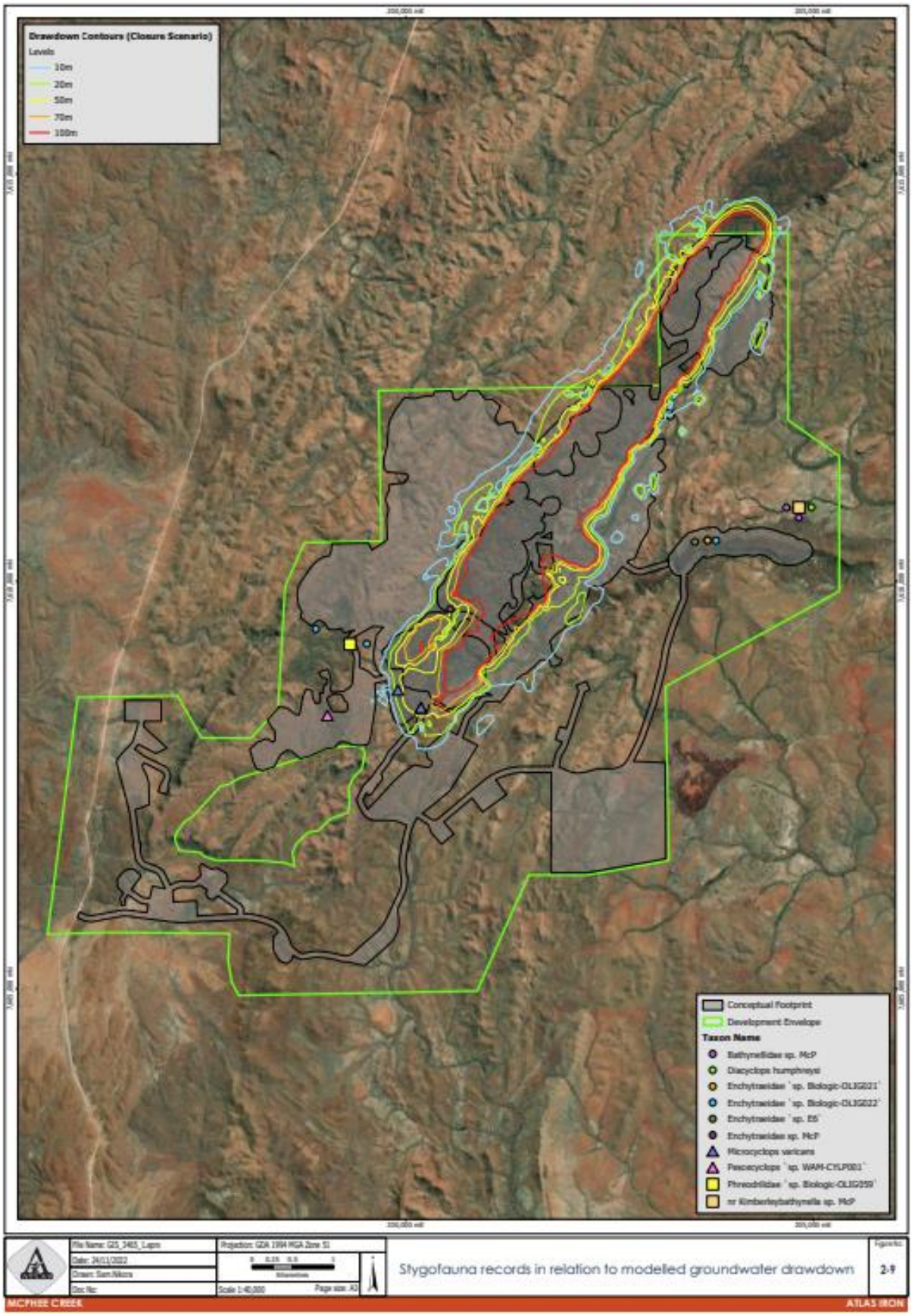

Figure 8: Modelled groundwater draw down contours and location of stygo - fauna records within the development envelope (taken from Atlas Iron 2023a)

Cumulative impacts

When considering this proposal in addition to projects within 200 km of the development envelope, the extents of groundwater drawdown and surface water discharge do not overlap with impacts from other projects. Nullagine town and surrounding pastoralists access groundwater resources downstream of the development envelope and will not be impacted by the proposal (GHD 2021a). The Proposal is not located near any other existing or reasonably foreseeable proposed mines, or new or significant water users. Therefore, cumulative impacts are not expected to occur with respect to inland waters.

2.3.10 Summary of key factor assessment and recommended regulation

The EPA has considered the likely residual impacts of the proposal on the environmental values of inland waters. In doing so, the EPA has considered whether reasonable conditions could be imposed, or other decision-making processes can ensure consistency with the EPA factor objective. The EPA assessment findings are presented in Table 6.

The EPA has also considered the principles of the *Environmental Protection Act 1986* (see Appendix C) in assessing whether the residual impacts will be consistent with its environmental factor objective and whether reasonable conditions can be imposed (see Appendix A).

Table 6: Summary of assessment for inland waters

Residual impact or risk to environmental value		Assessment finding or environmental outcome	Recommended conditions and DMA regulation
1.	Removal of up to 11 surface water pools	The loss of surface water pools is significant in the context of biological diversity and ecological integrity, as the pools provide habitat for conservation significant fauna species. The pools also have cultural importance for the relevant Traditional Owners. The EPA advises that subject to limitations on clearing, and recommended conditions requiring progressive rehabilitation and offsets, the significant residual impact can be counterbalanced, so that the environmental outcome is likely to be consistent with the EPA objective for inland waters.	**Condition A1** (Limitations and extent of proposal)
2.	Indirect impacts to surface water pools as a result of changes to	Significant surface water pools (WMPC-01, 03, 22, 29, and 36) within the development envelope will not be impacted.	**Condition B3** (inland waters) Implementation and revision of the WMP

Residual impact or risk to environmental value		Assessment finding or environmental outcome	Recommended conditions and DMA regulation
	surface water catchments	Additionally, significant water pools (WMPC-21, 18, 19, 20, 32) within the SFEZ, will not be impacted. The key residual impacts relate to impacts on water quality and water inflows to surface water pools remaining in the development envelope and SFEZ as a result of surrounding mining activity. Residual impacts are likely to be consistent with the EPA objective for inland waters.	including management measures relating to surface water management and water quality monitoring. Avoidance and no adverse impacts to retained pools.
2.	Dewatering discharge wetting front not to exceed maximum modelled extent for McPhee Creek (6.9 km), Branch of McPhee Creek (6.8 km), and Lionel Creek (4.4 km)	The EPA recommends implementation of ongoing monitoring of dewatering discharge under the recommended conditions, with proposal being likely to be implemented consistent with the EPA objective for inland waters.	**Condition B3** (WMP) Implementation and revision of the WMP including management measures relating to groundwater drawdown, mine water discharge and monitoring. **DMA regulation** DWER can regulate water discharges under Part V of the *Environmental Protection Act 1986* and disturbance to the ephemeral creeks through the *Rights in Water and Irrigation Act 1914*.
3.	No impacts to the surface water quality and surface water pools of each creek line	The EPA advises there is unlikely to be significant residual impacts from dewatering discharge altering water quality of the ephemeral creeks, and the environmental outcome is likely to be consistent with the EPA objective for inland waters	**Condition B3** (WMP) Implementation and revision of the WMP including management measures relating to groundwater drawdown, mine water discharge and monitoring. **DMA regulation** DWER can regulate water discharges under Part V of the *Environmental Protection Act 1986.*

Residual impact or risk to environmental value		Assessment finding or environmental outcome	Recommended conditions and DMA regulation
4.	No impacts to GDV and riparian vegetation beyond the development envelope	The key residual risks are changes in riparian and GDV species assemblage and diversity, and potential changes in vegetation condition. The EPA's recommended condition and DMA legislation (Part V of the EP Act) will appropriately manage residual risks to ensure they are likely to be consistent with the EPA objective for inland waters.	**Condition B3** (WMP) Implementation and revision of the WMP including management measures relating to surface water management and water quality monitoring. **DMA regulation** DWER can regulate water discharges under Part V of the *Environmental Protection Act 1986*. DMIRS can regulate progressive rehabilitation under the Mining Act.
5.	Up to 50 ha of riparian and GDV impacted within the development envelope resulting from drawdown	The drawdown associated with mine dewatering will impact riparian and GDV within the development envelope. The EPA advises that subject to limitations on loss of riparian and GDV, and recommended conditions requiring progressive rehabilitation and offsets, the significant residual impact can be regulated to ensure the environmental outcome is likely to be consistent with the EPA objective for inland waters.	**Condition A1** (Limitations and extent of proposal) Disturbance limits to GDV and riparian vegetation within the development envelope. **DMA regulation** DWER can regulate water abstraction under Part V of the *Environmental Protection Act 1986*. DMIRS can regulate progressive rehabilitation, under the Mining Act.

2.4 Subterranean Fauna

2.4.1 Environmental objective

The EPA environmental objective for subterranean fauna is *to protect subterranean fauna so that biological diversity and ecological integrity are maintained* (EPA 2016f).

2.4.2 Investigations and surveys

The EPA advises the following investigations and surveys were used to inform the assessment of the potential impacts to subterranean fauna:

- Subterranean Fauna Assessment (appendix R of the ERD) (Biologic 2021f)
- Subterranean Fauna 3D Habitat Modelling Memo (appendix S of the ERD) (Biologic 2021g).

The surveys were consistent with the *Technical Guidance – Subterranean Fauna Survey* (EPA 2021).

2.4.3 Assessment context – existing environment

The proposal is located within the Pilbara bioregion which is recognised as a global hotspot for subterranean fauna biodiversity and is a well-studied region for subterranean fauna in WA (EPA 2016f).

Troglofauna

The upper banded iron formation (BIF), lower BIF, and potentially Chert, represent medium to high suitability habitat for troglofauna within the development envelope (Biologic 2021e; Biologic 2021d). Habitat modelling indicates medium and high suitability troglofauna habitat occur throughout the main range, extending into an area of ridgeline to the south-west of the main range (Biologic 2021e). Broad connectivity is indicated by the habitat modelling between layers of high suitability (primary and hydrated mineralisation) and layers of medium to high suitability (Upper BIF and Lower BIF, and potentially Chert) throughout the Main Range and Avon West (Biologic 2021e; Biologic 2021d).

Major faults (the West fault and MP1 fault) between the main range and Avon West areas of the proposal are unlikely to form barriers for troglofauna species dispersal (Biologic 2021e; Biologic 2021d). At Crescent Moon, the pisolith is a ferruginous duricrust deposit that includes massive, pisolitic, and nodular lateritic ironstone with interconnected networks of pore spaces, vugs, cavities, and caverns in pisolith deposits (Biologic 2021e; Biologic 2021d). This is high suitability habitat for troglofauna and is geologically distinct, and physically separated from other suitable habitats in the main range (Biologic 2021e; Biologic 2021d).

A total of 55 named troglofaunal taxa from current and previous surveys of the development envelope have been identified. Sampling shows troglofauna species ranging throughout the main range (particularly Avon and Murray Pits) and Avon West, highlighting the habitat connectivity between these areas (Biologic 2021d). Troglofauna occurred between 30 m to 50 m below surface in the main range, with suitable habitat modelled to occur between the near surface to the water table approximately 55 m bgl along the main range (approximately 30 m bgl in Avon West). At Crescent Moon the suitable habitat coincides with the thickness of pisolitic CID and ranges from 10-24 m thickness at the top of the mesa landform due to the underlying shale being largely impermeable (Biologic 2021d).

None of the troglofauna taxa, or the communities recorded in the development envelope are listed or recognised as conservation priorities (Biologic 2021d). A total of 20 troglofauna taxa were found to be restricted to the proposed pits at the main range and Crescent Moon (Biologic 2021d). This includes four taxa only known from the Main Range and 16 species only known from Crescent Moon (Biologic 2021c).

Stygofauna

The groundwater habitat suitable for stygofauna in the McPhee Creek deposit forms unconfined aquifers with high secondary permeability (such as from fracturing) associated with the BIF and fractured bedrock aquifers of the Corboy Formation (Atlas Iron 2022a). While the geological strata are relatively continuous, the water level tends to form discrete aquifers that are relatively isolated. It is expected that this prohibits fauna dispersal within these “pod-like” aquifers (Atlas Iron 2022a). Across the main range, average groundwater levels are approximately 50-65 mbgl, whereas at Avon West the water table is higher, averaging 30 mbgl. It is noted that groundwater habitats deeper than 30 mbgl in the Pilbara have typically recorded fewer stygofauna species, or lower stygofauna abundance, than shallower groundwater habitats (Halse et al. 2014). Groundwater physico-chemistry within the development envelope is within the habitable ranges for stygofauna (Atlas Iron 2022a).

Ten (10) stygofauna taxa and four indeterminate taxa across four higher order groups: Oligochaeta, Bathynellacea, Cyclopoida, and Harpacticoida have been recorded in the development envelope (Biologic 2021d). The indeterminate taxa were either recorded outside of the direct impact areas or are likely to represent morphospecies recorded outside of direct impact (Biologic 2021d). Of the 10 stygofauna taxa recorded, six taxa represent widespread species, and four taxa were unique lineages (Biologic 2021d). Stygofauna taxa were depauperate in the main range and Avon West areas, with most specimens collected from alluvial areas at Crescent Moon and/or areas outside the indicative footprint. None of the recorded stygofauna taxa, are listed or recognised as conservation priorities under state or federal legislation (Biologic 2021d).

2.4.4 Consultation

Matters raised during stakeholder consultation and the proponent’s responses are provided in the proponent’s response to submissions document (Atlas Iron 2023c). Public consultation on the proposal raised concerns about:

- the scale of significant residual impacts to subterranean fauna from groundwater abstraction, waste rock dumps, topsoil stockpiles, and direct removal of habitat
- sampling efforts not being consistent with EPA guidance.

The key issues raised during the public consultation on the proposal and how they have been considered in the assessment are described in sections 2.4.5, 2.4.6, 2.4.7, 2.4.8 and 2.4.9.

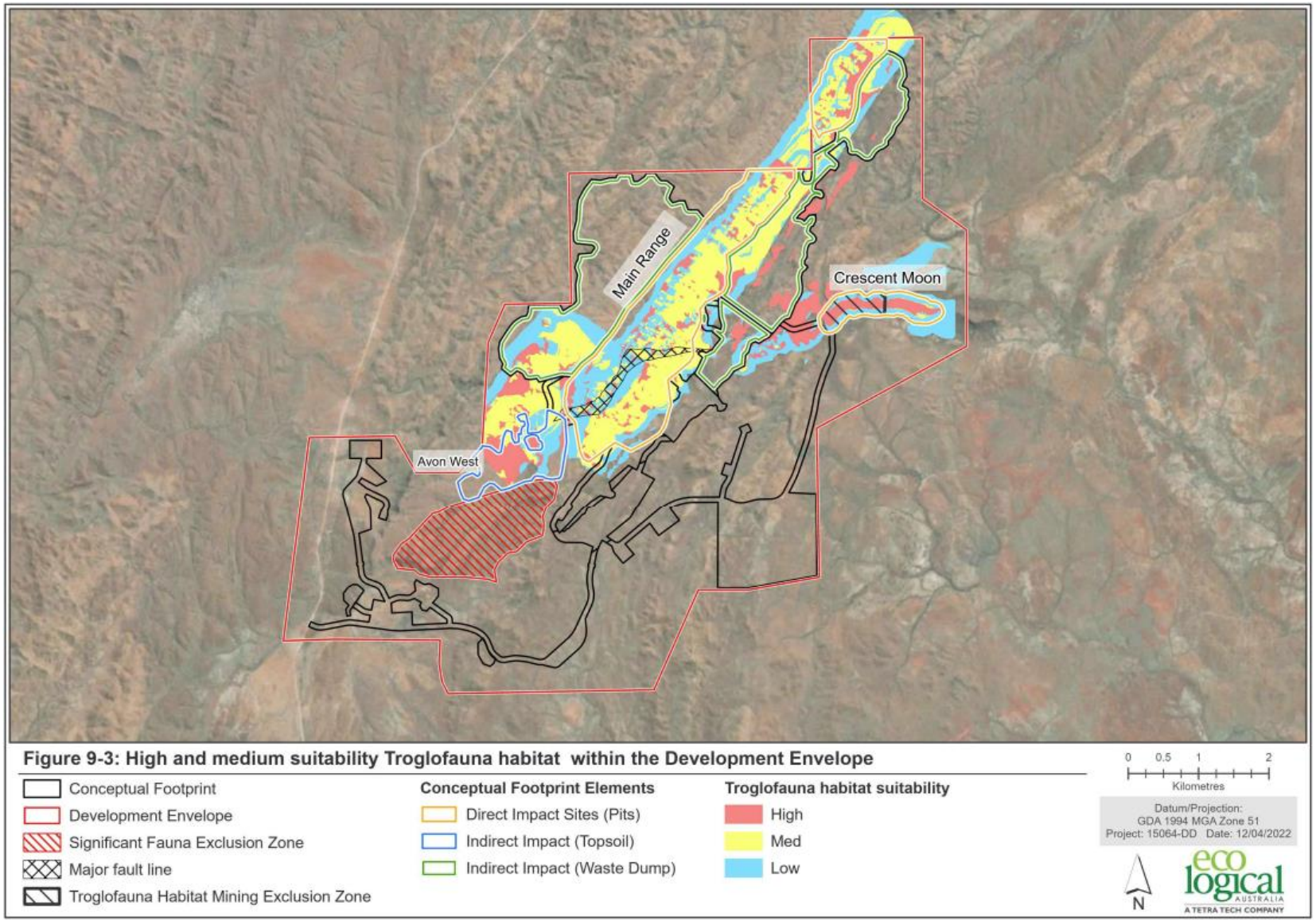

Figure 9: Modelled troglofaunal habitat suitability (taken from Atlas Iron 2022a)

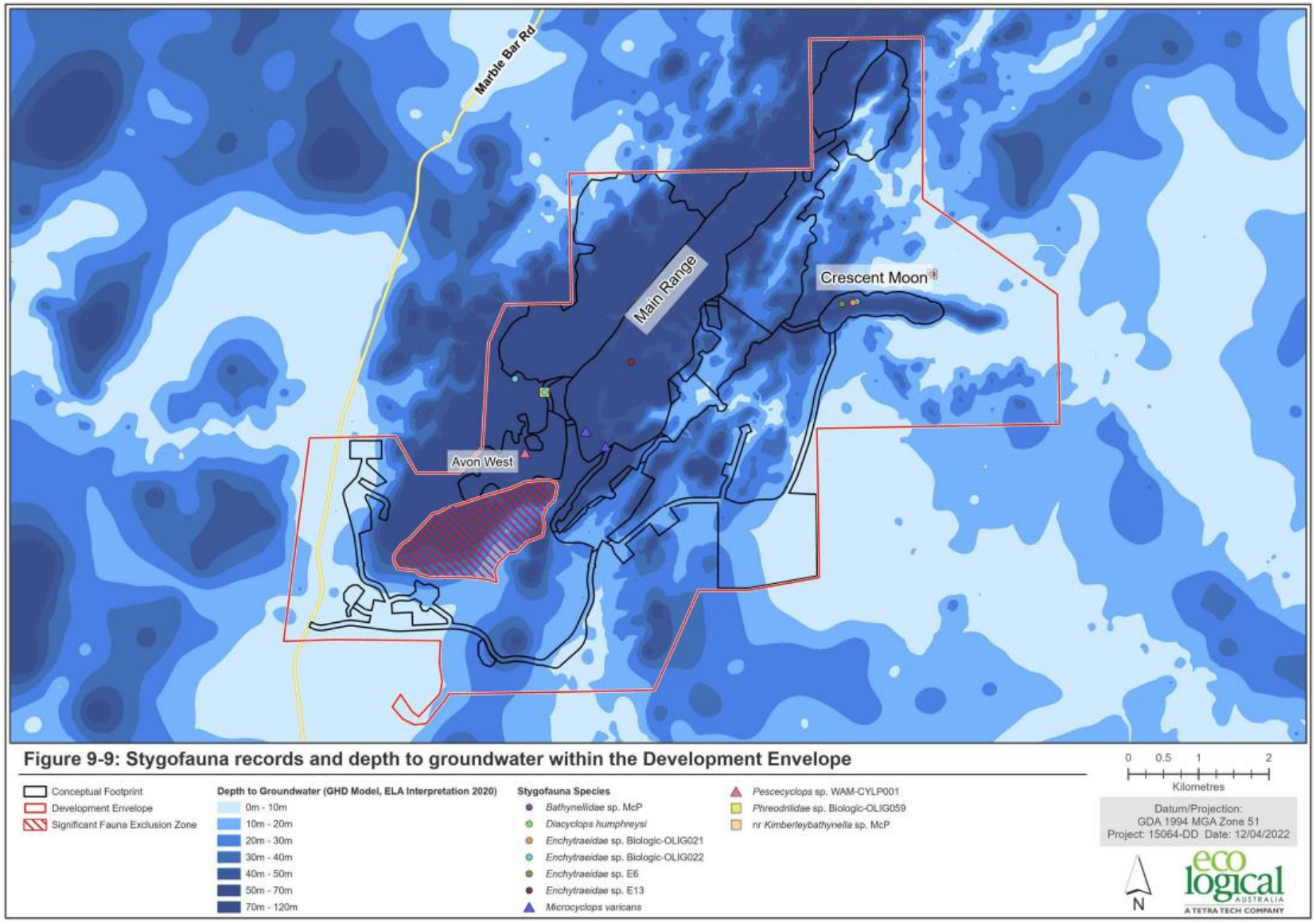

Figure 10: Recorded stygofauna within the McPhee Creek proposal Development envelope (taken from Atlas Iron 2022a)

2.4.5 Potential impacts from the proposal

Direct Impacts

The proposal has the potential to significantly impact on subterranean fauna from:

- the removal of 30% medium to high suitability troglofaunal habitat in the main range, and removal of 48% of medium to high suitability habitat in the Crescent Moon pit area of the development envelope
- loss of four troglofaunal individuals only known from impact areas of the main range, and a further loss of 15 troglofauna taxa only known from the Crescent Moon impact area.

