



Report and recommendations of the Environmental Protection Authority



Miralga Creek DSO Project

Atlas Iron Pty Ltd

Report 1689

September 2020

Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
11/05/2020	EPA decided to assess – level of assessment set	
28/05/2020	Additional Information released for public review	2
11/06/2020	Public review period for Additional Information closed	2
01/07/2020	EPA received final information for assessment	3
20/08/2020	EPA board considered assessment	7
24/09/2020	EPA provided report to the Minister for Environment	5
30/09/2020	EPA report published	3 days
14/10/2020	Close of appeals period	2

Timelines for an assessment may vary according to the complexity of the proposal and are usually agreed with the proponent soon after the Environmental Protection Authority (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.



Dr Tom Hatton
Chairman

22 September 2020

ISSN 1836-0483 (Print)
ISSN 1836-0491 (Online)
Assessment No. 2246

Summary

This document is an assessment report for Western Australia's Minister for Environment. It describes the outcomes of an Environmental Protection Authority (EPA) environmental impact assessment of the Miralga Creek DSO Project (the proposal), located in the Pilbara region of Western Australia. The proponent is Atlas Iron Pty Ltd.

Proposal

The proposal is to develop above watertable mining of iron ore from Miralga East, Miralga West and Sandtrax, located about 100 kilometres south-east of Port Hedland.

Background and Context

The proponent referred the proposal to the EPA on 7 April 2020. On 11 May 2020 the EPA decided to assess the proposal and set the level of assessment at Referral Information, with additional information required and a public review. The additional information was released for public review from 28 May 2020 to 11 June 2020. Three submissions from government agencies and no submissions from the public were received.

The proposal was also determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* to be assessed by an accredited process under the *Environmental Protection Act 1986*.

Key Environmental Factors and Relevant Principles

The EPA identified the following key environmental factors during the course of its assessment:

1. **Flora and Vegetation** – potential impacts from clearing of 219.8 hectares of native vegetation, including impact to priority species, indirect impacts from dust, hydrocarbon spills, weeds, fragmentation, reduced groundwater levels from borefield operations and changes to fire regimes.
2. **Terrestrial Fauna** – direct and indirect impacts to conservation significant habitat and fauna, including ghost bats, Pilbara leaf-nosed bats and northern quolls, as a result of mining.

In identifying the key environmental factors, the EPA had regard to the object and principles set out in s. 4A of the *Environmental Protection Act 1986*. The EPA considered that the following principles were particularly relevant to this assessment:

1. **The precautionary principle** – investigations on the biological and physical environment undertaken by the proponent have provided sufficient certainty to assess risks and identify measures to avoid or minimise impacts.
2. **The principle of intergenerational equity** – the EPA notes that the proponent has taken measures to avoid and minimise impacts, and this, together with the recommended conditions, will ensure the environment is maintained for future generations.

3. **The principle of the conservation of biological diversity and ecological integrity** – the EPA has concluded that provided the recommended conditions are imposed on the implementation of the proposal, the proposal will not compromise the biological diversity and ecological integrity of the affected areas.
4. **The principle of waste minimisation** – the EPA notes that the proponent will apply the waste hierarchy to operations.

Conclusion

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

- impacts to all the key environmental factors
- EPA's confidence in the proponent's proposed mitigation measures
- relevant *Environmental Protection Act 1986* principles and the EPA's objectives for the key environmental factors
- EPA's view that the impacts to the key environmental factors are manageable, provided the recommended conditions are imposed.

Having assessed the proposal, the EPA concluded that the proposal may be implemented subject to the recommended conditions.

Recommendations

The EPA recommends that the Minister for Environment notes:

1. The proposal assessed is for the construction and operation of the Miralga Creek Direct Shipping Ore (DSO) Project, which would require up to 219.8 hectares of clearing within the 556.8 hectare development envelope.
2. The key environmental factors identified by the EPA in the course of its assessment are Flora and Vegetation, and Terrestrial Fauna.
3. The EPA has recommended that the proposal may be implemented, provided that implementation is carried out in accordance with the recommended conditions and procedures set out in Appendix 4. Matters addressed in the conditions include:
 - control through authorised extent in Schedule 1 of the Recommended Environmental Conditions
 - preparation and implementation of a revised version of the Significant Species Management Plan (180-LAH-EN-PLN-0001, Rev 0, April 2020) (condition 6), to address baseline monitoring and a staged approach to blasting, and avoiding blasting within 100 metres of a cave until the results of monitoring validate predictions with a reasonable degree of confidence
 - implementation of offsets (condition 7) to counterbalance the significant residual impact of clearing 219.8 hectares of Chichester IBRA subregion vegetation, which is foraging and denning habitat for the northern quoll, ghost bat and Pilbara leaf-nosed bat.