The EPA recognises that stygofauna habitat would be lost from BWT mine excavation and through groundwater abstraction (that is, within the groundwater drawdown contour areas within the main range).

Indirect Impacts

The proposal has the potential for significant indirect impacts on subterranean fauna from:

- indirect loss of 43% of troglofauna habitat from vegetation clearing, waste dumps and topsoil stockpiles covering troglofauna habitat within the development envelope
- indirect loss of 38.2% of stygofauna habitat from vegetation removal or changes to infiltration from placement of mineral waste dumps within the development envelope
- indirect impacts from changes in surface hydrology or groundwater drawdown causing desiccation to the suitable troglofauna habitat
- indirect impacts to stygofauna habitat from waste dumps, exposure of PAF material, storage of PAF in waste dumps, and post-closure formation of pit lakes.

EPA considers the indirect impacts from blasting activities and vibration on troglofauna to be negligible. Studies associated with other Pilbara mining operations suggest that vibration and blasting have minimal effect on the integrity of geological structures (and, therefore, troglofauna habitat) even as close as 5 m away from the pit face (Rio Tinto 2018).

The EPA considers indirect impacts from contamination of soil or groundwater on subterranean fauna habitat are likely to be negligible as a result of well-established management practices and regulations for the handling, storage and disposal of hazardous wastes in accordance with requirements of the:

- *Dangerous Goods Safety Act 2004*
- *Environmental Protection Act 1986* (Part V)
- *Mining Act 1978*.

2.4.6 Avoidance measures

The proponent has designed the proposal to avoid impacts to subterranean fauna by:

- avoiding impacts to medium and high suitability troglofauna habitat through the retention of the Avon West area
- avoidance of 2.2 ha of high suitability habitat for troglofauna within the proposed topsoil stockpile area as controlled by recommended Condition B4-1.

2.4.7 Minimisation measures (including regulation by other DMAs)

The proponent has proposed measures to minimise impacts to subterranean fauna through:

- committing to implement a mining exclusion zone (MEZ) for the proposed Crescent Moon pit where 15 troglofauna taxa are known, until such a time that it can be demonstrated that the troglofauna habitat of Crescent Moon occurs in areas outside those to be impacted either through additional habitat modelling and/or additional sampling
- limiting groundwater drawdown by capping the abstraction to a maximum of 7.5 GL/a. The EPA notes that the abstraction of groundwater will be licensed by DWER under the RiWI Act, and the discharge of surplus mine water will be licensed by DWER under Part V of the EP Act.

2.4.8 Rehabilitation measures

The proponent has committed to progressively rehabilitate disturbed areas detailed in the mining proposal and mine closure plan required by DMIRS under the Mining Act. The progressive rehabilitation and revegetation will have the indirect effect of re-establishing nutrient flows into the subterranean environment to the benefit of subterranean fauna.

2.4.9 Assessment of impacts to environmental values

The EPA considered that the key environmental values for subterranean fauna likely to be impacted by the proposal are the loss of subterranean fauna habitat and taxa.

Public consultation on the proposal raised concerns regarding subterranean fauna sampling effort and consistency with the EPA technical guidance for subterranean fauna. The EPA notes subterranean fauna field surveys have been conducted for the proposal since 2010. The sampling effort, methods and sampling seasonality align with that recommended under EPA guidance (EPA 2021). The EPA notes the replication of sampling impact versus reference sites is not in accordance with EPA guidance (that is, equal number of sample sites between areas). However, the high number of sample sites taken over multiple years is likely to counteract the sampling effort imbalance.

Troglofauna

Development of mine pits within the main range will result in the removal of up to 30% of medium and high suitability troglofauna habitat, however, the proponent

advises that wider continuity and connectivity of suitable habitat (~70% AWT habitat being retained) will remain outside the pit boundaries providing suitable refugial habitat for troglofauna species affected by the proposal (Biologic 2021f). The EPA notes that a significant proportion (70%) of suitable, connected habitat will remain throughout the main range and Avon West areas. The EPA considers there is a high likelihood that the ecological integrity of the troglofauna habitat in this area will be maintained, and the environmental outcome is likely to be consistent with the EPA objective for subterranean fauna.

The development of the pit at Crescent Moon will result in the removal of up to 48% of medium and high suitability troglofauna habitat in the Crescent Moon area. The EPA notes 16 unique troglofauna taxa were recorded from the Crescent Moon area. The EPA considers if the proposal was to be implemented at Crescent Moon, based on the limited data on troglofaunal habitat connectivity within and outside the Crescent Moon area, it would likely result in a significant impact to troglofauna biodiversity recorded in the area. The proponent originally proposed the use of a Provisional Mining Exclusion Zone (PMEZ) for 50% of the Crescent Moon (western portion) to mitigate impacts and enable further surveys of troglofauna habitat to determine wider connectivity beyond the proposed mining pit. However, given the high endemism of troglofauna in the Crescent Moon area, and that four (4) of the 16 unique taxa (*Pauropoda* sp. Biologic-PAUR024', *Pauropoda* sp. Biologic-PAUR025, *Armadillidae* sp. Biologic-ISOP031', and *Trinemura* sp. Biologic-ZYGE032') are only found in the eastern area of the Crescent Moon area, the EPA recommends the PMEZ encompasses the entire (100%) Crescent Moon pit area through recommended condition B4, until it is demonstrated that suitable troglofauna habitat occurring at Crescent Moon extends beyond the proposed impacts and can demonstrate that the same troglofauna habitat occurs in areas beyond impacts. Additional benefits of the EPA recommended PMEZ approach would be provisional protection for SREs (see section 2.2) allowing for improved understanding of SREs and mitigation of potential impacts. The EPA considers if the proposal is implemented subject to the above condition, the environmental outcome is likely to be consistent with the EPA objective for subterranean fauna.

The extent of indirect impacts to potential subterranean fauna habitat from vegetation removal or changes to infiltration from placement of mineral waste dumps and/or topsoil stockpiles, is expected to be no more than approximately 43% of the modelled suitable habitat within the development envelope. The proponent advises that troglofauna are expected to utilise habitat in or below the proposed waste dumps within the main range and topsoil stockpile and waste dump located at Avon West based on studies associated with other iron ore mines (Rio Tinto 2018a), and troglofauna species recorded in this location were recorded from multiple sites and are unlikely to be restricted to the area occupied by the proposed topsoil stockpile.

The EPA notes the proponent has also committed to avoiding at least 2.2 ha (of the surface area) of high suitability troglofauna habitat to mitigate potential indirect impacts from habitat degradation. The EPA considers that the proponent has provided sufficient information as part of environmental review document and the response to submissions to demonstrate potential indirect impacts will be low in magnitude, temporary, and unlikely to significantly impact troglofauna habitat or species values. Implementation of the proposal subject to the EPA's recommended

conditions (see Table 7) will ensure the environmental outcome is likely to be consistent with the EPA objective for subterranean fauna.

Pre-mining troglofauna habitat is unlikely to derive much of its moisture from groundwater due to the depth (average depth approximately 50 m) of the fractured rock aquifer within the main range (Biologic 2021f). In addition, the Avon West area is largely outside of the direct areas of groundwater drawdown and the proponent advises that groundwater levels are not expected to decline significantly outside the main range pit areas as a result of the proposal (GHD 2021a). The EPA recognises that no groundwater drawdown or BWT mining will occur at Crescent Moon and impacts associated with groundwater drawdown will not occur. However, the EPA notes the proposed mining and land surface change have the potential to increase the rate of desiccation of the subterranean environment. The EPA advises that the residual impact to troglofauna should be subject to implementation conditions (recommended conditions A1, B3, and B4) to provide for the protection of the subterranean fauna and ensure the environmental outcome is likely to be consistent with the EPA objective for subterranean fauna.

Stygofauna

Direct impacts to stygofauna include the permanent loss of habitat lost through BWT mine excavation within the proposed pit areas of the main range, and additional impacts to stygofauna habitat will also occur from groundwater abstraction (see Figure 8 and section 2.3). Indirect impacts to stygofauna are similar to those identified for troglofauna and are associated with the degradation of habitat from clearing, changes in surface hydrology or contamination. The estimated extent of indirect impacts to potential stygofauna habitat from vegetation removal or changes to infiltration from placement of mineral waste dumps, is estimated to be 38.2 % of the surface extent of mapped habitats within the development envelope (Biologic 2021f)

The EPA notes that stygofauna taxa were depauperate within the development envelope and all recorded taxa were widespread, with no taxa being restricted to areas of proposed direct impact (Biologic 2021f). Further, mining within the Crescent Moon area will be AWT and no direct impacts to stygofauna will occur from mining excavation or dewatering. The EPA advises that impacts to stygofauna from mining excavation and groundwater abstraction are likely to be consistent with the EPA objective for subterranean fauna with the implementation of the proposal being subject to the EPA's recommended conditions (see Table 7 below; see section 2.3). The EPA notes the proponent's commitment to implement a water management plan (see section 2.3) which implicitly ensures management of potential subterranean fauna impacts. The EPA advises that the combination of statutory decision-making processes and the EPA's recommended condition B4 will ensure protection of stygofauna, ensuring the environmental outcome is likely to be consistent with the EPA objective for subterranean fauna.

Cumulative Impacts

The proponent considered cumulative impacts to subterranean fauna across a 20 km spatial extent. The proponent advised that there are no foreseeable mining projects

within this spatial extent. The EPA recognises the implementation of the proposal, subject to the EPA's recommended conditions (for example, condition requiring provisional mining exclusion at Crescent Moon) and other statutory decision-making processes, is likely to have a negligible cumulative impact and be consistent with the EPA objective for subterranean fauna.

2.4.10 Summary of key factor assessment and recommended regulation

The EPA has considered the likely residual impacts of the proposal on subterranean fauna environmental values. In doing so, the EPA has considered whether reasonable conditions could be imposed, or other decision-making processes can ensure consistency with the EPA factor objective. The EPA assessment findings are presented in Table 7.

The EPA has also considered the principles of the *Environmental Protection Act 1986* (see Appendix C) in assessing whether the residual impacts will be consistent with its environmental factor objective and whether reasonable conditions can be imposed (see Appendix A).

Table 7: Summary of assessment for subterranean fauna

Residual impact or risk to environmental value		Assessment finding or environmental outcome	Recommended conditions and DMA regulation
1.	Direct loss of subterranean fauna habitat and individuals.	The EPA considered that it is likely that troglofauna within the main range and Avon West areas are found outside the impact areas and the development envelope. However, there is likely to be a significant impact to troglofaunal in the proposed Crescent Moon pit area. As such, the EPA recommends conditioning the implementation of the proposed Crescent Moon provisional mining exclusion zone. Stygofauna habitat will be lost from mining and groundwater abstraction, however, recorded stygofauna taxa are widely distributed or occur outside of impacted areas. The EPA advises that subject to recommended conditions, and other statutory requirements the environmental outcome is likely to be consistent with the EPA factor objective for subterranean fauna.	**Condition A1** (Limitations and extent of proposal) Limits the loss of subterranean fauna habitat, groundwater abstraction and discharge of surplus water. **Condition B4** (Crecent Moon - Provisional Mining Exclusion Zone) Implement mining exclusion zone over Crescent Moon pit area until it is demonstrated that troglofauna habitat of Crescent Moon occur beyond directly impacted areas. **DMA regulation** Licensing of water abstraction by DWER under the *Rights in Water and Irrigation Act 1914* (RiWI Act). Licensing of emissions and discharges by

Residual impact or risk to environmental value		Assessment finding or environmental outcome	Recommended conditions and DMA regulation
			DWER under Part V of the EP Act. DMIRS can regulate progressive rehabilitation under the Mining Act.
2.	Indirect loss of subterranean fauna	Degradation of habitat from clearing, changes in surface hydrology or contamination is likely to impact subterranean fauna. The EPA considered that subject to recommended conditions, and other statutory requirements the environmental outcome is likely to be consistent with the EPA factor objective for subterranean fauna.	**Condition A1** (Limitations and extent of proposal) Limits the loss of subterranean fauna habitat, groundwater abstraction and discharge of surplus water. **Condition B3** (WMP) Implementation and revision of the WMP including management measures relating to surface water management and water quality monitoring. **DMA regulation** Licensing of water abstraction by DWER under the RiWI Act. Licensing of emissions and discharges by DWER under Part V of the EP Act. DMIRS can regulate progressive rehabilitation under the Mining Act.

2.5 Greenhouse Gas Emissions

2.5.1 Environmental objective

The EPA environmental objective for greenhouse gas (GHG) emissions is *to minimise the risk of environmental harm associated with climate change by reducing greenhouse gas emissions as far as practicable.*

2.5.2 Potential emissions from the proposal

The proposal will produce GHG emissions from:

- vegetation clearing
- plant and equipment used in construction activities
- plant and equipment used during operations, including drilling and blasting, excavation, crushing and screening, and haulage of ore
- onsite wastewater generation
- energy/electricity production from the use of diesel generators
- downstream shipping of ore
- downstream processing of ore into steel.

The *Environmental Factor Guideline – Greenhouse Gas Emissions* (EPA 2023a) provides that, generally, GHG emissions from a proposal will be assessed where they exceed 100,000 tonnes of scope 1 or scope 2 emissions each year measured in tonnes (t) of CO_2-e. This is currently the same as the threshold criteria for designation of a large facility under the Australian Government's *Safeguard Mechanism.*

The proponent has provided the following estimates of GHG emissions:

- scope 1: average of 56,711 tonnes of CO_2-e per annum, up to 90,995 tonnes of CO_2-e during the first year of operations
- no scope 2 emissions are expected due to the isolated location of the proposal
- scope 3 involving haulage, downstream processing, shipping and processing into steel: up to 20,286,450 tonnes of CO_2-e per annum.

The proposal includes the haulage of iron ore by road to other processing facilities, nominally the Roy Hill mine (Ministerial Statement 1189) located 116 km away. The proponent estimated GHG emissions associated with ore haulage to the Roy Hill site to be approximately 70,450 tonnes CO_2-e per annum. These emissions were considered by the proponent to represent scope 3 emissions on the basis that they result from activities undertaken by a third-party contractor. Throughout the assessment, the proponent has maintained that the GHG emissions from third-party haulage are not scope 1 emissions for the proposal. However, the EPA has concluded that the haulage of ore is an integral component of the proposal. As

noted[2] in the EPA's GHG Environmental Management Plan template (EPA 2023b), emission estimates and scopes should reflect the nature and extent of the 'proposal'. If there is a difference in the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) 'facilities' estimates or scopes and the EP Act 'proposal' estimates or scopes, NGER Act data should be utilised to provide emissions estimates, once adapted to be fit for purpose for the EP Act. The template provides the example that NGER emissions estimates for transport facilities are part of the proposal and should be estimated as scope 1 emissions under the EP Act.

The EPA has therefore assessed ore haulage emissions as scope 1 emissions. On this basis, the EPA notes that the proposal has the potential to emit GHG emissions which exceed 100,000 tonnes of CO_2-e scope 1 emissions per annum. The EPA has based its assessment on the following estimates of GHG emissions:

- scope 1 (including haulage): average of 127,161 t of CO_2-e per annum
- no scope 2 emissions
- scope 3 involving downstream processing, shipping and processing into steel: up to 20,216,000 t of CO_2-e per annum
- total scope 1 emissions of 1,964,127 t of CO_2-e over the life of the project.

For the purposes of benchmarking the proposal against comparable projects, the proponent has benchmarked the scope 1 GHG emissions intensity (emissions per unit of production) of the proposal against comparable iron ore projects in the Pilbara. The proponent estimated an emissions intensity of 0.0057 tonnes of CO_2-e per tonne of ore produced, based on an average production rate of 10 Mtpa. Benchmarked against other iron ore projects (Table 11-8 of the ERD Atlas Iron 2022a) the emissions intensity of the proposal is comparable or slightly lower. The proponent's scope 1 emissions intensity estimate excluded emissions resulting from haulage of ore from the mine to the processing facility, which comprise more than 50% of the proposal scope 1 emissions. The EPA notes that the proponent selected projects for benchmarking with similar emission sources, that is, projects not including haulage or ore.

2.5.3 Consultation

Public consultation on the proposal did not raise any specific concerns relating to GHG emissions.

2.5.4 Minimisation measures (including regulation by other DMAs)

The proponent has identified the following measures to minimise GHG emissions:

- removing on-site processing of ore and taking advantage of efficiencies by processing at an existing off-site facility
- reducing GHG emissions though selection of efficient design and equipment technologies such as:

[2] See 'note ii' of Attachment 2 (EPA 2023b)

  - use of diesel fuel additive
  - optimisation of operational design and layout
  - regular inspection, maintenance and replacement of equipment to retain energy efficiencies
  - use of solar-powered lighting and pumps
  - design and construction of accommodation camp and relating facilities to meet energy efficiency standards
- implementing the McPhee Creek Iron Ore Project Greenhouse Gas Management Plan (GHGMP) (Atlas Iron 2022d). The GHGMP includes emission reduction targets to meet net zero emissions by 2050, consistent with the EPA's factor guidance (EPA 2023a).

The EPA notes that scope 1 emission reduction targets in the GHGMP do not account for haulage related emissions. The emission reductions in the proponent's GHGMP relate to reductions in emissions that occur over the life of mine from natural process efficiencies from mine planning, as opposed to adoption of best practice design, technology, and management to avoid, reduce or offset scope 1 GHG emissions. Furthermore, the achievement of net zero emissions by 2050 appears to be achieved as a consequence of the relatively short project life (15 years) and anticipated completion of operations by approximately 2039.

The EPA notes that, until emissions are under 100,000 tonnes CO_2-e per annum, the proponent will be subject to reporting requirements of the Clean Energy Regulator to comply with the NGER Act, and subject to the NGER Emissions Reduction Fund Safeguard which requires facilities whose net emissions exceed the safeguard threshold to keep emissions at or below baseline.

2.5.5 Assessment of impacts to environmental values

GHG emissions from a cumulative range of sources have an impact on Western Australia's environment, even if the specific impact of a particular proposal's emissions may not be known with certainty. This is because there is an established link between GHG emissions and the risk of climate change. The EPA recognises that climate change will impact on Western Australia's environment and environmental values. For example, climate change has already caused a significant drying of the state's south-west, which in turn places significant additional pressures on water resources, flora and fauna, marine environmental quality, and social surroundings. The EPA therefore considers GHG emissions to be a key environmental factor in the assessment of the proposal.

There is also an established correlation between global temperature rise and greenhouse gas emissions. The EPA advises that for every 1,000 Gt CO2-e emitted by human activity, global surface temperature rises by 0.45°C (best estimate, with a likely range from 0.27°C to 0.63°C) (IPCC Climate Change 2023 Synthesis Report Summary for Policy Makers B.5.2).

The EPA therefore considers that percentages of Western Australia and Commonwealth emissions, and carbon budgets, can be useful assessment tools to

inform assessment, although they alone do not alone determine the outcome of assessment.

The EPA has considered the proponent's baseline GHG emissions estimates in the context of comparable iron ore projects in the state. Consistent with the proponent's benchmarking exercise referred to in section 2.5.2, the EPA has concluded that the estimated emissions intensity for the proposal is not dissimilar to comparable iron ore projects. The EPA also notes that the proposal's emissions intensity of 12.2 kg CO_2-e/t ore, including haulage, is broadly comparable with the emissions intensity of 11.9 kg CO_2-e/t ore estimated from a 2015 life cycle analysis of iron ore projects in Australia (Haque & Norgate 2015).