Contents

Summary.....	i
1. Introduction	1
1.1 Assessment on behalf of the Commonwealth.....	1
2. The Proposal	2
2.1 Changes to the proposal during assessment.....	12
2.2 Context.....	12
3. Consultation.....	13
4. Key Environmental Factors.....	14
4.1 Flora and Vegetation.....	16
4.2 Terrestrial Fauna.....	23
5. Offsets.....	35
6. Matters of National Environmental Significance	38
7. Conclusion	42
8. Recommendations	43
References.....	44
Appendix 1: List of submitters	46
Appendix 2: Consideration of Environmental Protection Act Principles	47
Appendix 3: Evaluation of Other Environmental Factors	50
Appendix 4: Identified Decision-Making Authorities and Recommended Environmental Conditions	60

Tables

Table 1: Summary of the proposal.....	2
Table 2: Location and proposed extent of physical and operational elements	3
Table 3: Significant flora in the study area, development envelope and indicative disturbance footprint.....	18
Table 4: Fauna habitat in the study area and development envelope	24
Table 5: Caves recorded in the study area	26

Figures

Figure 1: Regional location	4
Figure 2: Proposal development envelope and indicative disturbance footprint overview	5
Figure 3: Miralga East – Development envelope and indicative disturbance footprint.....	6
Figure 4: Miralga West – Development envelope and indicative disturbance footprint.....	7
Figure 5: Sandtrax – Development envelope and indicative.....	8
Figure 6: Haul road – Development envelope and indicative disturbance footprint.....	9
Figure 7: Magazine – Development envelope and indicative disturbance footprint.....	10
Figure 8: Accommodation camp and associated infrastructure – Development envelope and indicative disturbance footprint.....	11
Figure 9: Conservation significant flora locations	21
Figure 10: Cave locations.....	27
Figure 11: Northern quoll records.....	30

1. Introduction

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for Environment on the outcomes of the EPA's environmental impact assessment of the Miralga Creek DSO Project (referred to in this report as the proposal). The proponent of the proposal is Atlas Iron Pty Ltd.

The proposal is to develop above watertable mining of iron ore from Miralga East, Miralga West and Sandtrax, located about 100 kilometres (km) south-east of Port Hedland, in the Pilbara region.

The EPA has prepared this report in accordance with s. 44 of the *Environmental Protection Act 1986* (EP Act). This section of the EP Act requires the EPA to prepare a report on the outcome of its assessment of a proposal and provide this assessment report to the Minister for Environment. The report must set out:

- (a) what the EPA considers to be the key environmental factors identified during the assessment
- (b) the EPA's recommendations as to whether or not the proposal may be implemented and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

The EPA may also include any other information, advice and recommendations in the assessment report as it thinks fit.

The proponent referred the proposal to the EPA on 7 April 2020. On 11 May 2020 the EPA decided to assess the proposal and set the level of assessment at Referral Information with additional information required, and with a public review period of two weeks for the additional information. The additional information was released for public review from 28 May 2020 to 11 June 2020.

EPA Procedures

The EPA followed the procedures in the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016* (State of Western Australia 2016) and the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA 2020c).

1.1 Assessment on behalf of the Commonwealth

The proposal was determined to be a controlled action by a delegate of the Commonwealth Minister for the Environment under the *Environment Protection and Biodiversity Conservation Act 1999* on 24 April 2020 as it will, or is likely to have, a significant impact on the following Matters of National Environmental Significance:

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

The proposal was assessed as an accredited assessment between the Commonwealth and Western Australian governments.

2. The Proposal

The proposal involves mining of iron ore from five satellite pits from three discrete mining areas – Miralga East, Miralga West and Sandtrax. The proposal is located about 100 km south-east of Port Hedland along Marble Bar Road, in the Shire of East Pilbara (Figure 1).

The proposal consists of:

- above watertable mining from five open pits (three at Miralga East, one at Miralga West and one at Sandtrax)
- construction of three waste dumps
- construction of supporting infrastructure (access roads, mine operation centre, laydown areas, administration areas, explosive magazine, fuel storage area, haulage road and ROM stockyard)
- processing of ore (mobile crushing and screening plant)
- use of existing borefields
- clearing of 219.8 hectares (ha) of native vegetation within a 556.8 ha development envelope
- six separate development envelopes (Figures 3 to 8) within an overall proposal development envelope (Figure 2).

The proponent anticipates eight megatonnes of iron ore will be mined over four to five years.

The key characteristics of the proposal are summarised in Tables 1 and 2 below. A detailed description of the proposal is provided in section 2.3 of the Miralga Creek Direct Shipping Ore (DSO) Project EPA Referral Document (Atlas Iron 2020a).

Table 1: Summary of the proposal

Proposal title	Miralga Creek DSO Project
Short description	<p>The proposal is to develop above watertable mining of iron ore from Miralga East, Miralga West and Sandtrax, located about 100 km south-east of Port Hedland.</p> <p>The proposal includes the development of mine pits and associated infrastructure including but not limited to processing facilities, waste landforms and access roads. The proposal will include an accommodation camp and utilise some existing ancillary infrastructure from the nearby Abydos DSO Project.</p>

Table 2: Location and proposed extent of physical and operational elements

Element	Location	Proposed extent
<i>Physical elements</i>		
Pits	Three at Miralga East (Figure 3) One at Miralga West (Figure 4) One at Sandtrax (Figure 5)	Clearing of no more than 219.8 ha of native vegetation within the 556.8 ha development envelope.
Waste dumps	Miralga East (Figure 3) Miralga West (Figure 4) Sandtrax (Figure 5)	
Supporting Infrastructure: <ul style="list-style-type: none"> • Access roads • Mine Operation Centre • Laydown areas • Administration areas • Explosives magazine • Fuel storage area • Haulage route • ROM stockyard 	Figures 2 to 7	
<ul style="list-style-type: none"> • Accommodation camp • Wastewater treatment plant • Irrigation sprayfield • Landfill 	Within tenement L45/562 (Figure 8)	
<i>Operational elements</i>		
Groundwater abstraction	Existing borefields	Abstraction up to 0.9 gigalitres per annum of groundwater.