The EPA has also considered the proponent's baseline GHG emissions estimates against the relevant NGER safeguard mechanism default emissions intensities as specified in Schedule 1 of the *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015*. The EPA notes that the proponent's baseline intensity of 12.2 kg CO_2-e/t ore is approximately 24% higher than the combined NGER safeguard default intensity of 9.86 kg CO_2-e/t ore (for iron ore extraction and processing, and heavy haulage).

In summary, the EPA concluded that the proponent's baseline emissions estimates are plausible and not dissimilar to comparable projects in the state. The EPA is therefore satisfied that the proponent's baseline emissions estimate of 127,161 tonnes CO_2-e per annum on average (including haulage) is appropriate to form the basis for the EPA's assessment and recommended conditions.

The EPA has assessed total scope 1 GHG emissions from the proposal to be 1,964,127 tonnes CO_2-e under the baseline scenario of no additional mitigation and an operational life of 15 years.

The annual estimated scope 1 GHG emissions from the proposal would, at commencement of operations, constitute approximately 0.2% of Western Australia's total emissions (based on 2021 emissions of 80.2 Mt CO_2-e) (DCCEEW 2023) and 0.035% of Australia's total reported GHG emissions for 2022 of 463.9 Mt CO_2-e (DCCEEW 2022).

The annual estimated scope 3 GHG emissions would be approximately 25.2% of WA's emissions based on 2021 emissions. Processing, transport to Port, loading to ships (196,000 t CO_2-e per annum) and shipping (1,120,000 t CO_2-e per annum) is likely to be considered scope 1 emissions for WA's State-wide emissions. Total emissions in WA as a result of the proposal will therefore constitute 1.64% of WA's scope 1 emissions (based on 2021 emissions). The percentage of WA's scope 1 emissions as a result of the proposal will also increase over time as WA begins its trajectory to net zero emissions by 2050, and would become a material contribution to WA's emissions at the end of proposal life.

The best estimates of the remaining global carbon budgets from the beginning of 2020 are 500 GtCO2 for a 50% likelihood of limiting global warming to 1.5°C (IPCC Climate Change 2023 Synthesis Report Summary for Policy Makers B.5.2). Remaining carbon budgets from 2020 depend on emissions and emissions

mitigation from that time (IPCC Climate Change 2022 Summary for Policy Makers B.1.3).

The objective of the GHG Emissions Guideline is *to minimise the risk of environmental harm associated with climate change by reducing greenhouse gas emissions as far as practicable.*

The EPA notes that the GHG Emissions Guideline does not mandate net zero emissions over the life of a proposal. Rather, its objective is reduction of emissions having regard to the United Nations Framework Convention on Climate Change (UNFCC) Paris Agreement and the Intergovernmental Panel on Climate Change's (IPCC) 1.5 report which recommend achievement of net zero emissions by 2050. When assessing proposals where greenhouse gas emissions are a key environmental factor, the EPA therefore usually considers a proposal's annual and total contributions to GHG emissions, but also assesses the proponent's contribution and trajectory towards this net zero by 2050 goal.

The intent of the EPA's GHG Emissions Guideline is to inform the development and assessment of proposals, not determine the outcome of the EPA's assessment. Consistent with this, the EPA assesses proposals where GHG emissions are a key environmental factor on a case-by-case basis and recognises that a flexible approach is important to drive innovation and improvement in best practice technologies.

In relation to the proposal, the EPA had particular regard to:

- annual and total contributions to GHG emissions (see above), the emissions intensity of the proposal (including by considering industry benchmarking)
- whether the proponent has committed to achieving reduction targets over time in accordance with a linear trajectory (based on five yearly targets) to achieve net zero by 2050
- whether it has incorporated continual improvement
- transparency and reporting
- whether it has considered offsetting emissions.

In considering these, the EPA has noted:

- the proponent's benchmarking assessment, which found that its projected scope 1 GHG emissions, excluding haulage, are lower or comparable to similar iron ore projects in the Pilbara
- the proponent's commitment to net zero greenhouse gas emissions by 2050
- the proponent's adoption of a continuous improvement approach to ensure improvement opportunities are identified and implemented every four years
- the proponent's consideration of best practice design to reduce emissions
- the proponent's use of offsets to ensure proposed targets can be achieved (if continuous improvement opportunities are not sufficient).

2.5.6 Consideration of conditions

The EPA considers it is reasonable to recommend a condition which requires the proposal to achieve GHG emissions limits along an approximately linear trajectory (based on five yearly limits) to net zero by 2050. To provide certainty and transparency, the recommended condition is based on the proposal achieving (or bettering) emission reduction limits.

The EPA also believes it is reasonable to recommend the proponent implement a GHGMP that sets out emission reduction limits, and continuous improvement by going through ongoing five yearly reviews. Conditions relating to reporting, audits, peer reviews, and summary plans and reports are also recommended to increase transparency and continuous improvement of the proposal's GHG emissions and emissions intensity.

The GHG conditions recommended by the EPA require achievement of specific GHG emission limits but are flexible enough to be able to ensure the GHGMP include innovation and improvement in best practice technologies.

The EPA recognises that the Commonwealth Safeguard Mechanism may require the proponent to take similar or additional actions to reduce GHG emissions. In recognition of this, the recommended GHG condition includes emission reduction limits as an upper limit reflecting worst case scenario emissions outcomes. The model scope 1 GHG condition is included in the EPA's recommendations for consistency, and to ensure that emissions reductions are continued to be achieved in the event of significant change to Commonwealth law or policy. The requirement to implement the GHGMP may be suspended (recommended condition C2-1) if it can be demonstrated that the specified emissions reductions will be achieved, or bettered, through the requirements of another statutory process.

The EPA notes that the science and policy of GHG emissions and climate change are rapidly evolving. The EPA advises the GHG conditions are expected to be able to be responsive to this, particularly by enabling reviews of the GHGMP to reflect any significant changes (for example, if there are material changes to relevant state, Commonwealth or international GHG science or policy). The EPA also notes the Minister can direct the EPA to inquire into Ministerial statement conditions (including GHG conditions) at any time.

The EPA believes the recommended GHG emissions condition (condition B5) will be responsive enough to take account of changes in this evolving area as well as provide the need for innovation and improvement in best practice technologies. The conditions are also consistent with the GHG Emissions Guideline which is based on a continuous improvement approach to emissions reduction.

2.5.7 Summary of key factor assessment and recommended regulation

The EPA has considered whether the residual emissions from the proposal are consistent with the principles of the EP Act (see Appendix C) and with the EPA factor objective for GHG emissions.

In doing so, the EPA has also considered whether reasonable conditions could be imposed to reduce potential inconsistency with the EP Act principles and EPA factor objective.

The EPA advises that, with the application of the recommended condition, and the proponent's adoption of efficient technology, continuous improvement, and commitment to delivering against (at worst) a linear trajectory of net zero greenhouse gas emissions by 2050, the proposal is generally consistent with the EPA's GHG Emissions Guideline.

However, residual emissions remain estimated to add a potential 1,409,417 tonnes of CO_2-e over 16 years to WA emissions. Although this represents a significant reduction in the 1,964,127 tonnes CO_2-e tonnes which were estimated from the proposal without application of the recommended conditions, whether this reduction is sufficient to minimise the risk to climate change impacts to WA's environment depends on the state of cumulative emissions over time (such as whether any current emission sources discontinue).

Table 8: Summary of assessment for greenhouse gas emissions

Residual emissions		Assessment finding	Recommended conditions and DMA regulation
1.	Scope 1 emissions during operations are expected to commence at 161,445 tonnes CO_2-e per annum. Emissions at commencement are estimated to represent 0.2 % WA annual emissions (based on 2021 data). The proposal will not produce any scope 2 GHG emissions. Scope 3 GHG emissions associated with downstream processing, shipping and processing into steel are estimated to be up to 20,216,000 tonnes of CO_2-e per annum. GHG emissions contribute to climate change, which impacts on WA's environment.	1,409,417 tonnes scope 1 GHG emissions CO_2-e over 16 years, including construction. The following aspects of the proposal are generally consistent with the GHG Guideline (where relevant): • reduction of scope 1 emissions to net zero by 2050 • continuous improvement approach • use of efficient technology • benchmarking that projected GHG emissions are expected to be comparable in emissions intensity of similar iron ore projects.	**Condition B5** Achievement of and reporting on specific emissions limits. Revision, implementation and review of the GHGMP. Complementary reporting requirements to the Clean Energy Regulator to comply with the *National Greenhouse and Energy Reporting Act 2007* (NGER Act). Complementary application of the NGER Emissions Reduction Fund Safeguard which requires facilities whose net emissions exceed the safeguard threshold to keep emissions at or below baseline.

2.6 Social Surroundings

2.6.1 Environmental objective

The EPA environmental objective for social surroundings is *to protect social surroundings from significant harm* (EPA 2023c).

2.6.2 Investigations and surveys

The proponent has undertaken Aboriginal archaeological and ethnographic surveys within the development envelope from 2012 through to 2021 (see Table 10-2 of Atlas Iron 2022a)). A consultation summary report and detailed description of consultation outcomes between the proponent and relevant Nyamal Traditional Owners have been provided to support the mapping of Aboriginal cultural values (appendix B of the Draft Aboriginal Cultural Heritage Plan version 2: Atlas Iron 2022e). The proponent advised that between 2012 and 2022, 28 surveys have been conducted with relevant Nyamal Traditional Owners across the development envelope; including up to 1 km beyond the development envelope.

Consultation has also been undertaken with the Bonney Downs leaseholder, and the proponent advises that to date there has been no opposition to the proposal by the leaseholder.

The EPA considers that it has sufficient information to assess impacts on social surroundings.

2.6.3 Assessment context: existing environment

Native title has been partly determined within the Nyamal Native Title Claim Area (WC 1999/008), with determined areas (to the north of the proposal area) being represented by the Nyamal Aboriginal Corporation. The remaining undetermined area in which the proposal is located has not yet been determined by the Native Title Tribunal, with the native title claimants (Nyamal #1) being the representatives/stakeholders and/or the recognised knowledge holders for undetermined area.

Atlas has a Native Title Agreement (Agreement) with the Nyamal Traditional Owners. In addition to State and Federal legislative requirements, the proponent and relevant Nyamal stakeholders have an Aboriginal Heritage Protocol and Protection of Sites, as per the Agreement.

Surveys undertaken to date (28 surveys since 2012) have recorded 73 archaeological and ethnographic sites and potential sites within the development envelope (and up to 1 km beyond the development envelope), including artefact scatters, engravings, grinding patches, quarries, rock shelters, water sources and areas of ritual and mythological importance (Atlas Iron 2022a). There are no Protected Areas or registered Aboriginal cultural heritage of State Significance within the development envelope. The Department of Planning, Lands and Heritage (DPLH) Aboriginal Cultural Heritage Inquiry System identified two Registered Aboriginal Sites and eight Lodged Other Heritage Places (Atlas Iron 2022a; Atlas Iron 2022c).

Thirteen sites were identified as areas of high priority by the relevant Nyamal Traditional Owners due to their cultural significance and location in relation to the indicative footprint. Six high priority sites (MCP-02-12, MCP-03-12, MCP-04-12, MCP-14-12, MCP-43-13A, and MCP-44-13A) classified as 'Other Heritage Places' are located within the development envelope and have been lodged with DPLH. The relevant Nyamal Traditional Owners have also identified MCP-07-12, MCP-100-21, MCP-10-12, MCP-80-14, MCP-90-19, MCP-91-10, MCP-95-21 as sites of high cultural significance for the relevant Nyamal people.

The proposal's development envelope is located entirely within the Atlas held mining tenement M45/1243-I and miscellaneous licences L45/598 and L46/158. The development envelope also includes public and private infrastructure (including roads), pastoral activity with Bonney Downs Pastoral Lease (southern portion of the development envelope) and unallocated Crown Land (northern portion of the development envelope).

2.6.4 Consultation

Public consultation on the proposal raised concerns about the impacts to surface water pools, culturally significant flora and fauna values and culturally significant sites for the Nyamal people.

2.6.5 Potential impacts from the proposal

Direct Impacts

Four sites have been identified where impact is unavoidable and the sites will be destroyed, the sites include:

- MCP-05-12 – a quarry surrounded by an artefact
- MCP-47-13 – a discrete but dense quarry and artefact scatter
- MCP-36-13 – a quarry and artefact scatter site
- MCP-10-12 – a medium sized rock shelter comprised of a small, single chamber.

Another key risk to aboriginal and cultural heritage arises from unauthorised ground disturbance (that is, within heritage sites or within areas that have not been heritage surveyed) and/or unauthorised access to heritage sites. Mining operations will also potentially restrict access to country and Aboriginal cultural heritage sites for the relevant Nyamal Traditional Owners.

Indirect Impacts

The proposed mining operations associated with the proposal are also likely to result in indirect impacts to Aboriginal cultural heritage, including:

- temporary increase in dust, light and noise emissions due to blasting, general operation of heavy machinery, vehicles and diesel generators, and the presence of personnel
- changes to surface water flows and water quality from the reduction in catchment, as well as potential deterioration of surface water quality from

increased sediment runoff and PAF material placed within the waste rock dump which can potentially impact culturally significant flora and fauna (see section 2.1, 2.2, and 2.3)

- dewatering discharge of excess water to culturally important creek lines, (McPhee Creek, a branch of the McPhee Creek and Lionel Creek), impacting culturally significant flora and fauna (see section 2.1, 2.2, and 2.3)
- potential structural damage (that is, rockfall) or the occurrence of fly rock within heritage sites from blasting
- the introduction/spread of weeds and increased presence of non-indigenous fauna species (see section 2.1, and 2.2)
- alteration of fauna behaviour, injuries to and mortalities of fauna from interactions with vehicles, infrastructure, and machinery (see section 2.2).

2.6.6 Avoidance measures

The proponent has designed the proposal to avoid direct impacts to 69 of the 73 identified Aboriginal heritage sites and cultural values within the development envelope.

The EPA commends the proponent for this level of avoidance.

2.6.7 Minimisation measures (including regulation by other DMAs)

The proponent outlined the following minimisation measures to reduce both direct and indirect impacts to social surroundings:

- where avoidance is not possible (MCP-05-12, MCP-47-13, MCP-36-13, and MCP-10-12), the proponent has committed to engage the relevant Nyamal Traditional Owners to salvage artefacts (subject to approvals under the AH Act) prior to commencement of ground disturbing work in these areas
- creating a centralised proposal Aboriginal cultural heritage sites management database for recording sites of cultural significance
- avoidance and physical demarcation of heritage sites inclusive of buffers
- commitment to the implementation of:
    - Environmental Management Standard
    - Significant Site Demarcation Standard
    - Ground Disturbance Permit Procedure
    - Fauna Management Procedure
    - Dust Management Procedure
    - Clearing and Grubbing Procedure
    - Significant Site Demarcation Procedure
    - commitment to the implementation of:
    - Significant Species Management Plan (see section 2.2)
    - Water Management Plan (see section 2.3)

  - Blast Management Plan
- Mine Closure Plan
- implementation of Aboriginal cultural heritage protocols created and agreed to by the proponent and the relevant Nyamal Traditional Owners
- implementation of any requirements of the AH Act.

The proponent has also committed to consulting with the relevant Nyamal Traditional Owners in the ongoing development and review of the proposal's Mine Closure Plan required by DMIRS under the Mining Act. The draft mine closure plan indicates the proponent will:

- collect and use of local seed and flora species of cultural significance (bush tucker and medicinal plants) in rehabilitation
- ensure ongoing access to all heritage sites during and post-closure
- involve the relevant Nyamal Traditional Owners in rehabilitation activities.

The proponent advises the mine closure outcomes will include, but are not limited to:

- avoidance of heritage sites during closure works
- reinstatement of environmental values
- reinstatement of access to heritage sites and areas of cultural value.

2.6.8 Assessment of impacts to environmental values

The EPA considered that the key values for social surroundings likely to be impacted by the proposal include Aboriginal heritage sites and cultural values, including ethnobiological impacts resulting to impacts on terrestrial fauna, flora and inland waters (see section 2.1, 2.2, and 2.3). The loss of and/or restrictions on access to Country is also likely to result in impacts to cultural heritage values.

Direct impacts to Aboriginal heritage sites

Of the four sites subject to direct impacts, three are quarry and artefact scatter sites (MCP-05-12; MCP-47-13; MCP-36-13) and will be completely lost, however, the proponent advises that the relevant Nyamal Traditional Owners consider these sites as being of low archaeological and cultural significance (Atlas Iron 2022c; Atlas Iron 2022a). The proponent has also advised that these sites are representative of this site type within the region and occur frequently in both the development envelope and more broadly across the Pilbara region (Atlas Iron 2022d). The EPA notes the proponent has committed to recovering any material remains during archaeological salvage with relevant Nyamal Traditional Owners (subject to the relevant approvals under the AH Act).

Site MCP-10-12 is an approximately 10,000-year-old rock shelter valued by the relevant Nyamal Traditional Owners as a place that ancestors used. The proponent advises that excavation of subsurface artefacts and datable charcoal used to inform the interpretation of past activities at the site (Atlas Iron 2022a; Atlas Iron 2022c) did not indicate any extra-ordinary archaeological data regarding site MCP-10-12 within the east Pilbara context. The EPA notes the results of the excavation and analysis

works have yet to be considered by the relevant Nyamal Traditional Owners in relation to potential impacts to or ongoing management of site MCP-10-12 and that they previously advised the proponent that the site had high cultural significance for the Nyamal people.

The EPA advises that approvals to disturb Aboriginal cultural heritage are likely to be required under Aboriginal heritage legislation. However, given the state of flux of Aboriginal heritage legislation at the time of this report, including the extent to which the proposed amendments to the AH Act will protect Aboriginal cultural heritage and/or require consultation with the Traditional Owners, the EPA is not able to be satisfied that its social surroundings objective can be met for site MCP-10-12 under legislation at this time. The EPA has therefore recommended condition B6-1(1) which would require:

- no disturbance to Aboriginal cultural heritage sites in the development envelope, unless consent is granted to disturb that site under WA legislation which specifically relates to Aboriginal heritage and has required informed consultation with relevant Traditional Owners.

The EPA also considers Traditional Owner access to and cultural use of land should be required to ensure the proposal is likely to be consistent with the EPA objective for this factor, and has recommended condition B6-1(2) requiring this.

Other affects to Aboriginal cultural heritage from changes to physical and biological surroundings

The remaining 69 Aboriginal cultural heritage sites identified (in particular, sites MCP-02-12; MCP-03-12; MCP-04-12; MCP-100-21; MCP-07-12; and MCP-92-20 due to their close proximity to mining operations) are likely to be affected by:

- changes to surface water flows, potential impacts to pool permanency/levels and water quality (see section 2.3), especially the range pools associated with rockhole sites (MCP-02-12; MCP-03- 12; and MCP-04-12)
- blasting activities and vehicle traffic, such as structural damage (that is, rockfall) or the occurrence of flyrock, and geotechnical stability around Aboriginal cultural heritage sites
- dust or waste rock
- access restrictions to Aboriginal cultural heritage sites during mining operations and post-closure.

The EPA considers that the nature of the proposal means impacts may extend beyond the development envelope, resulting from the dewater discharge to the creek lines and the extent of the expected wetting front (see section 2.3).

The EPA considers the following are likely to ensure the EPA objective for social surroundings will be met in relation to the indirect impacts to Aboriginal cultural heritage:

- EPA's recommended condition B6-3 in relation to Traditional Owner consultation for revisions of the significant species and water management plans
- mine closure planning under the Mining Act which has taken traditional owner views into account, and will require ongoing consultation
- the proponent's cultural heritage protocols created and agreed to by the proponent and the relevant Nyamal Traditional Owners.

The EPA recognises the significant cultural links between the relevant Nyamal Traditional Owners and the three major creek lines of the area (Atlas Iron 2022c; Atlas Iron 2022a). The EPA advises that indirect impacts to Aboriginal cultural heritage associated with the creek lines beyond the development envelope is likely to be consistent with the EPA objective for social surroundings, if the proposal implementation is subject to the EPA's recommended conditions for terrestrial flora and vegetation (see section 2.1), terrestrial fauna (see section 2.2) and inland waters (see section 2.3). These conditions will ensure that impacts on the physical and biological environment are reduced to the extent they are not likely to significantly impact on social surroundings values.

Cumulative impacts

Native vegetation and fauna are important to the relevant Nyamal Traditional Owners for cultural uses, for example, bush tucker and bush medicines. As outlined in section 2.1 (flora and vegetation) and section 2.2 (terrestrial fauna), the cumulative impact of the proposal is not expected to be significant, and this is expected to be consistent for any cumulative impacts on culturally important flora and fauna values.