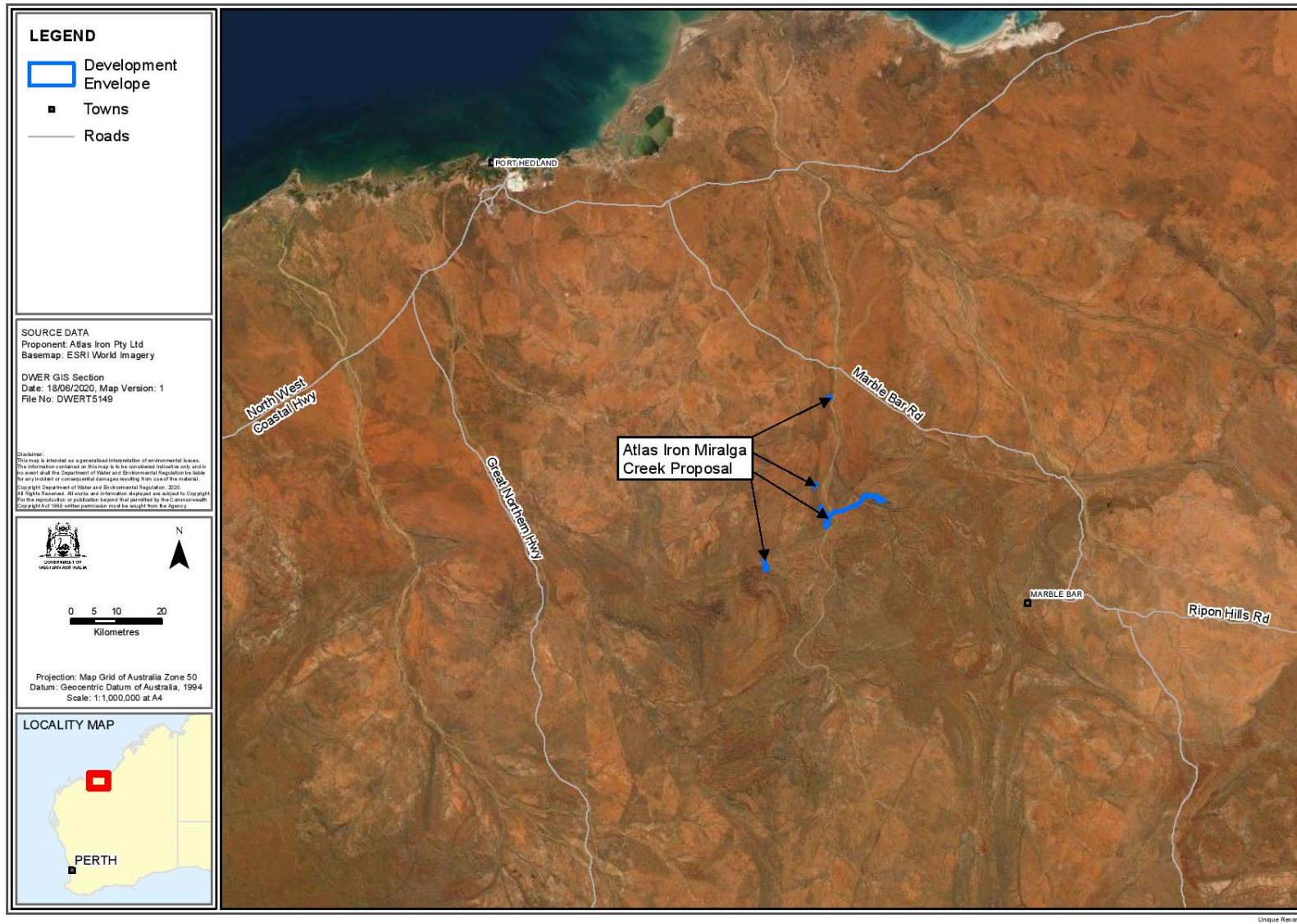
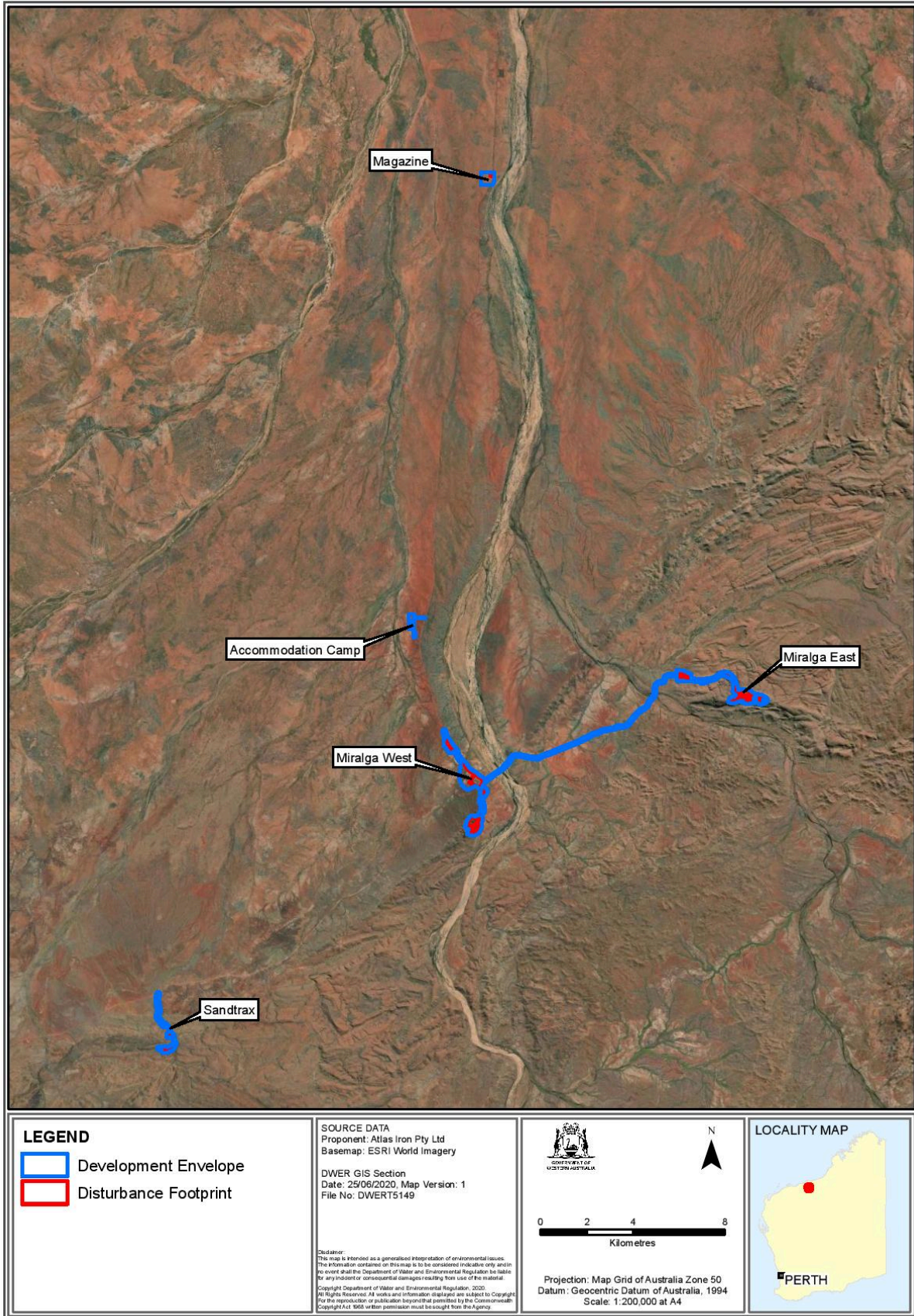


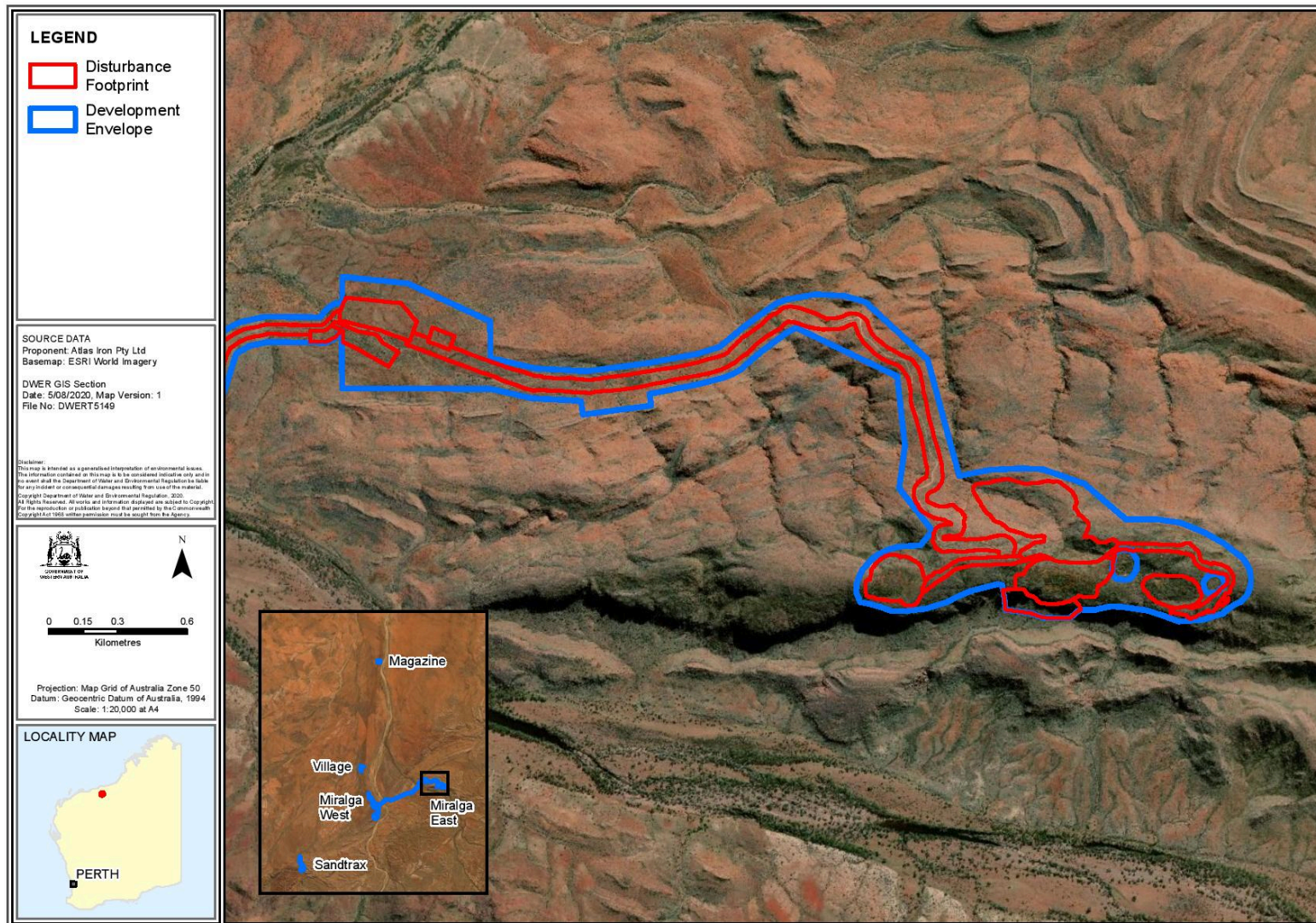
Figure 1: Regional location



S:\Projects\EA\38\2020_DWERT\270670_MiralgaCreekDirectShipping\0e\DSOProject\3_Assessment\MiralgaCreek_DWERT\270670_Figure2_WholeProject_V02.mxd

Unique Record ID:

Figure 2: Proposal development envelope and indicative disturbance footprint overview



Unique Record ID:

Figure 3: Miralga East – Development envelope and indicative disturbance footprint