2.6.9 Summary of key factor assessment and recommended regulation

The EPA has considered the likely environmental outcomes of the proposal to social surroundings environmental values. In doing so, the EPA has considered whether reasonable conditions could be imposed, or other decision-making processes can ensure consistency with the EPA's factor objective. The EPA's assessment findings are presented in

Table 9.

The EPA has also considered the principles of the EP Act (Appendix C) in assessing whether the residual impacts will be consistent with its environmental factor objective and whether reasonable conditions can be imposed (see Appendix A).

Table 9: Summary of assessment for social surroundings

Residual impact		Assessment finding	Recommended conditions and DMA regulation
1.	Direct impacts to Aboriginal heritage sites.	Up to four heritage sites would be directly impacted as a result of the proposal. The EPA is not satisfied at this time that the loss of the MCP-10-12 rock shelter would be consistent with its environmental objective for social surroundings. Aboriginal heritage legislation may provide this satisfaction, once it is in place. For other direct impacts on known sites, the EPA is satisfied its objective can be met.	**Condition A1** (Limitations and extent of proposal) **Condition B6** (Aboriginal cultural heritage) Requiring avoidance and otherwise minimisation of disturbance to Aboriginal cultural heritage sites, unless consented to through approvals under Aboriginal heritage legislation.
2.	Indirect impacts from dust, noise, vibrations, and visual amenity to Aboriginal cultural heritage sites.	The EPA has concluded that there is the residual risk of indirect impacts to cultural heritage sites from dust, noise, vibrations and visual amenity. The proponent has committed to implement the Dust Management Procedure (950-EN-PRO-0003) and implement and revise other protocols with relevant Traditional Owners including management measures relating to rock hole management, water quality monitoring. These, with the recommended conditions to avoid and otherwise minimise indirect impacts, ensure the environmental outcome is consistent with the EPA objective for social surroundings.	**Condition B6** (Aboriginal cultural heritage) The proponent to take reasonable steps to consult with traditional owners about revisions to relevant fauna and water management plans. Conditions to require avoidance where practical and otherwise minimisation of adverse impacts to cultural values within and surrounding the development envelope.
3.	Potential loss of relevant Nyamal Traditional Owner	The proponent has committed to mitigation measures to ensure ongoing and safe access to	**Condition B6** (Aboriginal cultural heritage)

Residual impact		Assessment finding	Recommended conditions and DMA regulation
	access to country and Aboriginal cultural heritage sites	country and to Aboriginal cultural heritage sites by the relevant Nyamal Traditional Owners.	Subject to reasonable health and safety requirements, no interruption of ongoing access to land utilised for traditional use or custom by relevant Traditional Owners.

3 Holistic assessment

While the EPA assessed the impacts of the proposal against the key environmental factors and environmental values individually in the key factor assessments above, given the link between flora and vegetation, terrestrial fauna, inland waters, subterranean fauna, GHG emissions and social surroundings factors, the EPA also considered connections and interactions between them to inform a holistic view of impacts to the whole environment.

Figure 11 illustrates the connections and interactions between the key environmental factors to inform the EPA's holistic assessment.

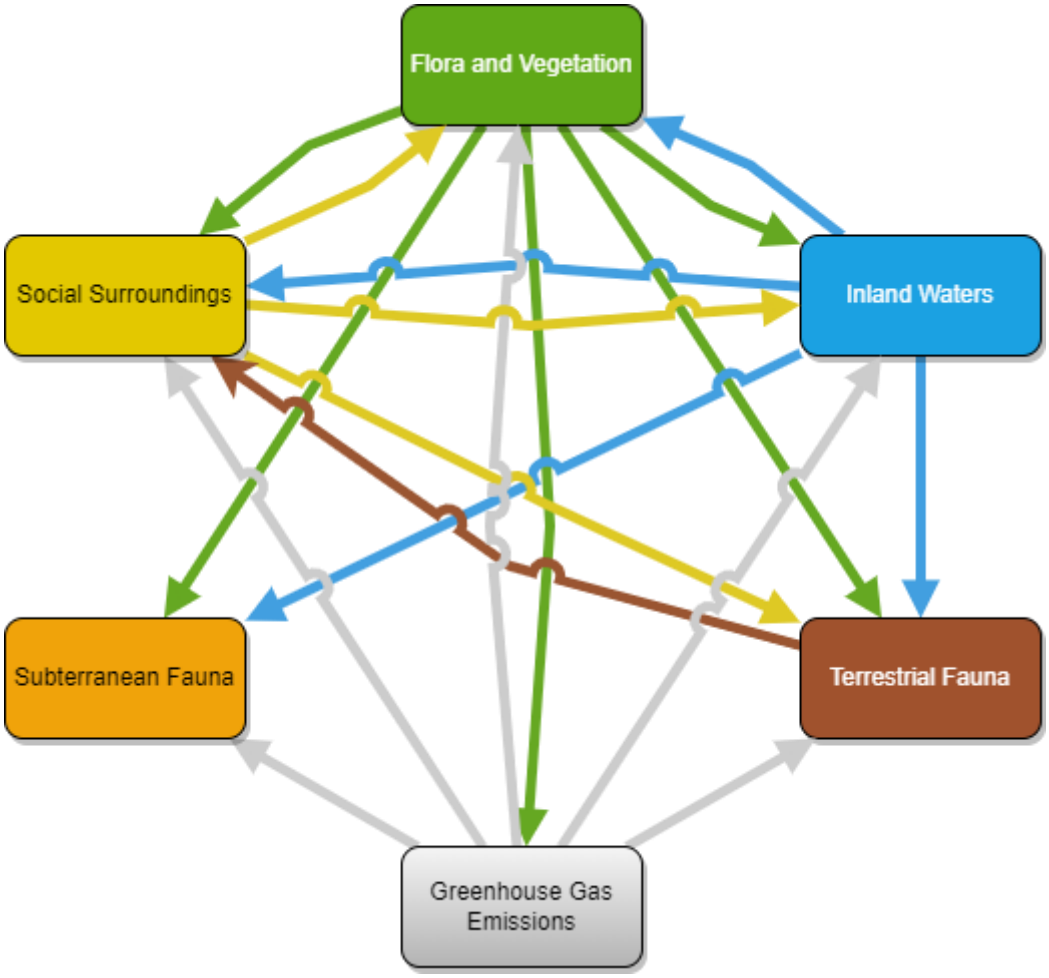

Figure 11: Intrinsic interactions between environmental factors

Flora and vegetation, terrestrial fauna, inland waters and subterranean fauna

Flora and vegetation, terrestrial fauna, and subterranean fauna have an integral reliance on inland waters to sustain and maintain growth. Groundwater and surface water catchments also sustain subterranean fauna. The flora and vegetation provide important habitat to fauna, including conservation significant fauna and short-range endemics. Minimising impacts to flora and vegetation and maintaining habitat connectivity will minimise impacts to terrestrial fauna.

The surface water catchments and groundwater aquifers of the proposal area support groundwater-dependent ecosystems such as vegetation and fauna habitat, which are an important environmental and cultural asset. The EPA recognises that there are inherent links between the inland waters factor and other environmental factors. For example, changes to the quality or quantity of inland waters can affect flora and vegetation, and social surroundings. The ecosystem health values related to inland waters generally include ability to sustain vegetation, aquatic fauna and terrestrial fauna habitat and the ecological processes that support them, including the strong cultural links for the Nyamal Traditional Owners.

The EPA considers that the proposed mitigation and management measures and recommended conditions for managing impacts to flora and vegetation will also mean the interrelated impacts to the health of other factors of the environment including the values associated with terrestrial fauna, inland waters, subterranean fauna, and social surroundings are likely to be consistent with the EPA environmental factor objectives. In addition, the EPA considers that the recommended conditions and the proposed mitigation and management measures for impacts to inland waters will also mean the interrelated impacts to the health of other environmental factors, including the values associated with flora and vegetation, terrestrial fauna, subterranean fauna, and social surroundings are likely to be consistent with the EPA environmental factor objectives.

Greenhouse gas emissions

There is an established link between GHG emissions and the risk of climate change. Consequently, cumulative GHG emissions have the potential to impact on all other environmental factors through the effects of climate change.

The EPA recognises that climate change will impact on Western Australia's environment and environmental values. The EPA considers that the proposed mitigation conditions to regulate GHG emissions will be appropriate to ensure impacts to other factors and values of the environment including the values associated with flora and vegetation, terrestrial fauna, inland waters, subterranean fauna and social surroundings are likely to be consistent with the EPA environmental factor objectives.

Social Surroundings

Aboriginal cultural associations, including traditional Aboriginal customs, directly link to the physical or biological aspects of the environment. This may include hunting, and collecting traditional bush foods and medicine which may be disrupted due to impacts to flora and vegetation and fauna. Water resources are of great importance to the Nyamal Traditional Owners. The impact assessment has considered the strong connections of the relevant Nyamal Traditional Owners to the land, and the potential impacts that restricted access to country, disturbance from the proposal and changes to ground and surface water, flora and vegetation, including riparian vegetation, and terrestrial fauna may have on this connection.

The EPA considers that the proposed mitigation and management measures and recommended conditions for impacts to social surroundings will also mean the interrelated impacts to the health of other factors of the environment including the values of flora and vegetation, terrestrial fauna and inland waters are likely to be consistent with the EPA environmental factor objectives.

Summary of holistic assessment

When the separate environmental factors and values affected by the proposal were considered together in a holistic assessment, the EPA formed the view that the impacts from the proposal would not alter the EPA's views about consistency with the EPA's factor objectives as assessed in section 2.

4 Offsets

Environmental offsets are actions that provide environmental benefits which counterbalance the significant residual impacts of a proposal.

Consistent with the *WA Environmental Offsets Guidelines* (Government of Western Australia 2014), the EPA may consider the application of environmental offsets to a proposal where it determines that the residual impacts of a proposal are significant, after avoidance, minimisation and rehabilitation have been pursued.

The EPA considers that the clearing of native vegetation and impacts on other associated environmental values in the Pilbara IBRA bioregion is significant where the cumulative impact may reach critical levels if not managed (EPA 2014). The Pilbara's unique land tenure hampers the delivery of offsets, and the Pilbara Environmental Offsets Fund (PEOF) has been established to provide a strategic landscape-scale approach that builds on regional programs to deliver environmental offset outcomes greater than can be achieved by individual proposals.

Projects currently being delivered through the PEOF include weed management at the Woodstock Abydos Aboriginal Reserve, coordinated fire management programs in the Fortescue River area, and an eradication program of *Parkinsonia aculeata* along the Shaw River. Together, these programs are aiming to control threatening processes to improve vegetation condition and habitat for fauna, including threatened fauna. The DBCA is also reviewing and developing management and research priorities for northern quoll, greater bilby, ghost bat, Pilbara leaf-nosed bat and Pilbara olive python to guide future investment in fauna programs (Government of Western Australia 2023).

The proposal is located within the Chichester subregion of the Pilbara IBRA bioregion. The special purpose account statement for the PEOF states that monetary contributions can be accepted in the fund for proposals located wholly or partly within the Pilbara IBRA region.

In the case of this proposal, likely (and potential) significant impacts are:

- flora and vegetation values
- significant fauna habitat values.

In applying the residual impact significance model (Government of Western Australia 2014), the EPA considers the proposal would result in significant residual impacts to:

- 'Good' to 'Excellent' condition native vegetation
- riparian vegetation
- critical habitat for northern quoll, Pilbara olive python, greater bilby, ghost bat, and Pilbara leaf-nosed bat
- supporting habitat for northern quoll and Pilbara olive python.

The EPA has concluded that the clearing of habitat is a significant residual impact on its own, in the context of the proposal, and in the context of the biological diversity and ecological integrity in the local area, as it provides habitat for threatened fauna species.

Due to the remaining quantity and quality of habitat types in the local area and region, the EPA considers that the significant residual impact could be counterbalanced in accordance with the WA Environmental Offsets Guidelines by a contribution to the PEOF. The EPA considers future PEOF projects are expected to be able to collectively counterbalance the significant impacts from the clearing of native vegetation and critical fauna habitat of the proposal. The EPA notes that PEOF Governance Framework (DWER 2019) states that projects will aim to counterbalance the significant residual impacts that have been identified in Ministerial statements with projects that are designed to deliver enduring and long-term strategic conservation outcomes in the Pilbara. The PEOF Implementation Plans identify the significant residual impacts for which contributions to the Fund have been made and how they will be addressed.

The EPA recommends Condition B7 be imposed on the proponent to provide an offset in the form of a contribution to the PEOF, to counterbalance the significant residual impacts of the proposal. PEOF has confirmed it is reasonably likely to be able to offset the required vegetation and habitat, including the material increases in critical habitat for northern quoll, Pilbara olive python, greater bilby, ghost bat, and Pilbara leaf-nosed bat and supporting habitat for northern quoll and Pilbara olive python as a result of additional impacts due to the proposal.

The EPA recognises the challenges in delivering offset projects that contribute to the protection and restoration of critical fauna habitat for conservation significant fauna species, such as those impacted through this proposal. Consistent with the precautionary principle, and offset conditions recommended under the EPBC Act, the EPA has recommended a more detailed offset condition (recommended condition B7-12) which would require the proponent to prepare an offset strategy specifically for critical fauna habitat vales in the event that the PEOF is found to not be likely to contribute to the improvement of critical fauna habitat.

The EPA recommends that the following offset rates (calculated on the 2022-2023 calendar year) should apply in the form of a contribution to the PEOF for landscape-scale actions to protect biodiversity in the Pilbara:

- $893 AUD (excluding GST) per hectare of ‘Good’ to ‘Excellent’ condition native vegetation cleared as a result of the proposal within the Chichester IBRA subregion
- $1,787 AUD (excluding GST) per hectare of riparian vegetation cleared as a result of the proposal within the Chichester IBRA subregion
- $1,787 AUD (excluding GST) per hectare of critical habitat for northern quoll, Pilbara olive python, greater bilby, ghost bat, and Pilbara leaf-nosed bat
- $893 AUD (excluding GST) per hectare of supporting habitat for northern quoll and Pilbara olive python.

5 Matters of national environmental significance

The Commonwealth Minister for the Environment has determined that the proposal is a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as it is likely to have a significant impact on one or more MNES. It was determined that the proposed action is likely to have a significant impact on the following matters protected by the EPBC Act:

- listed threatened species and communities (s. 18 and s. 18A).

The EPA has assessed the controlled action on behalf of the Commonwealth as an accredited assessment under the EPBC Act.

This assessment report is provided to the Commonwealth Minister for Environment who will decide whether or not to approve the proposal under the EPBC Act. This is separate from any Western Australian approval that may be required.

Commonwealth policy and guidance

The EPA had regard to the following relevant Commonwealth guidelines, policies and plans during its assessment:

- Commonwealth EPBC Act Environmental Offsets Policy (Commonwealth of Australia 2012)
- A Review of Ghost Bat Ecology, Threats and Survey Requirements. Prepared for the Department of Agriculture, Water and Environment, May 2021 (Bat Call WA 2021)
- A Review of Pilbara leaf-nosed Bat Ecology, Threats and Survey Requirements. Prepared for the Department of Agriculture, Water and Environment, May 2021 (Bat Call WA 2021)
- Conservation Advice *Macroderma gigas* Ghost Bat, Department of the Environment and Energy, Australian Government, Canberra (Threatened Species Scientific Committee 2016)
- Conservation Advice *Rhinonicteris aurantia* Pilbara Leaf-nosed Bat. Department of the Environment and Energy, Australian Government, Canberra (Threatened Species Scientific Committee 2016)
- Conservation Advice *Pezoporus occidentalis* Night Parrot. Department of the Environment and Energy, Australian Government, Canberra (Threatened Species Scientific Committee 2016)
- Conservation Advice *Trichosurus vulpecula arnhemensis* Northern Brushtail Possum. Department of Agriculture, Water and Environment, Australian Government, Canberra (Threatened Species Scientific Committee 2021)
- Conservation Advice *Falco hypoleucos* Grey Falcon. Department of the Environment and Energy, Australian Government, Canberra (Threatened Species Scientific Committee 2016)

- Conservation Advice for *Liasis olivaceus barroni* (Olive Python – Pilbara subspecies), Department of the Environment, Water, Heritage and the Arts, Australian Government, Canberra (Department of the Environment, Water, Heritage and the Arts 2008)
- Conservation Advice *Macrotis lagotis* Greater Bilby. Department of the Environment and Energy, Australian Government, Canberra (Threatened Species Scientific Committee 2016)
- EPBC Act Referral Guideline for the Endangered Northern Quoll (*Dasyurus hallucatus*), Department of the Environment, Canberra, ACT (Department of the Environment 2016)
- Threat Abatement Plan for Predation by Feral Cats. Canberra, ACT: Commonwealth of Australia (Department of the Environment 2015)
- Commonwealth Listing Advice on Northern quoll (*Dasyurus hallucatus*) (Threatened Species Scientific Committee 2005)
- National recovery plan for the Northern quoll (*Dasyurus hallucatus*), Department of Natural Resources, Environment, The Arts and Sport, Darwin, NT (Hill, B.M. & S.J. Ward 2010)

EPA assessment

Listed threatened species and communities

Listed threatened species and communities and listed migratory species that occur or may occur in the proposal area include:

- northern quoll
- ghost bat
- Pilbara leaf-nosed bat
- Pilbara olive python
- greater bilby
- night parrot
- northern brush tailed possum
- fork-tailed swift (migratory).

The occurrence of the above-listed threatened species in the development envelope is discussed in section 12 of the proponent's ERD (Atlas Iron 2022a). Northern quoll, ghost bat, Pilbara leaf-nosed bat and Pilbara olive python were recorded in the development envelope during recent survey work. Greater bilby and fork-tailed swift have previously been recorded and have the potential to occur or are likely to occur in the development envelope. Grey falcon has not been recorded in the development envelope; however, the species was recorded in close proximity to the proposal area and is considered likely to occur. Discussion of these species is provided in section 2.2 of this report.

Potential impacts to listed species are primarily a result of clearing of vegetation and habitat loss. Clearing of high value fauna habitat has been minimised where possible, including reducing the loss of spinifex sandplains representing potential greater bilby habitat (Atlas Iron 2023a). However, the proposal will result in the loss of up to 682.3 ha of high value fauna habitat comprising breakaway/cliff, drainage line, gorge/gully, hillcrest/hillslopes and spinifex sandplain. Fauna habitat mapping has identified a further 427.2 ha of high value habitat outside of the development envelope, and an additional 115.2 ha of habitat within the SFEZ, that will not be impacted by the proposal.

Potential impacts to listed bat species may occur through direct and indirect (blasting related noise and vibration) disturbance of bat roosting habitat. The proponent has committed to retaining and protecting five ghost bat caves categorised as critical habitat. The EPA has recommended that a further cave, nominally an isolated category 3 roost, be subject to further monitoring, assessment and categorisation before disturbance is permitted.

Targeted surveys have been conducted for the night parrot; however, the species has not been recorded within the development envelope. Interim Guidance for Night Parrot Surveys (Department of Parks and Wildlife 2017) indicates that the species requires large, dense *Triodia* hummocks, not impacted by fire events for roosting and nesting. This type of *Triodia* habitat has not been identified within the development envelope, however the 67 ha of spinifex sandplain and 1059.4 ha of spinifex stony plain habitat may provide suitable foraging and dispersal habitat. Based on the sub-optimal habitat within the development envelope, and the lack of night parrot records from surveys, implementation of the proposal is not expected to result in an unacceptable or unsustainable impact on the species.

The assessment of the potential impacts to other listed species is discussed in sections 2.1 Flora and Vegetation, section 2.2 Terrestrial Fauna, 2.3 Inland Waters, and section 4 of this report.

Summary

The EPA recommends the following environmental conditions to minimise impacts on MNES:

- condition A1 – limits the location and authorised extent of the clearing of vegetation to 1912 ha
- condition B2-1 – limits on the authorised extent of disturbance of important fauna habitat types
- condition B2-1(3) – establishment of the Fauna Corridor Exclusion Zone to increase the ecological value of the Significant Fauna Exclusion Zone and mitigate impacts to threatened fauna
- condition B2-7 – implementation and revision of a Significant Species Management Plan to manage impacts to threatened fauna, including maintaining the structural integrity of retained bat roosts.

The EPA considers that there will be a significant residual impact from the clearing the habitat of northern quoll, Pilbara olive python, greater bilby, ghost bat and Pilbara leaf-nosed bat. The EPA has recommended an offset in condition B7 (see section 4) which takes into account the significant residual impact to clearing conservation significant terrestrial fauna habitat due to implementation of the proposal.

The EPA's view is that the impacts from the proposal on the above-listed MNES are therefore not expected to result in an unacceptable or unsustainable impact on any matters of national environmental significance.