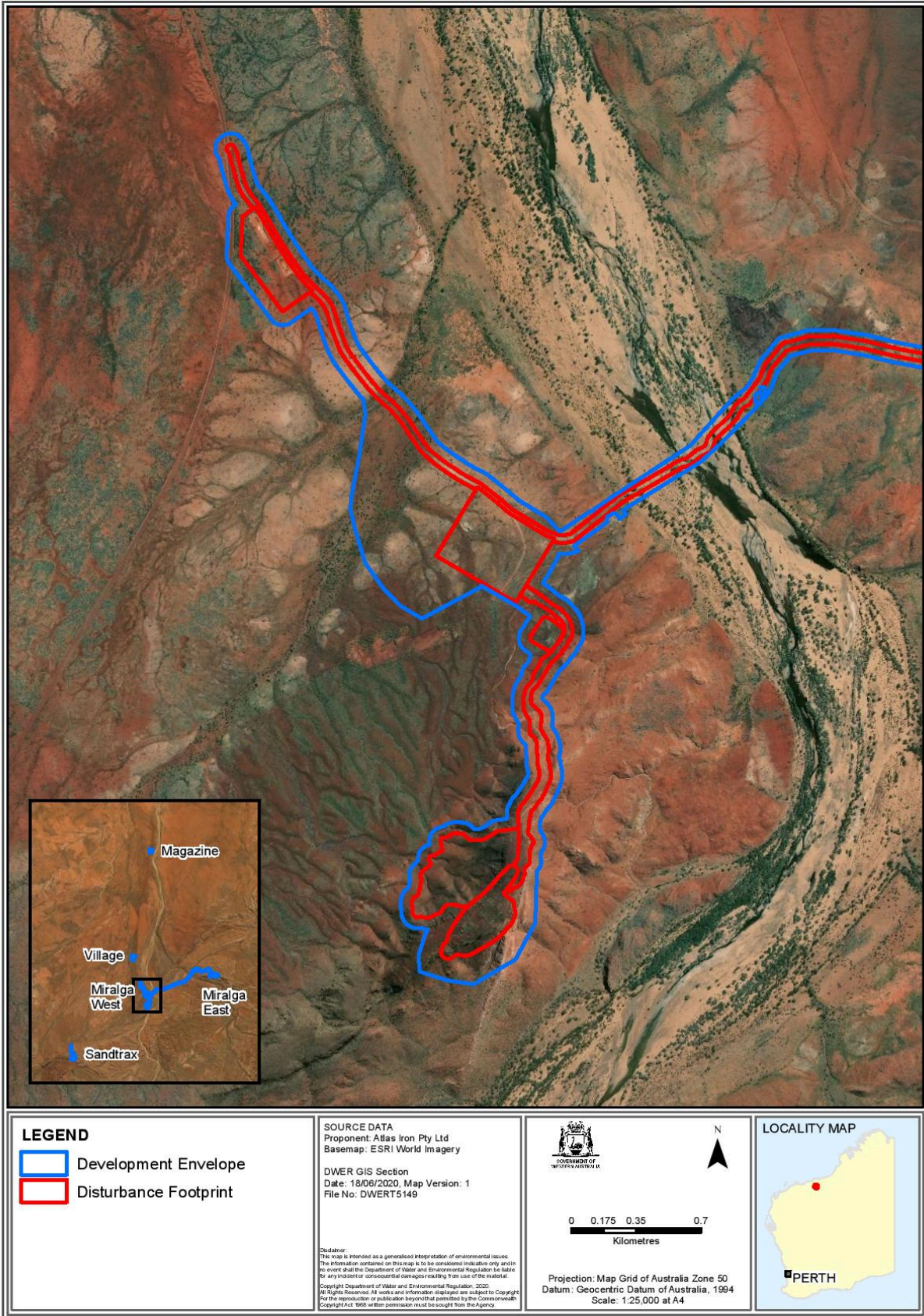
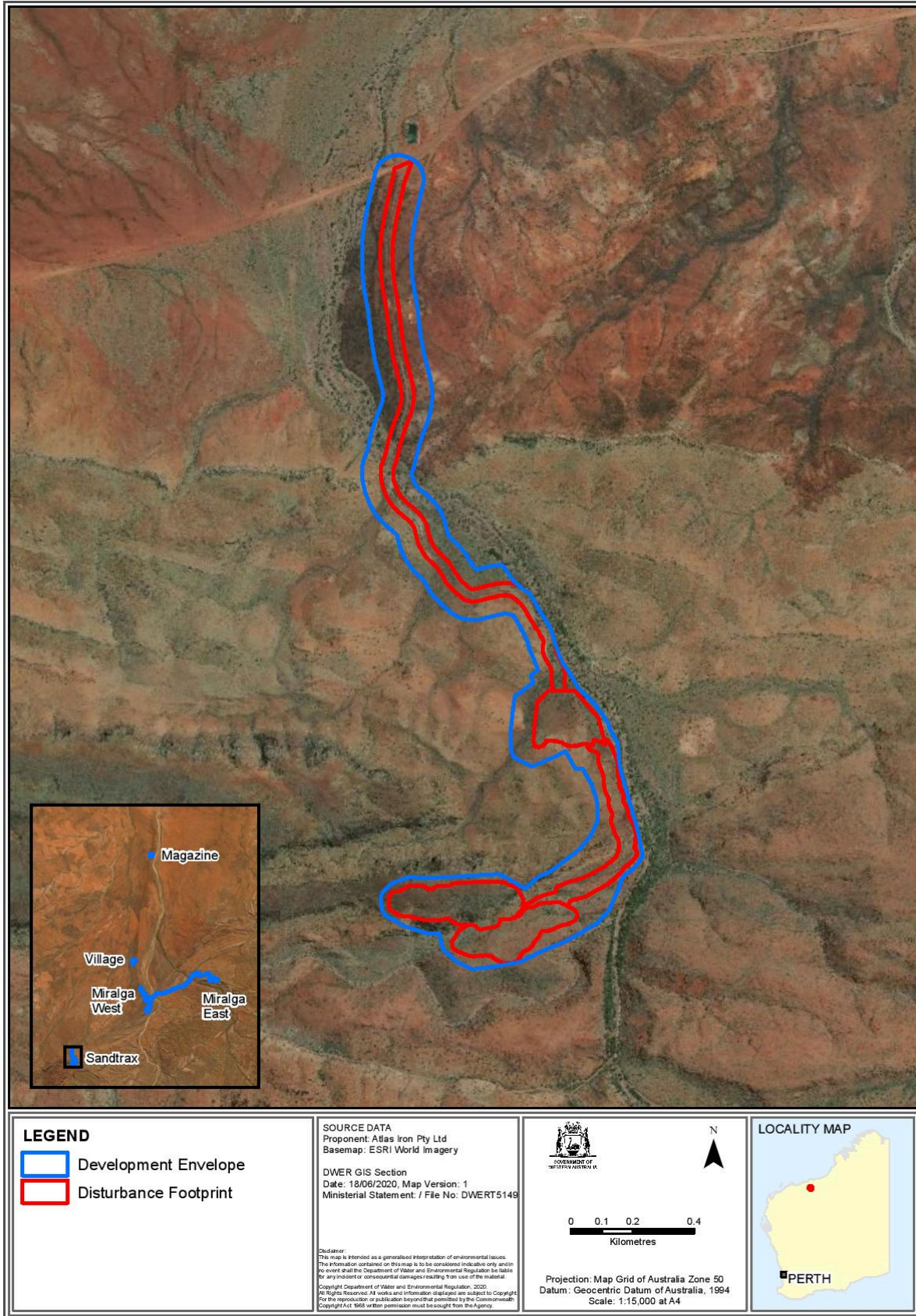


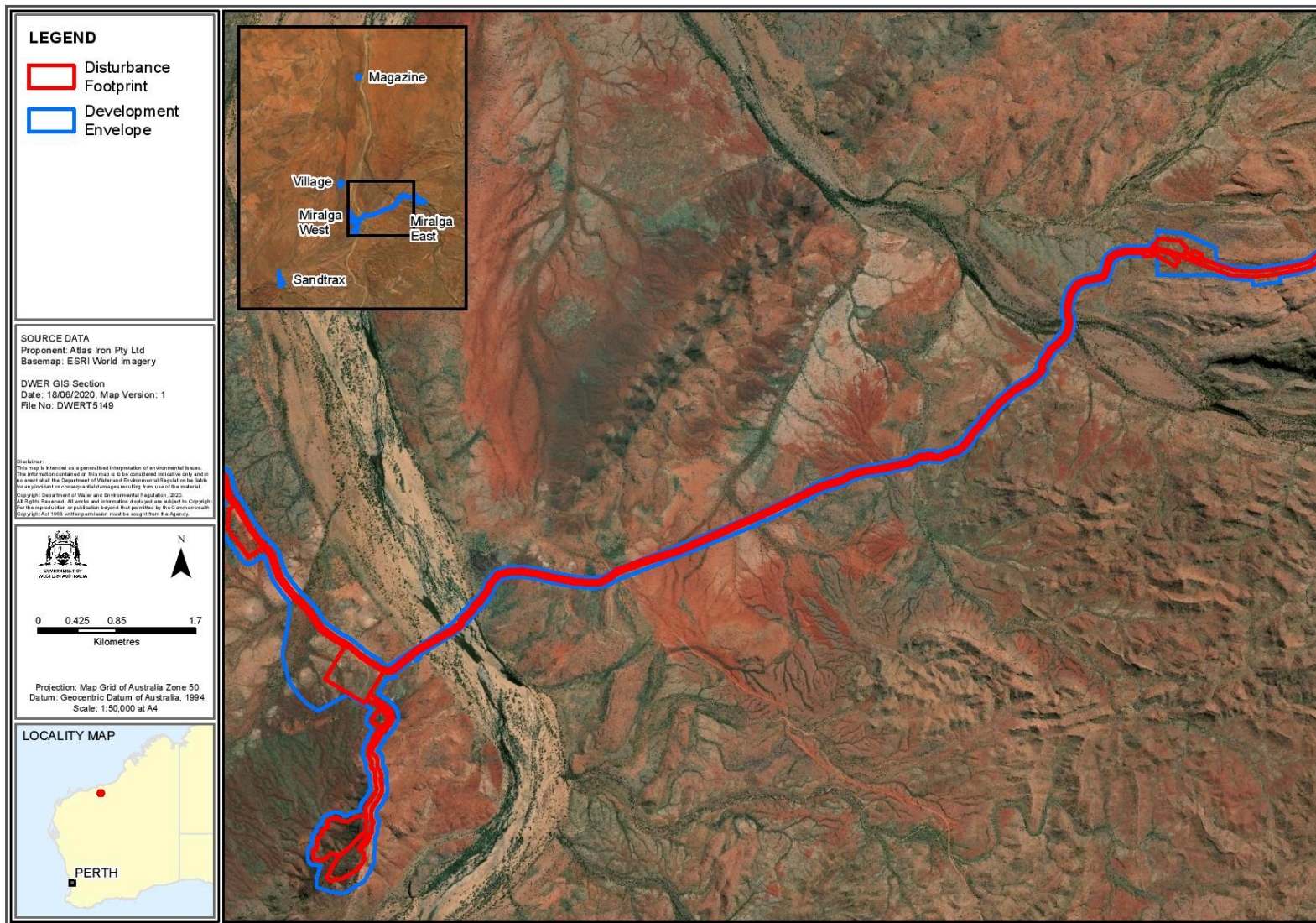
Figure 4: Miralga West – Development envelope and indicative disturbance footprint