6 Recommendations

The EPA has taken the following into account in its assessment of the proposal:

- environmental values which may be significantly affected by the proposal
- assessment of key environmental factors, separately and holistically (this has included considering cumulative impacts of the proposal where relevant)
- likely environmental outcomes which can be achieved with the imposition of conditions
- consistency of environmental outcomes with the EPA's objectives for the key environmental factors
- EPA's confidence in the proponent's proposed mitigation measures
- whether other statutory decision-making processes can mitigate the potential impacts of the proposal on the environment
- principles of the EP Act.

The EPA recommends that the proposal may be implemented subject to the conditions recommended in Appendix A.

7 Other advice

The EPA may, if it sees fit, include other information, advice or recommendations relevant to the environment in its assessment reports, even if that information has not been taken into account by the EPA in its assessment of a proposal.

The EPA provides the following information for consideration by the Minister.

- the EPA notes that the following aspects of the McPhee Creek Iron Ore Project can be regulated through Part V of the EP Act:
  - licensing of emissions and discharges (including noise, dust, light spill) from prescribed premises
  - regulation of spills including chemicals and hydrocarbons
  - regulation of dewatering discharge to creek lines.
- the EPA notes that the following aspects of the McPhee Creek Iron Ore Project can be regulated through RiWI Act:
  - regulation of well/bore construct or alteration
  - regulation of groundwater abstraction
  - regulation of interference with bed and banks.
- the assessment of the mine closure plan by the DMIRS under the Mining Act considers the decommissioning, rehabilitation and closure of mining and associated activities, so that it is physically safe, geo-technically stable, geo-chemically non-polluting/non-contaminating, and capable of sustaining an agreed post mining land use without unacceptable liability to the State. It is the EPA's view that decommissioning, rehabilitation and closure of key aspects of this proposal (for example, mine pits) can be adequately regulated through the Mining Act, rather than requiring additional conditions under part IV of the EP Act, to achieve an environmental outcome where the rehabilitated land is safe, stable, resilient, with appropriate hydrology and comprising habitats capable of supporting biodiversity
- to enable reduction of duplication of environmental management regulation in areas where law and policy are being developed (such as greenhouse gas through the Commonwealth government's Safeguard Mechanism and Aboriginal cultural heritage through the State government's proposed amendments to the *Aboriginal Heritage Act 1972* (AH Act)), the EPA has recommended condition C2-1(2), which includes that environmental management plans are required to be implemented except for any period where the DWER CEO confirms that another statutory decision-making process can meet the requirements of the plan

Appendix A: Recommended conditions

Section 44(2)(b) of *Environmental Protection Act 1986* specifies that the EPA's report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This appendix contains the EPA's recommended conditions and procedures.

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED
***(Environmental Protection Act 1986*)**

MCPHEE CREEK IRON ORE PROJECT

Proposal:	The Proposal is for the above and below water table mining of iron ore from five open cut pits, located approximately thirty (30) km north of Nullagine. The Proposal includes the development of mine pits and associated infrastructure including crushing and screening facilities, waste landforms, run of mine pad, access roads, solar field, administration, accommodation camp, stockpile and laydown areas, borrow pits, groundwater bores and transfer infrastructure, explosives magazine, fuel storage and landfill.
Proponent:	Atlas Iron Pty Ltd Australian Company Number 110 396 168
Proponent address:	Level 17, 300 Murray Street PERTH WA 6000
Assessment number:	2285

Report of the Environmental Protection Authority: 1750

Introduction: Pursuant to section 45 of the *Environmental Protection Act 1986,* it has been agreed that the proposal entitled 'McPhee Creek Iron Ore Project' described in the 'Proposal Content Document' attachment of the referral of 18 February 2021, as amended by the change to proposal approved under s. 43A on 22 March 2023, may be implemented and that the implementation of the proposal is subject to the following implementation conditions and procedures:

Conditions and procedures

Part A: Proposal extent

Part B: Environmental outcomes, prescriptions and objectives

Part C: Environmental management plans and monitoring

Part D: Compliance and other conditions

PART A: PROPOSAL EXTENT

Limitations and Extent of Proposal

A1-1 The proponent must ensure that the proposal is implemented in such a manner that the following limitations or maximum extents / capacities / ranges are not exceeded:

Proposal element	Location	Maximum extent
Physical elements		
Development envelope	Figure 1	No more than 4,465 **ha**
Indicative Disturbance footprint	Within the development envelope shown in Figure 1	No more than 1,913 **ha** within a 4,465 **ha** development envelope.
Direct **disturbance** of native vegetation	Within the development envelope shown in Figure 1	Clearing of no more than 1,912 **ha** of native vegetation in a 'Good' or better condition within a 4,465 **ha** development envelope.
Fauna Corridor Exclusion Zone	Figure 1	No direct **disturbance**, including mining activities, pits, excavation, waste dumps and permanent structures. **Low impact activities** to support monitoring and management are permitted.
Significant Fauna Exclusion Zone	Figure 1	No direct **disturbance**, including mining activities, pits, excavation, waste dumps and permanent structures. **Low impact activities** to support monitoring and management are permitted.
High Value Troglofauna Habitat Exclusion Zone	Figure 1	No direct **disturbance**, including mining activities, pits, excavation, waste dumps and permanent structures. **Low impact activities** to

		support monitoring and management are permitted.
Bat Cave Buffer Zones	Figure 2	The spatial areas as defined by geographic coordinates in Schedule 1. The spatial areas represent the following radial cave buffers: CMPC-03 – 500 metres CMPC-08 – 50 metres CMPC-10 – 253 metres CMPC-25 – 282 metres CMPC-05 – 50 metres CMPC-09 – 50 metres CMPC-13 – 50 metres CMPC-16 – 50 metres CMPC-20 – 50 metres CMPC-21 – 50 metres
Operational elements		
Groundwater abstraction		Groundwater abstraction for **mine dewatering** of up to 7.5 **GL/a**
Surplus water discharge	Figure 3	Controlled discharge of up to 6 **GL/a** surplus water into McPhee Creek, Branch of McPhee Creek, and Lionel Creek, with resultant wetting fronts under natural no-flow conditions to extend no more than 6.9 **km** in McPhee Creek, 6.8 **km** in Branch of McPhee Creek, 4.4 **km** in Lionel Creek.
Timing elements		
Mine life	N/A	Up to 15 years from the date of substantial commencement

PART B – ENVIRONMENTAL OUTCOMES, PRESCRIPTIONS AND OBJECTIVES

B1 Flora and Vegetation

B1-1 The proponent must ensure the implementation of the proposal achieves the following environmental outcomes:

(1) directly **disturb** no more than 24 **ha** of groundwater dependent vegetation as described and recorded in the **baseline flora and vegetation survey** as EvApyCci and EcAPyCci;

(2) **disturb** no more than 815 individuals of *Eragrostis crateriformis* as described and recorded in the **baseline flora and vegetation survey**;

(3) **disturb** no more than 842 individuals of *Ptilotus mollis* as described and recorded in the **baseline flora and vegetation survey**;

(4) avoid **disturbance** of and **adverse impacts** to *Acacia aphanoclada*, including the individual as described and recorded in the **baseline flora and vegetation survey**;

(5) avoid **disturbance** of and **adverse impacts** to *Rostellularia adscendens* var. *latifolia* including the three individuals as described and recorded in the **baseline flora and vegetation survey**; and

(6) ensure there are no **adverse impacts** to flora and vegetation resulting from the introduction or spread of **environmental weeds** within the development envelope and **Significant Fauna Exclusion Zone** compared with pre-construction condition as described and recorded in the **baseline flora and vegetation survey**.

B1-2 The proponent shall undertake the following actions during construction and operational activities:

(1) implement weed hygiene measures during construction and operations to prevent the introduction or spread of **environmental weeds**.

B2 Terrestrial Fauna

B2-1 The proponent must ensure the implementation of the proposal achieves the following environmental outcomes:

(1) **disturb** no more than:

(a) 93.6 **ha** of the fauna habitat type identified as **gorge/gully habitat**;

(b) 17.0 **ha** of the fauna habitat type identified as **breakaway/cliff habitat**;

(c) 55.0 **ha** of the fauna habitat type identified as **drainage line habitat**;

(d) 504.6 **ha** of the fauna habitat type identified as **hillcrest/hillslope habitat**; and

(e) 12.1 **ha** of the fauna habitat type identified as **spinifex sandplain habitat**;

(2) avoid **disturbance** of and ensure no **adverse impact** to the structural integrity, microclimate or capacity to support ghost bats (*Macroderma gigas)* of the bat caves listed in condition A1-1 and as shown in Figure 2;

(3) no **adverse impact** to fauna habitat within the **Significant Fauna Exclusion Zone** and **Fauna Corridor Exclusion Zone**;

(4) no **adverse impact** to potential short-range endemic *Olpiidae* sp.; and

(5) no **ground disturbing activities** within the Bat Cave Buffer Zones shown in Figure 2.

B2-2 The proponent must implement the proposal to achieve the following environmental objectives:

(1) avoid where practicable and otherwise minimise **adverse impacts** and **disturbance** to native fauna including physical injury or mortality, behavioural changes, and health impacts;

(2) avoid where practicable and otherwise minimise the risk of **adverse impacts** and **disturbance** to the local population of ghost bat (*Macroderma gigas*) utilising the bat caves shown in Figure 2;

(3) minimise the adverse impact of **feral fauna** species within the development envelope and the **Significant Fauna Exclusion Zone.**

Clearing for construction

B2-3 Prior to **ground disturbing activities** the proponent shall undertake the following actions:

(1) for any clearing proposed during the **grey falcon (*Falco hypoleucos*) nesting period**, within seven (7) days prior to clearing, survey all potential **breeding trees** within the eucalyptus fringed **drainage line habitat** type; and

(2) where nesting grey falcon (*Falco hypoleucos*) are identified under condition B2-3(1), avoid clearing the **breeding tree** until such time that the tree is no longer occupied for breeding by grey falcon (*Falco hypoleucos*).

B2-4 Prior to ground disturbing activities within the **spinifex sandplain habitat** type the proponent shall undertake the following actions:

(1) within seven (7) days prior to clearing, using a licensed **fauna spotter** undertake pre-clearance surveys to detect the presence of **greater bilby (*Macrotis lagotis*) burrows**; and

(2) where **greater bilby (*Macrotis lagotis*) burrows** are identified under condition B2-4(1), avoid clearing the **greater bilby (*Macrotis lagotis*) burrow**.

Lighting

B2-5 The proponent shall ensure that all required artificial lighting use **directional and/or shielded lighting** and use the minimum number and intensity of lights required, to avoid where practicable and otherwise minimise **adverse impacts** to nocturnal fauna due to artificial lighting.

Feral fauna predation

B2-6 The proponent shall implement management controls to minimise the **adverse impacts** to terrestrial fauna from predation from **feral fauna** species in the development envelope and the **Significant Fauna Exclusion Zone.**

Significant Species Management Plan

B2-7 The proponent must review and revise the Significant Species Management Plan – McPhee Creek Iron Ore Project (13 June 2023, 124-EN-PLN-0008 v5) that demonstrates how achievement of the terrestrial fauna environmental outcomes in condition B2-1 will be monitored and substantiated consistent with the requirements of condition C4, and demonstrates how achievement of the terrestrial fauna environmental objectives in condition B2-2 will be monitored and substantiated consistent with the requirements of condition C5, and submit it to the **CEO**.

B3 Inland Waters

B3-1 The proponent must implement the proposal to achieve the following environmental outcomes:

(1) avoid **disturbance** and have no **adverse impacts** to surface water pools WMPC-01, WMPC-03, WMPC-22, WMPC-29 and WMPC-36 within the development envelope, shown in Figure 3;

(2) no **adverse impacts** to surface water pools WMPC-18, WMPC-19, WMPC-20, WMPC-21, and WMPC-32 within the **Significant Fauna Exclusion Zone** shown in Figure 3;

(3) no **adverse impacts** to permanent and semi-permanent surface water pools within McPhee Creek, Branch of McPhee Creek and Lionel Creek outside of the development envelope;

(4) no **adverse impacts** to surface water quality within McPhee Creek, Branch of McPhee Creek and Lionel Creek; and

(5) indirect **adverse impacts** to no more than 50 **ha** of groundwater dependent vegetation, as described and recorded in the **baseline flora and vegetation survey** as EvApyCci and EcAPyCci.

B3-2 The proponent must review and revise the Water Management Plan – McPhee Creek Iron Ore Project (26 June 2023, 124-EN-PLN-0007 v3) that satisfies the requirements of condition C4 and demonstrates how achievement of the inland waters environmental outcomes in condition B3-1 will be monitored and substantiated, and submit it to the **CEO**.

B4 Subterranean Fauna

B4-1 The proponent must implement the proposal to achieve the following environmental outcomes:

(1) directly **disturb** no more than 30.2% of the volume of medium and high suitability troglofauna habitat on the main range as described and recorded in the **Subterranean Fauna Assessment** and avoid high suitability habitat where practicable.

B4-2 The proponent must implement the proposal to achieve the following environmental objectives:

(1) avoid where practicable and otherwise minimise the risk of **adverse impacts** and **disturbance** to stygofauna resulting from surface activities within areas of potential stygofauna habitat as described and recorded in the **Subterranean Fauna Assessment**; and

(2) avoid where practicable and otherwise minimise the risk of **adverse impacts** and **disturbance** to troglofauna and troglofauna habitat resulting from surface activities within areas of potential troglofauna habitat as described and recorded in the **Subterranean Fauna Assessment**.

Troglofauna habitat assessment

B4-3 The proponent must implement the proposal to achieve the following environmental outcome:

(1) no **adverse impact** to the biological diversity or ecological integrity associated with the troglofauna community identified within the Crescent Moon pit area, as described in the **Subterranean Fauna Assessment**.

B4-4 Subject to condition B4-5 the proponent must not undertake any **mining operations** within the **Crescent Moon Provisional Mining Exclusion Zone,** as depicted in Figure 1 and defined by geographic coordinates in Schedule 1**.**

B4-5 Where:

(1) a Troglofauna Habitat Connectivity Assessment Plan has been prepared and approved by the **CEO** in accordance with condition B4-6;

(2) the proponent has implemented the approved Troglofauna Habitat Connectivity Assessment Plan referred to in condition B4-5(1) and reported the outcomes to the **CEO**;

(3) the **CEO** is satisfied that the outcomes of the troglofauna habitat connectivity assessment confirm the connectivity of troglofauna habitat between the indicative disturbance footprint with suitable habitat outside the indicative disturbance footprint;

(4) the **CEO** is satisfied that the outcomes of the troglofauna habitat connectivity assessment demonstrates that the environmental outcome in condition B4-3 can be achieved if **mining operations** were to occur within the **Crescent Moon Provisional Mining Exclusion Zone**;

(5) the proponent has obtained additional information regarding the taxonomy and distribution of the potential short-range endemic singleton *Olpiidae* sp. and reported this information to the **CEO**;

(6) the **CEO** is satisfied that the information referred to in condition B4-5(5) demonstrates that the environmental outcome in condition B2-1(4) can be achieved if **mining operations** were to occur within the **Crescent Moon Provisional Mining Exclusion Zone;** and

(7) the proponent has received the prior written advice of the **CEO** that **mining operations** can be undertaken within the **Crescent Moon Provisional Mining Exclusion Zone** or a specified portion thereof; and

then **mining operations** may occur in the **Crescent Moon Provisional Mining Exclusion Zone** or any portion thereof as specified by the **CEO** within condition B4-5(7).

B4-6 The Troglofauna Habitat Connectivity Assessment Plan required by condition B4-5(1) must provide for:

(1) the characterisation of troglofauna habitats within and connected to the impact areas using geological and hydrogeological information including information from drill logs and cores from the impact areas and connected potential habitat areas;

(2) the characterisation of troglofauna habitats within and connected to the impact areas using troglofauna records from the impact area and connected potential habitat areas;

(3) troglofauna sampling in potential troglofauna habitats connected to the impact area in accordance with *Technical Guidance – Sampling methods for subterranean fauna* (EPA 2016) or its revisions;

(4) an assessment of troglofauna habitat connectivity and the likely extent of connected habitats outside the impact areas on the information obtained from conditions B4-6(1) to B4-6(3); and

(5) an assessment of the likelihood of the environmental outcome in condition B4-1 being achieved if **mining operations** were undertaken within the **Crescent Moon Provisional Mining Exclusion Zone.**

B5 Greenhouse Gas Emissions

B5-1 Subject to condition B5-1(5), the proponent shall take measures to ensure that **net GHG emissions** do not exceed:

(1) 654,705 tonnes of CO_2-e for the period until 30 June 2028;

(2) 451,705 tonnes of CO_2-e for the period between 1 July 2028 and 30 June 2033;

(3) 320,780 tonnes of CO_2-e for the period between 1 July 2033 and 30 June 2038;

(4) 189,855 tonnes of CO_2-e for the period between 1 July 2038 and 30 June 2043;

(5) Where the time between the **commencement of operations** and the end of a period specified in condition B5-1(1) is less than five (5) years, the **net GHG emissions** limit for that period is to be determined in accordance with the following formula:
Reduced **net GHG emissions** limit = (A ÷ 1825) x B

Where:

A is the **net GHG emissions** limit for the period as specified in condition B5-1.

B is the number of days between the **commencement of operations** and the end of the relevant period specified in condition B5-1.

B5-2 The proponent shall revise, and submit to the **CEO**, the Greenhouse Gas Emissions Environmental Management Plan (22 April 2022) to:

(1) be consistent with the achievement of the **net GHG emissions** limits in condition B5-1 subject to the adjustment provided for in condition B5-1(5) (or achievement of emission reductions beyond those required by those emission limits);

(2) specify the estimated **proposal GHG emissions** and **emissions intensity** for the life of the proposal;

(3) include a comparison of the estimated **proposal GHG emissions** and **emissions intensity** for the life of the proposal against other relevant emissions reduction practices, pathways and comparable facilities;

(4) identify and describe any measures that the proponent will implement to avoid, reduce and/or offset **proposal GHG emissions** and/or reduce the **emissions intensity** of the proposal as far as practicable; and

(5) provide a program for the future review of the plan to:

(a) assess the effectiveness of measures referred to in condition B5-2(4);

(b) identify and describe options for future measures that the proponent may or could implement to avoid, reduce, and/or offset **proposal GHG emission** as far as practicable and/or reduce the **emissions intensity** of the proposal; and

(c) consider reasonably practicable options for reductions in **scope 3 emissions**.

B5-3 Within one (1) month of receiving confirmation in writing from the **CEO** that:

(1) the Greenhouse Gas Environmental Management Plan referred to in condition B5-2 has been revised and satisfies condition B5-2; or

(2) any subsequent version of the **confirmed** Greenhouse Gas Environmental Management Plan submitted under condition C2-2 or B5-8 which satisfies the requirements of condition B5-2,

the proponent must submit a separate summary of the relevant plan to the **CEO**, which must:

(3) include a summary of the matters specified in conditions B5-2(1) to condition B5-2(4); and

(4) be published as required by condition B5-7.

B5-4 The proponent shall submit an annual report to the **CEO** each year by 31 March, commencing on the first 31 March after the **commencement of operations**, or such other date within that financial year as is agreed by the **CEO** to align with other reporting requirements for **GHG**, specifying for the previous financial year:

(1) the quantity of **proposal GHG emissions**; and

(2) the **emissions intensity** for the proposal.

B5-5 The proponent shall submit to the **CEO** by 31 March 2030 or such other date within that financial year as is agreed by the **CEO** to align with other reporting requirements for **GHG emissions**, and every five (5) years thereafter:

(1) a consolidated report specifying:

(a) for each of the preceding five financial years, the matters referred to in conditions B5-4(1) and conditions B1-4(2);

(b) for the period specified in condition B5-1 that ended on 30 June of the year before the report is due:

(i) the quantity of **proposal GHG emissions**;

(ii) the **net GHG emissions**;

(iii) any measures that have been implemented to avoid or reduce **proposal GHG emissions;** and

(iv) the type, quantity, identification or serial number, and date of retirement or cancellation of any **authorised offsets** which have been retired or cancelled and which have been used to calculate the **net GHG emissions** referred to in condition B5-5(1)(b)(ii), including written evidence of such retirement or cancellation.

(2) an audit and peer review report of the consolidated report required by condition B5-5(1), carried out by an independent person or independent persons with suitable technical experience dealing with the suitability of the methodology used to determine the matters set out in the consolidated report, whether the consolidated report is accurate and whether the consolidated report is supported by credible evidence.

B5-6 A consolidated report referred to in condition B5-5(1) must be accompanied by:

(1) the latest revision of the **confirmed** Greenhouse Gas Environmental Management Plan required under condition B5-2 or condition B5-8; and

(2) a separate summary report, for the period specified in condition B5-1 that ended on 30 June of the year before the report is due and any previous periods specified in condition B5-1, and which includes:

(a) a graphical comparison of **net GHG emissions** with the **net GHG emissions** limits detailed in condition B5-1 (subject to the adjustment provided for in condition B5-1(5));

(b) proposal **emissions intensity** compared to comparable facilities;

(c) a summary of measures to reduce the **proposal GHG emissions** undertaken by the proponent for compliance periods detailed in condition B5-1; and

(d) a clear statement as to whether limits for **net GHG emissions** set out in condition B5-1 have been met, and whether future **net GHG emissions** limits are likely to be met, including a description of any reasons why those limits have not been, and/or are unlikely to be met.

B5-7 In addition to the requirements of condition C2-6 about publication of the **confirmed** Greenhouse Gas Environmental Management Plan, the proponent shall make the summary of the **confirmed** Greenhouse Gas Environmental Management Plan, and all reports required by this condition B5 publicly available on the proponent's website within the timeframes specified below, or in any other manner or time specified by the **CEO**:

(1) the summary of the **confirmed** Greenhouse Gas Environmental Management Plan within twenty (20) business days of submitting the document to the **CEO** in accordance with condition B5-2; and

(2) the reports referred to in condition B5-4, condition B5-5, and condition B5-6 within twenty (20) business days of submitting the document to the **CEO,** and they shall remain published for the life of the proposal.

B5-8 In addition to the requirements of condition C2-2, the proponent must revise and submit to the **CEO** the **confirmed** Greenhouse Gas Environmental Management Plan by the date that the first five (5) yearly consolidated report is required to be submitted under condition B5-5 and every five (5) years after that date.

B6 Aboriginal Cultural Heritage

B6-1 The proponent must implement the proposal to meet the following environmental outcomes:

(1) no disturbance to **Aboriginal cultural heritage sites** in the development envelope, unless consent is granted to disturb that site under WA legislation which specifically relates to Aboriginal heritage and has required informed consultation with **relevant Traditional Owners**; and

(2) subject to reasonable health and safety requirements, no interruption of ongoing access to land utilised for traditional use or custom by relevant traditional owners.

B6-2 The proponent must implement the proposal to meet the following environmental objective:

(1) avoid, where practicable, and otherwise minimise **adverse impacts** to **Aboriginal cultural heritage** within and surrounding the development envelope.

B6-3 The proponent must undertake ongoing consultation and engagement with **relevant Traditional Owners** about the achievement of the outcomes and objectives in condition B6-1 and condition B6-2 and condition B3-1 for the life of the proposal. The proponent must take reasonable steps to consult with **relevant Traditional Owners** when revising the following environmental management plans under condition C2-2:

(1) the Significant Species Management Plan – McPhee Creek Iron Ore Project required under condition B2-7; and

(2) the Water Management Plan – McPhee Creek Iron Ore Project required under condition B3-2.

B7 Pilbara Environmental Offsets Fund

B7-1 The proponent must contribute funds to the **Pilbara Environmental Offsets Fund** calculated pursuant to condition B7-2, to achieve the objective of counterbalancing the significant residual impacts to:

(1) **‘Good’ to ‘Excellent’ condition native vegetation;**

(2) Riparian vegetation (including groundwater dependent vegetation);

(3) Critical habitat for northern quoll (*Dasyurus hallucatus*), Pilbara olive python (*Liasis olivaceus barroni*), greater bilby (*Macrotis lagotis*), ghost bat (*Macroderma gigas*) and Pilbara leaf-nosed bat (*Rhinonicteris aurantia*) and subject to any reduction approved by the **CEO** under condition B7-9.

(4) supporting habitat for northern quoll (*Dasyurus hallucatus*), Pilbara olive python (*Liasis olivaceus barroni*), ghost bat (*Macroderma gigas*) and Pilbara leaf-nosed bat (*Rhinonicteris aurantia*) subject to any reduction approved by the CEO under condition B7-9.

B7-2 The proponent's contribution to the **Pilbara Environmental Offsets Fund** must be paid biennially, with the amount to be contributed calculated based on the clearing undertaken in each year of the biennial reporting period in accordance with the rates in condition B7-3. The first biennial reporting period must commence from **ground disturbing activities** of the environmental value(s) identified in condition B7-3.

B7-3 Calculated on the 2022-2023 financial year, the contribution rates are:

(1) $893 AUD (excluding GST) per hectare of **'Good' to 'Excellent' condition native vegetation** cleared as a result of the proposal within the Chichester **IBRA** subregion;

(2) $1,787 AUD (excluding GST) per hectare of riparian vegetation (including groundwater dependent vegetation) cleared as a result of the proposal within the Chichester **IBRA** subregion;

(3) $1,787 AUD (excluding GST) per hectare of the following values cleared as a result of the proposal:

(a) northern quoll (*Dasyurus hallucatus*) critical habitat;

(b) Pilbara olive python (*Liasis olivaceus barroni*) critical habitat;

(c) greater bilby (*Macrotis lagotis*) critical habitat;

(d) ghost bat (*Macroderma gigas*) critical habitat; and

(e) Pilbara leaf-nosed bat (*Rhinonicteris aurantia*) critical habitat.

(4) $893 AUD (excluding GST) per hectare of the following values cleared as a result of the proposal:

(a) northern quoll (*Dasyurus hallucatus*) supporting habitat;

(b) Pilbara olive python (*Liasis olivaceus barroni*) supporting habitat;

(c) ghost bat (*Macroderma gigas*) supporting habitat; and

(d) Pilbara leaf-nosed bat (*Rhinonicteris aurantia*).

B7-4 The rates in condition B7-3 change annually each subsequent financial year in accordance with the percentage change in the **CPI** applicable to that financial year.

B7-5 To achieve the objective in condition B7-1 the proponent must prepare an Impact Reconciliation Procedure, and submit to the **CEO**. This procedure must:

(1) spatially define the environmental value(s) identified in condition B7-1;

(2) spatially define the areas where offsets required by condition B7-1 are to be exempt;

(3) include a methodology to calculate the amount of clearing undertaken during each year of the biennial reporting period for each of the **environmental values** identified in condition B7-3;

(4) state that clearing calculation for the first biennial reporting period will commence from **ground disturbing activities** in accordance with condition B7-2 and end on the second 30 June following commencement of **ground disturbing activities**;

(5) state that clearing calculations for each subsequent biennial reporting period will commence on 1 July of the required reporting period, unless otherwise agreed by the **CEO**; and

(6) be prepared in accordance with *Instructions on how to prepare Environmental Protection Act 1986 Part IV Impact Reconciliation Procedures and Impact Reconciliation Reports* (or any subsequent revisions).

B7-6 The proponent must submit an Impact Reconciliation Report in accordance with the **confirmed** Impact Reconciliation Procedure in condition B7-5.

B7-7 The Impact Reconciliation Report required pursuant to condition B7-6 must:

(1) provide the location and spatial extent of the clearing undertaken as a result of the proposal during each year of each biennial reporting period; and

(2) include evidence that clearing undertaken in any area was necessary for the commencement of proposal-related activities or operations in that cleared area within six (6) months of the clearing having occurred.

B7-8 The proponent may apply in writing and seek the written approval of the **CEO** to reduce all or part of the contribution payable under condition B7-2 where:

(1) a payment has been made to satisfy a condition of an approval under the *Environment Protection and Biodiversity Conservation Act 1999* in relation to the proposal; and

(2) the payment is made for the purpose of counterbalancing impacts of the proposal on matters of national environmental significance.

B7-9 The **CEO** may grant approval to discount the amount payable under condition B7-1(3) and condition B7-1(4) if the **CEO** is satisfied that the payment will offset the significant residual impacts of the proposal.

B7-10 Condition C2 applies to the **confirmed** Impact Reconciliation Procedure required by condition B7-5 as if it were an environmental management plan.

B7-11 Failure to implement a **confirmed** Impact Reconciliation Procedure or submit an Impact Reconciliation Report as required by condition B7-6 represents a non-compliance with these conditions.

B7-12 If the proponent becomes aware on reasonable grounds that the **Pilbara Environmental Offsets Fund** is not likely to contribute to the improvement of critical habitat for the species in condition B7-1 (3), the proponent must submit to the **CEO**, within twelve (12) months of becoming aware, a McPhee Creek Offset Strategy (Environmental Management Plan) which demonstrates how the residual significant impacts to critical habitat will be offset to meet the following environmental objectives:

(1) counterbalance the significant residual impacts to critical habitat yet to be cleared for the species in condition B7-1(3);

(2) contribute to reducing the rate of decline in species in condition B7-1(3); and

(3) contribute to the improvement of critical habitat for the species in condition B7-1(3);

B7-13 The McPhee Creek Offset Strategy (Environmental Management Plan) must:

(1) demonstrate that the environmental objectives in condition B7-12 will be met;

(2) have regard to the **conservation advice**, **recovery plans** and **threat abatement plans** relevant to the species in condition B7-1(3);

(3) identify an area, or areas, (the **Proposed Offset Conservation Area**) to be **acquired**, to be **acquired** with **on-ground management**, and/or for **on-ground management**, and contains the environmental value/s identified in B7-1(3);

(4) demonstrate how the **environmental values** within the **Proposed Offset Conservation Areas** will be maintained and improved or managed in order to counterbalance the significant residual impact to the

environmental values in condition B7-1(3) and achieve the environmental outcomes and objectives in condition B7-12;

(5) demonstrate application of the principles of the WA Environmental Offsets Policy, the *WA Environmental Offsets Metric* and the WA Offsets Template, as described in the *WA Environmental Offsets Guidelines*, and the *Environmental Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy Assessment Guide*, or any subsequent revisions of these documents;

(6) identify the proportion of resources allocated for each specific offset addressed by the McPhee Creek Offset Strategy (Environmental Management Plan);

(7) identify how the ongoing performance of the offset measures, and whether they are achieving the outcomes and objectives in condition B7-12, will periodically be made publicly available;

(8) identify how the **Proposed Offset Conservation Areas** will be protected, being either the sites are ceded to the Crown for the purpose of management for conservation, or the sites are managed under other suitable mechanism for the purpose of conservation as agreed by the **CEO** by notice in writing;

(9) for offsets **acquired** specify:

(a) a timeframe and works associated with establishing the **Proposed Offset Conservation Areas**, including a contribution for maintaining the offset for at least twenty (20) years after completion of purchase;

(b) identify the **relevant management body** for the on-going management of the **Proposed Offset Conservation Areas**, including its role, and the role of the proponent, and confirmation in writing that the **relevant management body** accepts responsibility for its role.

(10) Where **on-ground management** is proposed:

(a) state the targets for each environmental value to be achieved, including completion criteria, which will result in a **tangible improvement** to the **environmental values** being offset. For revegetation offsets this must include, but not be limited to:

(i) fauna target densities;

(ii) breeding/foraging fauna habitat achieved;

(iii) completion criteria to measure (at a minimum) abundance/distribution, habitat structure and vegetation condition; and

(iv) adaptive management to inform successful habitat revegetation for the species listed in condition B7-1(3).

(b) demonstrate the consistency of the targets with environmental outcomes and objectives in condition B7-12 and the objectives of any relevant guidance, including but not limited to, **recovery plans** or area management plans;

(c) detail the **on-ground management** actions, with associated timeframes for implementation and completion, to achieve the targets identified in condition B7-13(10)(a);

(d) detail the monitoring, reporting and evaluation mechanisms for the targets and actions identified under condition B7-13(10)(a) and condition B7-13(10)(c).

(11) where a **research offset** is proposed, prepare a research program that:

(a) identifies the objectives and intended outcomes, and specifies the deliverables and completion criteria;

(b) identifies how the research will result in a positive conservation outcome, and will either improve management and protection or address priority knowledge gaps that have been identified as a research priority needed to improve management and protection, for the **environmental values** identified in condition B7-1;

(c) demonstrate the consistency of the objectives in condition B7-13(11)(a) with any relevant guidance, including but not limited to, recovery plans or area management plans, the principles of the *WA Environmental Offsets Policy*, the *WA Environmental Offsets Guidelines*, or any subsequent revisions of these documents;

(d) identifies and justifies the how the research will support land **acquired** and/or **on-ground management** in achieving a positive conservation outcome;

(e) provides an implementation and reporting schedule, including an outline of key activities, all deliverables, stages of implementation, reporting of research results (including interim results), reporting on implementation status, and milestones towards completion criteria;

(f) identifies the governance arrangements including responsibilities for implementing, and oversight of, the research program,

agreements with government agencies, agreements with any third parties, and contingency measures;

(g) identify how a research program summary, and the results (including interim results) of the research program will be communicated and/or published in an open access format; and

(h) identifies the third party to carry out the work required to meet the outcomes of condition B7-13(11)(a), who is satisfactory for the role to the **CEO**. In applying to the **CEO** for endorsement of the selected third parties, the proponent shall provide:

(i) demonstration of the track record, experience, qualifications and competencies of the proposed third party to carry out the work and achieve the outcomes.

B7-14 If, within twelve (12) months of the proponent becoming aware on reasonable grounds that the **Pilbara Environmental Offsets Fund** is not likely to contribute to the improvement of critical habitat for the species in condition B7-1(3), and the **CEO** has not **confirmed** the McPhee Creek Offset Strategy (Environmental Management Plan) meets the requirements of condition B7-13, any further clearing of the **environmental values** in condition B7-1(3) is to cease. Clearing may only restart after the **CEO** notifies the proponent that the McPhee Creek Offset Strategy (Environmental Management Plan) meets the requirements of condition B7-13.

B7-15 The requirement for contributions referred to in condition B7-3(3) and condition B7-3(4) shall cease for critical habitat cleared, after the CEO has **confirmed** under condition B7-13 that the McPhee Creek Offset Strategy (Environmental Management Plan) meets the requirements of condition B7-13.

PART C – ENVIRONMENTAL MANAGEMENT PLANS AND MONITORING

C1 Environmental Management Plans: Conditions Related to Commencement of Implementation of the Proposal

C1-1 The proponent must not undertake:

(1) **ground disturbing activities** until the **CEO**, on advice of the Department of Biodiversity, Conservation and Attractions, has **confirmed** in writing that either the environmental management plan required by condition B2-7 meets the requirements of that condition and conditions C4 and C5, or that ground disturbing activities can commence;

(2) **mine dewatering** activities until the **CEO** has **confirmed** in writing that the environmental management plan required by condition B3-2 meets the requirements of that condition and condition C4;

(3) **ground disturbing activities** until the **CEO** has **confirmed** in writing that either the Impact Reconciliation Procedure required by condition B7-5 meets the requirements of that condition, or ground disturbing activities can commence; and

(4) the commencement of **operations** until the **CEO** has **confirmed** in writing that the environmental management plan required by condition B5-2 meets the requirements of that condition.

C2 Environmental Management Plans: Conditions Relating to Approval, Implementation, Review and Publication

C2-1 Upon being required to implement an environmental management plan under Part B, or after receiving notice in writing from the **CEO** under condition C1-1 that the environmental management plan(s) required in Part B satisfies the relevant requirements, the proponent must:

(1) implement the most recent version of the **confirmed** environmental management plan; and

(2) continue to implement the **confirmed** environmental management plan referred to in condition C2-1(1), other than for any period which the **CEO** confirms by notice in writing that it has been demonstrated that the relevant requirements for the environmental management plan have been met, or are able to be met under another statutory decision-making process, in which case the implementation of the environmental management plan is no longer required for that period.

C2-2 The proponent:

(1) may review and revise a **confirmed** environmental management plan provided it meets the relevant requirements of that environmental management plan, including any consultation that may be required when preparing the environmental management plan;

(2) must review and revise a **confirmed** environmental management plan and ensure it meets the relevant requirements of that environmental management plan, including any consultation that may be required when preparing the environmental management plan, as and when directed by the **CEO;** and

(3) must revise and submit to the **CEO** a **confirmed** Environmental Management Plan if there is a material risk that the outcomes or objectives it is required to achieve will not be complied with, including but not limited to as a result of a change to the proposal.

C2-3 Despite condition C2-1, but subject to conditions C2-4 and C2-5, the proponent may implement minor revisions to an environmental management plan if the revisions will not result in new or increased **adverse impacts** to the environment or result in a risk to the achievement of the limits, outcomes or objectives which the environmental management plan is required to achieve.

C2-4 If the proponent is to implement minor revisions to an environmental management plan under condition C2-3, the proponent must provide the **CEO** with the following at least twenty (20) business days before it implements the revisions:

(1) the revised environmental management plan clearly showing the minor revisions;

(2) an explanation of and justification for the minor revisions; and

(3) an explanation of why the minor revisions will not result in new or increased **adverse impacts** to the environment or result in a risk to the achievement of the limits, outcomes or objectives which the environmental management plan is required to achieve.

C2-5 The proponent must cease to implement any revisions which the **CEO** notifies the proponent (at any time) in writing may not be implemented.

C2-6 **Confirmed** environmental management plans, and any revised environmental management plans under condition C2-4(1), must be published on the proponent's website and provided to the **CEO** in electronic form suitable for on-line publication by the Department of Water and Environmental Regulation within

twenty (20) business days of being implemented, or being required to be implemented (whichever is earlier).

C3 Conditions Related to Monitoring

C3-1 The proponent must undertake monitoring capable of:

(1) substantiating whether the proposal limitations and extents in Part A are exceeded; and

(2) **detecting** and substantiating whether the environmental outcomes identified in Part B are achieved (excluding any environmental outcomes in Part B where an environmental management plan is expressly required to monitor achievement of that outcome).

C3-2 The proponent must submit as part of the Compliance Assessment Report required by condition D2, a compliance monitoring report that:

(1) outlines the monitoring that was undertaken during the implementation of the proposal;

(2) identifies why the monitoring was capable of substantiating whether the proposal limitation and extents in Part A are exceeded;

(3) for any environmental outcomes to which condition C3-1(2) applies, identifies why the monitoring was scientifically robust and capable of **detecting** whether the environmental outcomes in Part B are met;

(4) outlines the results of the monitoring;

(5) reports whether the proposal limitations and extents in Part A were exceeded and (for any environmental outcomes to which condition C3-1 (2) applies) whether the environmental outcomes in Part B were achieved, based on analysis of the results of the monitoring; and

(6) reports any actions taken by the proponent to remediate any potential non-compliance.

C4 Environmental Management Plans: Conditions Relating to Monitoring and Adaptive Management for Outcomes Based Conditions

C4-1 The environmental management plans required under condition B2-7 and condition B3-2 must contain provisions which enable the substantiation of whether the relevant outcomes of those conditions are met, and must include:

(1) **threshold criteria** that provide a limit beyond which the environmental outcomes are not achieved;

(2) **trigger criteria** that will provide an early warning that the environmental outcomes are not likely to be met;

(3) monitoring parameters, sites, control/reference sites, methodology, timing and frequencies which will be used to measure **threshold criteria** and **trigger criteria**. Include methodology for determining alternate monitoring sites as a contingency if proposed sites are not suitable in the future;

(4) baseline data;

(5) data collection and analysis methodologies;

(6) adaptive management methodology;

(7) **contingency measures** which will be implemented if **threshold criteria** or **trigger criteria** are not met; and

(8) reporting requirements.

C4-2 Without limiting condition C3-1, failure to achieve an environmental outcome, or the exceedance of a **threshold criteria**, regardless of whether threshold **contingency measures** have been or are being implemented, represents a non-compliance with these conditions.

C5 Environmental Management Plans: Conditions Related to Management Actions and Targets for Objective Based Conditions

C5-1 The environmental management plan required under condition B2-7 must contain provisions which enable the achievement of the relevant objectives of those conditions and substantiation of whether the objectives are reasonably likely to be met, and must include:

(1) **management actions**;

(2) **management targets**; and

(3) **contingency measures** if **management targets** are not met; and

(4) reporting requirements.

C5-2 Without limiting condition C2-1, the failure to achieve an environmental objective, or implement a **management action**, regardless of whether **contingency measures** have been or are being implemented, represents a non-compliance with these conditions.

PART D – COMPLIANCE, TIME LIMITS, AUDITS AND OTHER CONDITIONS

D1 Non-compliance Reporting

D1-1 If the proponent becomes aware of a potential non-compliance, the proponent must:

(1) report this to the **CEO** within seven (7) days;

(2) implement **contingency measures**;

(3) investigate the cause;

(4) investigate environmental impacts;

(5) advise rectification measures to be implemented;

(6) advise any other measures to be implemented to ensure no further impact; and

(7) provide a report to the **CEO** within twenty-one (21) days of being aware of the potential non-compliance, detailing the measures required in conditions D1-1(1) to D1-1(6) above.

D1-2 Failure to comply with the requirements of a condition, or with the content of an environmental management plan required under a condition, constitutes a non-compliance with these conditions, regardless of whether the **contingency measures**, rectification or other measures in condition D1-1 above have been or are being implemented.

D2 Compliance Reporting

D2-1 The proponent must provide an annual Compliance Assessment Report to the **CEO** for the purpose of determining whether the implementation conditions are being complied with.

D2-2 Unless a different date or frequency is approved by the **CEO**, the first annual Compliance Assessment Report must be submitted within fifteen (15) months of the date of this Statement, and subsequent plans must be submitted annually from that date.

D2-3 Each annual Compliance Assessment Report must be endorsed by the proponent's Chief Executive Officer, or a person approved by proponent's Chief Executive Officer to be delegated to sign on the Chief Executive Officer's behalf.

D2-4 Each annual Compliance Assessment Report must:

(1) state whether each condition of this Statement has been complied with, including:

(a) exceedance of any proposal limits and extents;

(b) achievement of environmental outcomes;
(c) achievement of environmental objectives;

(d) requirements to implement the content of environmental management plans;

(e) monitoring requirements;

(f) implement **contingency measures**;

(g) requirements to implement adaptive management; and

(h) reporting requirements;

(2) include the results of any monitoring (inclusive of any raw data) that has been required under Part C in order to demonstrate that the limits in Part A, and any outcomes or any objectives are being met;

(3) provide evidence to substantiate statements of compliance, or details of where there has been a non-compliance;

(4) include the corrective, remedial and preventative actions taken in response to any potential non-compliance;

(5) be provided in a form suitable for publication on the proponent's website and online by the Department of Water and Environmental Regulation;

(6) be prepared and published consistent with the latest version of the Compliance Assessment Plan required by condition D2-5 which the **CEO** has **confirmed** by notice in writing satisfies the relevant requirements of Part C and Part D.

D2-5 The proponent must prepare a Compliance Assessment Plan which is submitted to the **CEO** at least six (6) months prior to the first Compliance Assessment Report required by condition D2-2, or prior to implementation of the proposal, whichever is sooner.

D2-6 The Compliance Assessment Plan must include:

(1) what, when and how information will be collected and recorded to assess compliance;

(2) the methods which will be used to assess compliance;

(3) the methods which will be used to validate the adequacy of the compliance assessment to determine whether the implementation conditions are being complied with;

(4) the retention of compliance assessments;

(5) the table of contents of Compliance Assessment Reports, including audit tables; and

(6) how and when Compliance Assessment Reports will be made publicly available, including usually being published on the proponent's website within sixty (60) days of being provided to the **CEO**.

D3 Contact Details

D3-1 The proponent must notify the **CEO** of any change of its name, physical address or postal address for the serving of notices or other correspondence within twenty-eight (28) days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the state.

D4 Time Limit for Proposal Implementation

D4-1 The proposal must be substantially commenced within five (5) years from the date of this Statement.

D4-2 The proponent must provide to the **CEO** documentary evidence demonstrating that they have complied with condition D4-1 no later than fourteen (14) days after the expiration of the period specified in condition D4-1.

D4-3 If the proposal has not been substantially commenced within the period specified in condition D4-1, implementation of the proposal must not be commenced or continued after the expiration of that period.

D5 Public Availability of Data

D5-1 Subject to condition D5-2, within a reasonable time period approved by the **CEO** upon the issue of this Statement and for the remainder of the life of the proposal, the proponent must make publicly available, in a manner approved by the **CEO**, all validated environmental data collected before and after the date of this Statement relevant to the proposal (including sampling design, sampling methodologies, monitoring and other empirical data and derived information products (e.g. maps)), environmental management plans and reports relevant to the assessment of this proposal and implementation of this Statement.

D5-2 If:

(1) any data referred to in condition D5-1 contains trade secrets; or

(2) any data referred to in condition D5-1 contains particulars of confidential information (other than trade secrets) that has commercial value to a person that would be, or could reasonably be expected to be, destroyed or diminished if the confidential information were published,

the proponent may submit a request for approval from the **CEO** to not make this data publicly available and the **CEO** may agree to such a request if the **CEO** is satisfied that the data meets the above criteria.

D5-3 In making such a request the proponent must provide the **CEO** with an explanation and reasons why the data should not be made publicly available.

D6 Independent Audit

D6-1 The proponent must arrange for an independent audit of compliance with the conditions of this statement, including achievement of the environmental outcomes and/or the environmental objectives and/ or environmental performance with the conditions of this statement, as and when directed by the **CEO**.

D6-2 The independent audit must be carried out by a person with appropriate qualifications who is nominated or approved by the **CEO** to undertake the audit under condition D6-1.

D6-3 The proponent must submit the independent audit report with the Compliance Assessment Report required by condition D2, or at any time as and when directed in writing by the **CEO**. The audit report is to be supported by credible evidence to substantiate its findings.

D6-4 The independent audit report required by condition D6-1 is to be made publicly available in the same timeframe, manner and form as a Compliance Assessment Report, or as otherwise directed by the **CEO**.

Table 1: Abbreviations and definitions

Acronym or abbreviation	Definition or term
Aboriginal cultural heritage	Means the tangible and intangible elements that are important to the Aboriginal people of the state, and are recognised through social, spiritual, historical, scientific or aesthetic values, as part of Aboriginal tradition to the extent they directly affect or are affected by physical or biological surroundings.
Aboriginal cultural heritage site(s)	A place which has Aboriginal cultural heritage which is subject to a WA law relating specifically to Aboriginal heritage from time to time.
Acquired	The protection of **environmental values** on an area of initially unprotected land for the purpose of conservation through improved security of tenure or restricting the use of land (e.g. ceding land to the Crown or perpetual conservation covenants). This includes upfront costs of establishing the offset site and the on-going management of costs of maintaining the offset for the long term (20 years).
Adverse impact	Negative change that is neither trivial nor negligible that could result in a reduction in health, diversity or abundance of the receptor/s being impacted, or a reduction in **environmental value**. Adverse impacts can arise from direct or indirect impacts, or other impacts from the proposal. In relation to flora and vegetation this includes, but is not limited to, hydrological change, spread or introduction of environmental weeds, introduction or spread of disease, changes in erosion and edge effects. In relation to terrestrial fauna this includes but is not limited to, vehicle strike, collision with fencing, habitat fragmentation, artificial light and vibration, noise emissions and predation. In relation to inland waters this includes but is not limited to, changes to water quality and hydrological changes resulting from **mine dewatering**, surplus water discharge, reduction in surface water catchments and altered water flow regimes. In relation to **Aboriginal cultural heritage** this includes but is not limited to, hydrological change, structural damage, introduction or spread of non-indigenous flora and/or fauna, alteration of fauna behaviour, artificial light, dust, vibration and noise emissions.

Authorised offsets	Units representing **GHG emissions** issued under one of the following schemes and cancelled or retired in accordance with any rules applicable at the relevant time governing the cancellation or retiring of units of that kind: (a) Australian Carbon Credit Units issued under the *Carbon Credits (Carbon Farming Initiative) Act 2011* (Cth); (b) Verified Emission Reductions issued under the Gold Standard program; (c) Verified Carbon Units issued under the Verified Carbon Standard program; or (d) other offset units that the Minister has notified the proponent in writing meet integrity principles and are based on clear, enforceable and accountable methods.
Baseline flora and vegetation survey	The flora and vegetation survey results, and supporting spatial data described in the report McPhee Creek Flora and Vegetation Survey, by Ecoscape 2020.
Breakaway/cliff habitat	The area defined as the habitat type “breakaway/cliff” in the report and supporting spatial data in the McPhee Creek Consolidated Terrestrial Fauna Report, by Biologic 2021.
Breeding tree/s	Trees that are suitable for use as breeding habitat by grey falcon (*Falco hypoleucos*).
CEO	The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the *Environmental Protection Act 1986*, or the **CEO’s** delegate.
CO_2-e	Carbon dioxide equivalent
Confirmed	In relation to a plan required to be made and submitted to the **CEO**, means, at the relevant time, the plan that the **CEO confirmed**, by notice in writing, meets the requirements of the relevant condition. In relation to a plan required to be implemented without the need to be first submitted to the **CEO**, means that plan until it is revised, and then means, at the relevant time, the plan that the **CEO confirmed**, by notice in writing, meets the requirements of the relevant condition.
Conservation advice	Conservation advice made or adopted by the Australian Government Minister for Environment under the *Environment Protection and Biodiversity Conservation Act 1999*

Contingency measures	Planned actions for implementation if it is identified that an environmental outcome, environmental objective, threshold criteria, trigger criteria, or management target are likely to be, or are being, exceeded. Contingency measures include changes to operations or reductions in disturbance or **adverse impacts** to reduce impacts and must be decisive actions that will quickly bring the impact to below any relevant threshold, trigger, management target and to ensure that the environmental outcome and/or objective can be met.
CPI	The All Groups Consumer Price Index numbers for Perth compiled and published by the Australian Bureau of Statistics.
Crescent Moon Provisional Mining Exclusion Zone	The spatial area as depicted in Figure 1 and defined by geographic coordinates in Schedule 1.
Detecting	The smallest statistically discernible effect size that can be achieved with a monitoring strategy designed to achieve a statistical power value of at least 0.8 or an alternative value as determined by the **CEO**.
Directional and/ or shielded lighting	Means light fittings that are located, directed, or shielded to avoid lighting anything but the target object or area as described in the National Light Pollution Guidelines for Wildlife (May 2023).
Disturb / disturbance	Means directly has or materially contributes to the disturbance effect on health, diversity or abundance of the receptor/s being impacted or on an environmental value. In relation to flora, vegetation or fauna habitat, includes to result in death, destruction, removal, severing or doing substantial damage to. In relation to fauna, includes to have the effect of altering the natural behaviour of fauna to its detriment. In relation to inland waters, includes to have the effect of altering hydrological regimes or water quality to the detriment of the **environmental values** supported by or dependent on surface water and/or groundwater. In relation to **Aboriginal cultural heritage**, includes direct physical or biological effects on the tangible and intangible elements that are important to Aboriginal people, and are recognised through social, spiritual, historical, scientific or aesthetic values, as part of Aboriginal tradition.

Drainage line habitat	The area defined as the habitat type “drainage line” in the report and supporting spatial data in the McPhee Creek Consolidated Terrestrial Fauna Report, by Biologic 2021.
Emissions intensity	**Proposal GHG emissions** per tonnes per annum of ore produced.
Environmental value	A beneficial use, or ecosystem health condition.
Environmental Weeds	Any plant declared under section 22(2) of the *Biosecurity and Agriculture Management Act 2007*, any plant listed on the Weeds of National Significance List and any weeds listed on the Department of Biodiversity, Conservation and Attractions’ Pilbara Impact and Invasiveness Ratings list, as amended or replaced from time to time.
Fauna spotter	A person who is qualified and has attained the appropriate licence/s and authorisation/s under the *Biodiversity Conservation Act 2016* and the *Biodiversity Conservation Regulations 2018*.
Fauna Corridor Exclusion Zone	The spatial area as depicted in Figure 1 and defined by geographic coordinates in Schedule 1.
Feral fauna	Non-native (introduced) fauna species that are, or have the potential to, become established in the wild. Examples relevant to the proposal include but are not limited to: cat (*Felis catus*), red fox (*Vulpes vulpes*), cane toad (*Rhinella marina*) and goat (*Capra hircus*).
GHG emissions	Greenhouse gas emissions expressed in tonnes of carbon dioxide equivalent (CO_2-e) as calculated in accordance with the definition of 'carbon dioxide equivalence' in Section 7 of the *National Greenhouse and Energy Reporting Act 2007* (Cth), or, if that definition is amended or repealed, the meaning set out in an Act, regulation or instrument concerning greenhouse gases as specified by the Minister.
GL/a	Gigalitres per annum
‘Good’ to ‘Excellent’ condition native vegetation	Means native vegetation that has been rated ‘good’, ‘excellent’ or any value between these ratings, in accordance with the *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016)* including any revision to this technical guidance.
Gorge/gully habitat	The area defined as the habitat type “gorge/gully” in the report and supporting spatial data in the McPhee Creek Consolidated Terrestrial Fauna Report, by Biologic 2021.

Greater bilby (*Macrotis lagotis*) burrow	A burrow identified within **Spinifex sandplain habitat** that upon assessment by a licensed **fauna spotter** is reasonably suspected of being recently utilised by greater bilby (*Macrotis lagotis*) or is considered viable for potential future use by greater bilby (*Macrotis lagotis*).
Greenhouse gas or GHG	Has the meaning given by Section 7A of the *National Greenhouse and Energy Reporting Act 2007* (Cth) or, if that definition is amended or repealed, the meaning set out in an Act, regulation or instrument concerning greenhouse gases as specified by the Minister.
Grey falcon (*Falco hypoleucos*) nesting period	The period between 1 June and 30 November in any calendar year.
Ground disturbing activities	Any activity or activities undertaken in the implementation of the proposal, including any clearing, civil works or construction.
ha	Hectare
High Value Troglofauna Habitat Exclusion Zone,	The spatial area as depicted in Figure 1 and defined by geographic coordinates in Schedule 1.
Hillcrest/hillslope habitat	The area defined as the habitat type “Hillcrest/hillslope” in the report and supporting spatial data in the McPhee Creek Consolidated Terrestrial Fauna Report, by Biologic 2021.
IBRA	Interim Biogeographic Regionalisation for Australia
km	Kilometre
Low impact activities	Means activities involving minimal disturbance of ground or vegetation. Activities may include monitoring of fauna, vegetation or water, or management activities associated with **feral fauna** control or weed control.
Management action	The identified actions implemented with the intent of achieving the environmental objective.
Management target	A type of indicator to evaluate whether an environmental objective is being achieved.
Mine dewatering	The extraction of groundwater from below the water table to access an ore body.

Mining operations	Means any mode or method of working whereby the earth or any rock, structure, stone, fluid or mineral bearing substance may be disturbed, removed, washed, sifted, crushed, leached, roasted, distilled, evaporated, smelted, combusted or refined or dealt with for the purpose of obtaining any mineral or processed mineral resource therefrom whether it has been previously disturbed or not (*Mining Act 1978*).
Net GHG emissions	**Proposal GHG emissions** for a period less any reduction in GHG Emissions represented by the cancellation or retirement of authorised offsets which: (a) were cancelled or retired between the first day of the period until 1 March in the year after the period has ended; (b) have been identified in the report for that period as required by condition B5-5(1)(b)(iv); (c) have not been identified as cancelled or retired in the report for that period as required by condition B5-5(1)(b)(iv); (d) have not been used to offset **GHG emissions** other than **proposal GHG emissions**; and (e) were not generated by avoiding **proposal GHG emissions**.
On-ground management	This includes revegetation (re-establishment of native vegetation in degraded areas) and rehabilitation (repair of ecosystem processes and management of weeds, disease or feral animals) with the objective to achieve a **tangible improvement** to the **environmental values** in the offset area.
Operations / Commencement of operations	Operation of the plant infrastructure for the proposal and includes pre-commissioning, commissioning, start-up and operation of the plant infrastructure for the proposal.
Pilbara Environmental Offsets Fund	A special purpose account created pursuant to section 16(1)(d) of the *Financial Management Act 2006* by the Department of Water and Environmental Regulation.
Proposal GHG emissions	GHG emissions released to the atmosphere as a direct result of an activity or series of activities that comprise/s or form/s part of the proposal, including GHG emissions resulting from the haulage of ore from the proposal to any third-party processing facility.
Proposed Offset Conservation Area	The area of land identified in condition B7-13(2).
Recovery plans	Recovery plans made or adopted by the Australian Government Minister for Environment under the *Environment Protection and Biodiversity Conservation Act 1999*

Relevant management body	A party or parties that has a role in the establishment and/or on-going management of the **Proposed Offset Conservation Area**. Note: This includes the role of the proponent.
Relevant Traditional Owner	In relation to the land subject to the proposal, means one or more of the following: - a registered native title body corporate for the land; or - a registered native title claimant for the land; or - a group of persons with Aboriginal traditional and cultural associations with the land.
Research offset	A program or study that must be reasonably related to the impact and is designed to result in a positive conservation outcome. It may include improving the management and protection of existing conservation estate, adding to existing State Government initiatives, policies or strategies, or addressing priority knowledge gaps.
Scope 3 emissions	Indirect **GHG emissions** other than scope 2 emissions that are generated in the wider community. Scope 3 emissions (both upstream and downstream) occur as a consequence of the activities of a proposal, but from sources not owned or controlled by the proponent as part of the proposal.
Significant Fauna Exclusion Zone	The spatial area outside of, but encapsulated by, the development envelope, as depicted in Figure 1 and defined by geographic coordinates in Schedule 1.
Spinifex sandplain habitat	The area defined as the habitat type “spinifex sandplain” in the report and supporting spatial data in the McPhee Creek Consolidated Terrestrial Fauna Report, by Biologic 2021.
Subterranean Fauna Assessment	The subterranean fauna assessment results, and 3D habitat modelling results described in the report McPhee Creek Subterranean Fauna Assessment, by Biologic 2021.
Tangible improvement	A perceptible, measurable and definable improvement that provides additional ecological benefit and/or value.
Threat abatement plans	Threat abatement plans made or adopted by the Australian Government Minister for Environment under the *Environment Protection and Biodiversity Conservation Act 1999*
Trigger criteria	Indicators that have been selected for monitoring to provide a warning that, if exceeded, the environmental outcome may not be achieved. They are intended to forewarn of the approach of the threshold criteria and trigger response actions.

Threshold criteria	The indicators that have been selected to represent limits of impact beyond which the environmental outcome is not being met.

Figures (attached)

Figure 1 Development envelope, indicative disturbance footprint, Significant Fauna Exclusion Zone, Fauna Corridor Exclusion Zone, High Value Troglofauna Habitat Exclusion Zone, and Crescent Moon Provisional Mining Exclusion Zone of the McPhee Creek Iron Ore Project

Figure 2 Significant caves to be avoided within the McPhee Creek Iron Ore Project development envelope, and Bat Cave Buffer Zones

Figure 3 Maximum extent of creek line dewatering discharge wetting fronts, and significant surface water pools and rock-holes to be avoided

Figure 1 McPhee Creek Iron Project development envelope, indicative footprint and exclusion zones

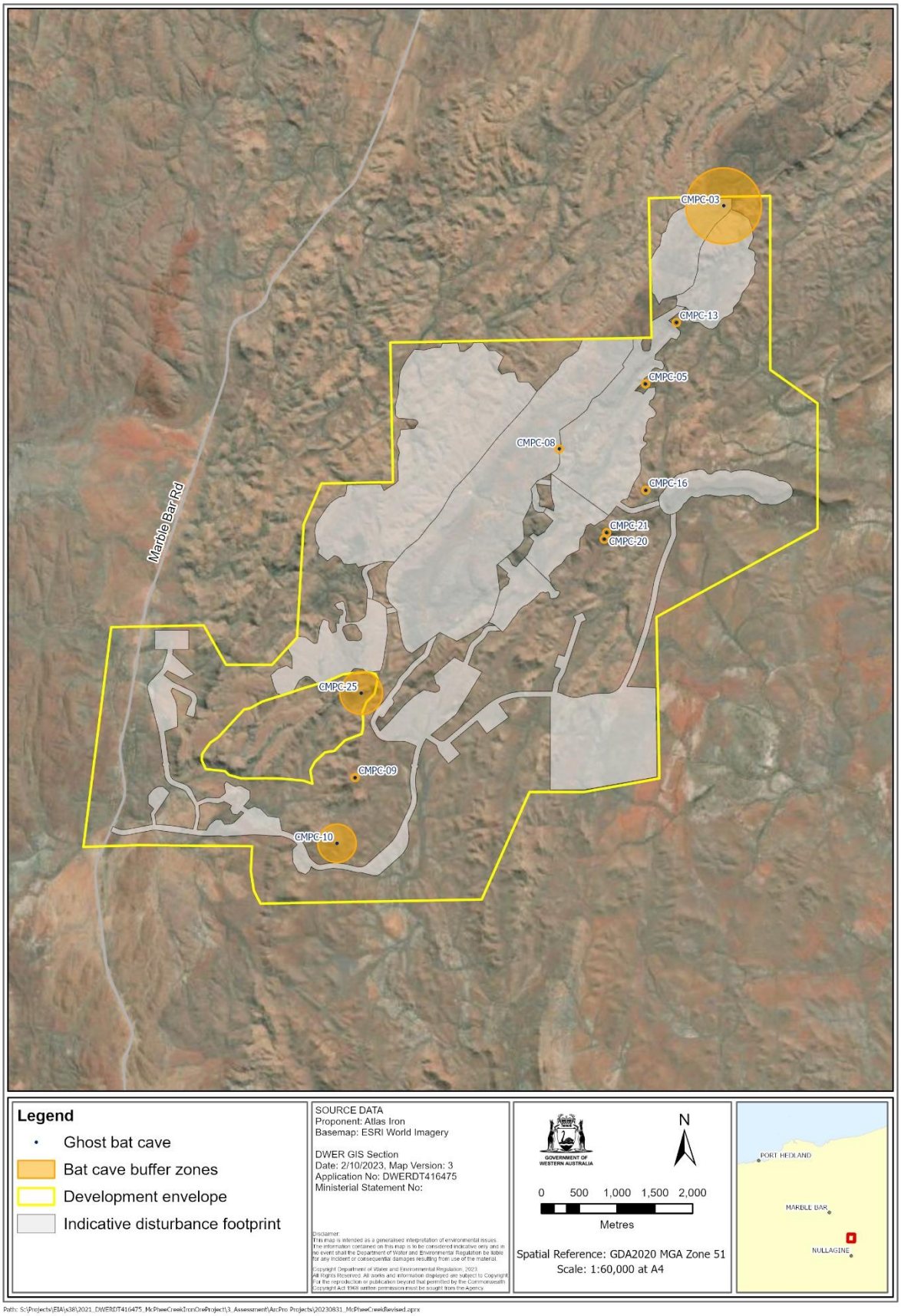

Figure 2 Significant bat caves and buffer zones

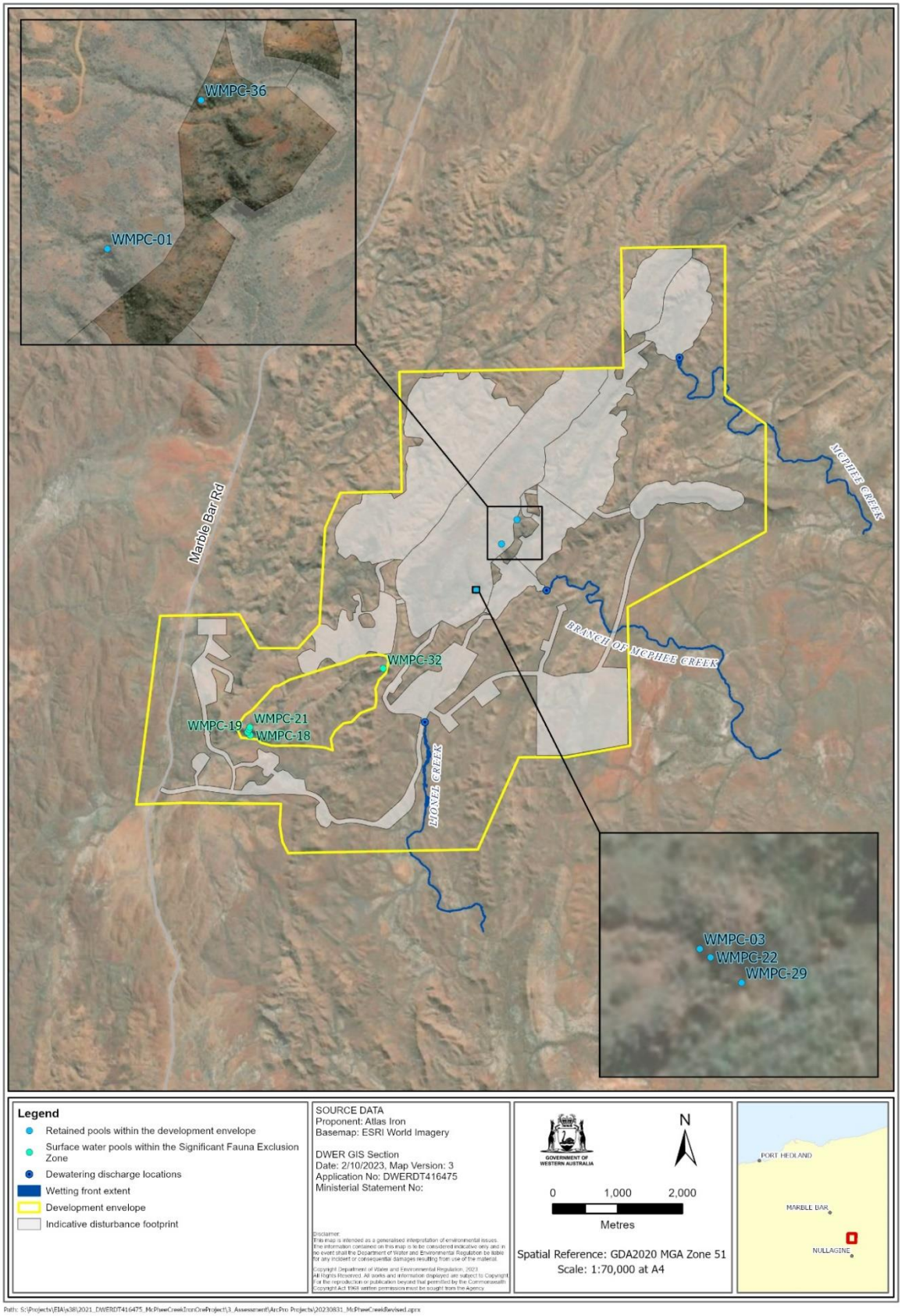

Figure 3 Creek line dewatering discharge wetting fronts, and significant surface water pools

Schedule 1

All co-ordinates are in metres, listed in Map Grid of Australia Zone 51 (MGA Zone 51), datum of Geocentric Datum of Australia 2020 (GDA2020).

Spatial data depicting the figures are held by the Department of Water and Environmental regulation. Record no. A22074455.

Appendix B: Decision-making authorities

Table B1: Identified relevant decision-making authorities for the proposal

Decision-making authority	Legislation (and approval)
1. Minister for Aboriginal Affairs	*Aboriginal Cultural Heritage Act 2021* - s. 119(1)(c) and s.120(1) and (2) decision to grant or refuse a permit - s. 150(1)(b) decision whether to approve a management plan or *Aboriginal Heritage Act 1972* - s. 18 consent to impact a registered Aboriginal heritage site
2. Minister for Environment	*Biodiversity Conservation Act 2016* - s. 40 authority to take or disturb threatened species
3. Minister for Mines and Petroleum	*Mining Act 1978* - granting of a mining lease/exploration licence/general purpose lease/retention licence
4. Minister for Water	*Rights in Water and Irrigation Act 1914* - s. 17 permit to interfere with beds and banks - s. 5C licence to take water - s. 26D licence to construct or alter a well - dewatering licence
5. Chief Executive Officer, Department of Biodiversity, Conservation and Attractions	*Biodiversity Conservation Act 2016* - authority to take flora and fauna (other than threatened species)
6. Chief Health Officer, Department of Health	*Health Act 1911* - Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulation 1974 - treatment of sewage intended to serve a building that is not a single dwelling or any other building that produces more than 540 litres of sewage per day
7. Chief Dangerous Goods Officer Department of Mines, Industry Regulation and Safety	*Dangerous Goods Safety Act 2004* - storage and handling of dangerous goods
8. Executive Director Resource and Environmental Compliance, Department of Mines, Industry Regulation and Safety	*Mining Act 1978* - Mining Proposal and Mine Closure Plan
9. Mining Registrar, Department of Mines, Industry Regulation and Safety	*Mining Act 1978* - miscellaneous license / prospecting licence

10. State Mining Engineer, Department of Mines, Industry Regulation and Safety	*Mines Safety and Inspection Act 1994* - mine safety - s. 42(3)a approval to commence mining operations
11. Chief Executive Officer, Department of Water and Environmental Regulation	*Environmental Protection Act 1986* - part V works approval and licence
12. Chief Executive Officer Shire of East Pilbara	*Health Act 1911* and Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974 - treatment of sewage for a single dwelling or any other building that produces less than 540 litres of sewage per day *Building Act 2011* - building permit (for example, worker accommodation, offices) *Planning and Development Act 2005* - planning approval/development approval *Local Government Act 1995* (and relevant local By Law) - extractive industries licence

Appendix C: Environmental Protection Act Principles

Table C1: Consideration of principles of the *Environmental Protection Act 1986*

EP Act principle	Consideration
1. The precautionary principle *Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.* *In application of this precautionary principle, decisions should be guided by –* *(a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and* *(b) an assessment of the risk-weighted consequences of various options.*	The EPA has considered the precautionary principle in its assessment and has had particular regard to this principle in its assessment of flora and vegetation, terrestrial fauna, inland waters, subterranean fauna, GHG emissions and social surroundings. The assessment of these impacts is provided in this report. Investigations into the biological and physical environment undertaken by the proponent have provided sufficient scientific certainty to assess the risks and identify measures to avoid or minimise impacts. The EPA notes that the proponent has identified measures to avoid potential serious or irreversible damage to the environment included: • avoidance of the Significant Fauna Exclusion Zone, and an associated Fauna Corridor Exclusion Zone • implementation of the Provisional Mining Exclusion Zone at Crecent Moon to protect significant environmental values • avoidance of surrounding cultural heritage sites, bat caves and pools, including buffers zones • implementation of Significant Species Management Plan • implementation of a Water Management Plan • ongoing consultation with the relevant traditional owners regarding access issues, cultural heritage surveys and environmental monitoring. <u>Greenhouse gas emissions</u> The EPA notes that climate change as a result of cumulative GHG emissions has the potential to cause serious damage to WA's environment. The specific impacts of any single proposal's GHG emissions are not able to be known with certainty at this time. However, the EPA has not used this as a reason for postponing assessment of the proposal's contribution to the State's GHG emissions or recommending practicable conditions to reduce emissions in order to minimise the risk of environmental harm associated with climate change.

EP Act principle	Consideration
	The EPA notes that during the life of proposal, the estimated unmitigated GHG emissions are: • scope 1 including haulage: average of 127,161 tonnes of CO_2-e per annum • no scope 2 emissions • scope 3 involving downstream processing, shipping and processing into steel: up to 20,216,000 tonnes of CO_2-e per annum. Resulting in a total scope 1 emissions of 1,964,127 tonnes of CO_2-e over the life of the project. The EPA notes that with the implementation of the proponent's mitigation measures, the estimates that the life of proposal scope 1 GHG emissions would be reduced to a potential 1,683,440 tonnes of CO_2-e over life of the project to WA emissions. The proponent has committed to following a trajectory to net zero emissions by 2050. The EPA has recommended conditions to ensure these limits are met. These include condition B5 which requires the implementation of a Greenhouse gas management plan to ensure the proponent continues to review emissions and implement continuous improvement to reduce emissions.
2. The principle of intergenerational equity *The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.*	The EPA has considered the principle of intergenerational equity in its assessment and has had particular regard to this principle in its assessment of flora and vegetation, terrestrial fauna, inland waters, subterranean fauna, GHG emissions and social surroundings. The EPA is of the view that consistency with this principle could be achieved with the implementation of its recommended conditions, which requires the proponent to: • not disturb Aboriginal cultural heritage sites in the development envelope, unless consent is granted to disturb that site under WA legislation which specifically relates to Aboriginal heritage and has required informed consultation with the relevant Nyamal Traditional Owners • develop and implement a Greenhouse gas management plan within six months of implementing the proposal, and requiring the proponent to demonstrate trajectory to net zero emissions by 2050 through emission reporting • maintain levels of ecological protection within the terrestrial environment such as limits on the extent of disturbance to flora, vegetation, fauna habitat types, and surface water pools, and management targets to avoid indirect impacts

EP Act principle	Consideration
	• contribute to the PEOF for future landscape-scale environmental offset projects, to counterbalance the significant residual impact to vegetation and threatened fauna habitats within the Pilbara. The EPA has concluded that the environmental values will be protected, and the health, diversity and productivity of the environment will be maintained for the benefit of future generations. <u>Greenhouse gas emissions</u> The EPA has noted that GHG emissions pose a risk to future generations, however, also notes that the proponent has committed to following a linear trajectory to net zero emissions by 2050 consistent with the Paris Agreement and IPCC 1.5 report, and to use offsets should these targets not be met by continuous improvement. The EPA has recommended conditions to ensure this.
3. The principles of the conservation of biological diversity and ecological integrity *Conservation of biological diversity and ecological integrity should be a fundamental consideration.*	The EPA has considered the principle of conservation of biological diversity and ecological integrity in its assessment and has had particular regard to this principle in its assessment of flora and vegetation and terrestrial fauna. <u>Flora and vegetation and terrestrial fauna</u> The EPA has considered the principle of conservation of biological diversity and ecological integrity in its assessment and has had particular regard to this principle in its assessment of flora and vegetation, and terrestrial fauna. The EPA has considered to what extent the potential impacts from the proposal to flora and vegetation and terrestrial fauna can be ameliorated to ensure consistency with the principle of conservation of biological diversity and ecological, including exclusion areas within the development envelope and offsets. The EPA has recommended: • mining exclusion zones within the development envelope for a Fauna Corridor Exclusion Zone to connect the Significant Fauna Exclusion Zone to outside the proposal's development envelope • avoidance of critical bat cave habitats including buffer zones within the development envelope • specific limits of disturbance to high value terrestrial fauna habitats (breakaway/cliff, gorge/gully and drainage line habitat types). The application of the exclusion areas and limits on disturbance (and any associated conditions) are to ensure there is no significant residual impact on the biodiversity diversity and ecological integrity of these values within the local extent of the development envelope.

EP Act principle	Consideration
	The EPA also concluded that given the nature of the impacts (areas of vegetation and habitat for conservation significant fauna species that will be cleared) that the proposed offsets are likely to counter-balance the impacts of the loss of biological diversity and ecological integrity.
4. Principles relating to improved valuation, pricing and incentive mechanisms (1) *Environmental factors should be included in the valuation of assets and services.* (2) *The polluter pays principle — those who generate pollution and waste should bear the cost of containment, avoidance or abatement.* (3) *The users of goods and services should pay prices based on the full life cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any wastes.* (4) *Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solutions and responses to environmental problems.*	In considering this principle, the EPA notes that the proponent would bear the cost relating to mitigation and management of proposal-related impacts to flora and vegetation, terrestrial fauna, inland waters, subterranean fauna, and social surroundings. The EPA has had regard to this principle during the assessment of the proposal. The proponent will be responsible for bearing the costs of implementing measures to reduce and offset GHG emissions, including the costs of implementation specific abatement measures in the future to further reduce and offset GHG emissions to achieve net zero by 2050.
5. The principle of waste minimisation *All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.*	In considering this principle, the EPA notes that the proponent proposes to implement the Waste Management Procedures and is required to adhere to other statutory processes associated with waste management (for example, Environmental Protection (Rural Landfill) Regulations 2002, and *the Mining Act 1978).* The EPA has also captured waste as management targets through recommended conditions (for example, Significant Species Management Plan under condition B2). The EPA recognises the proponent has committed to use excess water from ground water abstraction for operational uses prior to discharge to creek lines, which will also be managed through the EPA's recommended condition B3. The EPA has considered the principle of waste minimisation in its assessment and has had particular regard to this principle in its assessment.

Appendix D: Other Environmental Factors

Table D1: Evaluation of other environmental factors

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
Land			
Landforms	Potential impacts include reduced landform diversity and aesthetic impacts through visual amenity.	There were no agency or public comments related to landforms.	Landforms was not identified as a preliminary key environmental factor when the EPA set the level of assessment. The development envelope is centred around iron ore deposits associated with the McPhee Creek ridgeline which runs in a south-west to north-east direction approximately 60 m above the surrounding landscape Atlas 2022a). The proposal will result in the modification of the ridgeline landform through resource extraction and the construction of mine waste features, such as waste rock dumps. With the exception of exploration-related disturbance, the ridgeline landform is largely undisturbed and intact. The ridgeline landform is characteristic of the Capricorn land system which is regionally well-represented, with 482,779 ha within the Chichester subregion and 25,158 ha mapped within 20 km of the development envelope (Atlas 2022a). On a local scale, the ridgeline landform continues outside of the development envelope at least 10 km to the north-east (Biologic 2019b). In its assessment of determining whether the impacted landform is a significant landform the EPA had regard to the following: • the ridgeline landform (and associated ecological and habitat values) is well represented locally and throughout the region

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
			• the ridgeline is not known to exclusively support any endemic or highly restricted species and is not recognised as having any specific scientific importance • the ridgeline is not known to have any intrinsic Aboriginal cultural heritage • to ensure areas of recognised Aboriginal cultural heritage, such as rock shelters and pools located within the ridgeline, the EPA has recommended condition B6 to ensure that the proposal avoids, and otherwise minimises impacts to cultural and heritage values. The EPA considers it is unlikely that the proposal would have a significant impact on landforms as the significant criteria of variety, integrity, ecological importance, scientific importance, rarity and social importance were not met and that the impact to this factor is manageable. Accordingly, the EPA did not consider landforms to be a key environmental factor at the conclusion of its assessment.
Terrestrial environmental quality	• there is a low risk potentially acid forming (PAF) material and the formation of acid mine drainage (AMD) being generated during operations and upon closure • inadequate transport, handling and storage of hydrocarbons and chemicals.	DWER did advise the inclusion of management targets and monitoring targets within the proposals Water Management Plan to ensure APF/AMD did not result in impacts to inland waters and also terrestrial environmental quality.	The EPA recommends the implementation of a Water Management Plan that contains adequate management and monitoring measures to ensure water quality is not impacted from PAF. The EPA considers that PAF/AMD risk associated with the McPhee proposal is manageable through the recommended conditions (e.g. related to inland waters) as well as through other statutory decision making processes (e.g., Mine Closure Planning under the *Mining Act 1978*). Additionally, the EPA considers that statutory process in relation to hydrocarbons and chemical handling, storage and transport will adequately manage risks to the environment. Accordingly, the EPA did not consider

Environmental factor	Description of the proposal's likely impacts on the environmental factor	Government agency and public comments	Evaluation of why the factor is not a key environmental factor
			terrestrial environmental quality to be a key environmental factor at the conclusion of its assessment.
Air			
Air quality	• potential impacts to air quality from the proposal are in the form of dust. The closest sensitive receptor location is the town of Nullagine, approximately 30 km from the proposal.	There were no agency or public comments related to air quality.	Air quality was not identified as a preliminary key environmental factor when the EPA set the level of assessment. While dust impacts are considered for other environmental factors (for example, flora and vegetation, terrestrial fauna, inland waters and social surroundings), the nearest sensitive receptor (that is, town of Nullagine) is approximately 30 km from the proposal. Accordingly, the EPA did not consider air quality to be a key environmental factor at the conclusion of its assessment.

Appendix E: Relevant Policy, Guidance and Procedures

The EPA had particular regard to the policies, guidelines and procedures listed below in the assessment of the proposal.

- *Environmental factor guideline – Flora and vegetation* (EPA 2016)
- *Environmental factor guideline – Greenhouse gas emissions* (EPA 2023)
- *Environmental factor guideline – Human health* (EPA 2016)
- *Environmental factor guideline – Inland waters* (EPA 2018)
- *Environmental factor guideline – Landforms* (EPA 2016)
- *Environmental factor guideline – Social surroundings* (EPA 2023)
- *Environmental factor guideline – Subterranean fauna* (EPA 2016)
- *Environmental factor guideline – Terrestrial environmental quality* (EPA 2016)
- *Environmental factor guideline – Terrestrial fauna* (EPA 2016)
- *Environmental impact assessment (Part IV Divisions 1 and 2) procedures manual* (EPA 2021)
- *WA Environmental Offsets Policy* (Government of Western Australia 2011)
- *WA Environmental Offsets Guidelines* (Government of Western Australia 2014)
- *Statement of environmental principles, factors, objectives and aims of EIA* (EPA 2021)
- Environmental impact assessment (Part IV Divisions 1 and 2) administrative procedures 2021 (State of Western Australia 2021)
- *Technical guidance – Flora and vegetation surveys for environmental impact assessment* (EPA 2016)
- *Technical guidance – Sampling of short-range endemic invertebrate fauna* (EPA 2016)
- *Technical guidance – Subterranean fauna surveys for environmental impact assessment* (EPA 2021)
- *Technical guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment* (EPA 2020).

Appendix F: List of Submitters

7-day comment on referral

- No submissions were received.

Public review of proponent information

Organisations and public

- Four (4) individuals submitted comments on the referral.

Government agencies

- Department of Water and Environmental Regulation
- Department of Biodiversity, Conservation and Attractions
- Department of Health
- Department of Climate Change, Energy, the Environment and Water

Appendix G: Assessment Timeline

Table G1: Assessment timeline for the McPhee Creek Iron Ore Project

Date	Progress stages	Time (weeks)
22 March 2021	EPA decided to assess – level of assessment set	
24 August 2021	EPA approved Environmental Scoping Document	22
1 July 2022	EPA accepted Environmental Review Document	44
11 July 2022	Environmental Review Document released for public review	4
22 August 2022	Public review period for Environmental Review Document closed	6
30 June 2023	EPA received proponent's Response to Submissions	45
17 August 2023	EPA completed its assessment (s. 44(2b))	3
30 August 2023	EPA accepted proponent's Response to Submissions	2
13 October 2023	EPA provided report to the Minister for Environment	6
18 October 2023	EPA report published	3 days
8 November 2023	Appeals period closed	3

Timelines for an assessment may vary according to the complexity of the proposal and are usually agreed with the proponent soon after the EPA decides to assess the proposal and records the level of assessment.

In this case, the EPA met its timeline objective to complete its assessment and provide a report to the Minister.

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