©:\Projects\EA\38\2020_DWERT\270670_MiralgaCreekDirectShippingOnDSO\Project\Assessment\MiralgaCreek_DWERT\270670_Figure5_Sandtrax_V02.mxd

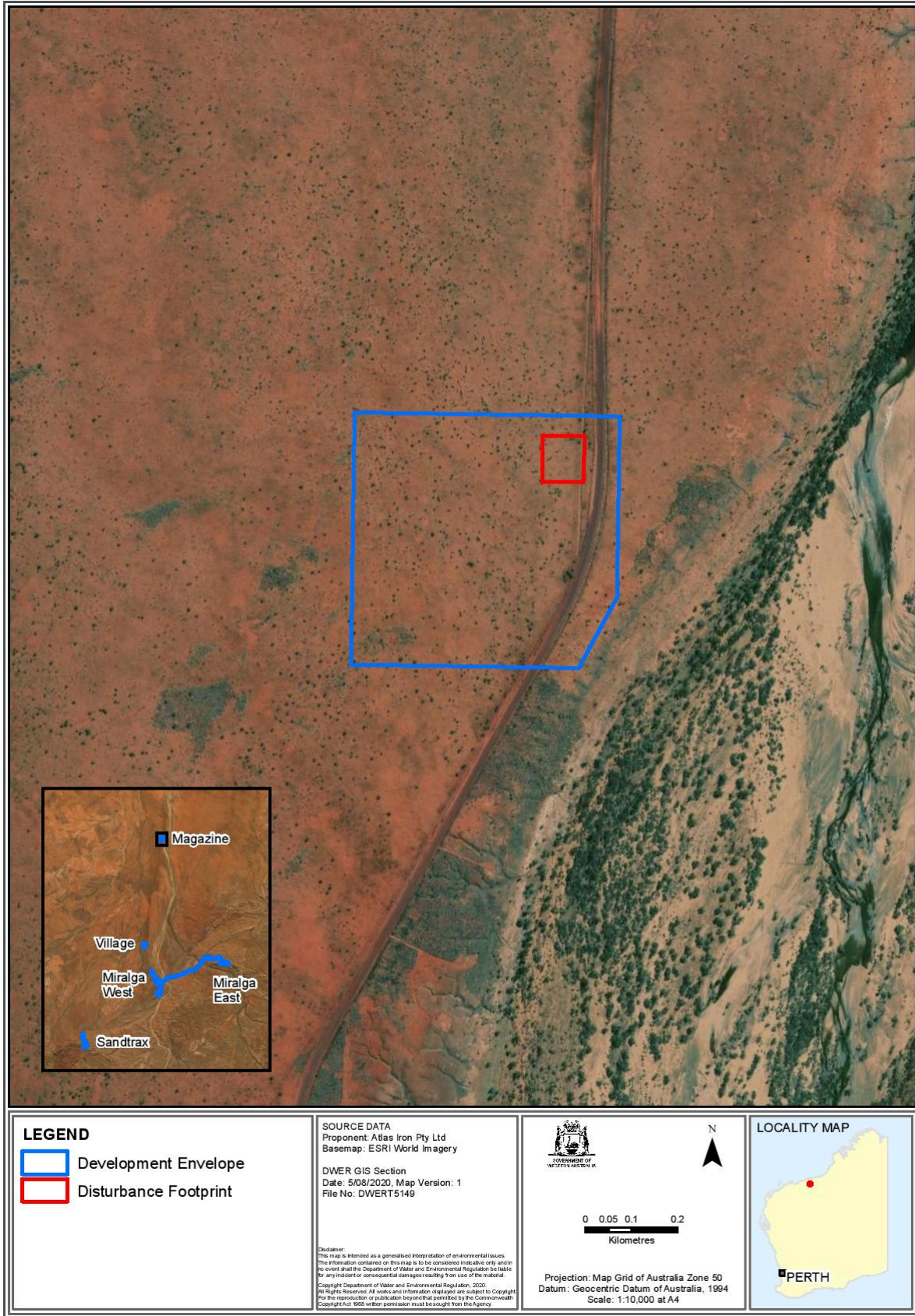
Unique Record ID:

Figure 5: Sandtrax – Development envelope and indicative disturbance footprint



Unique Record ID:

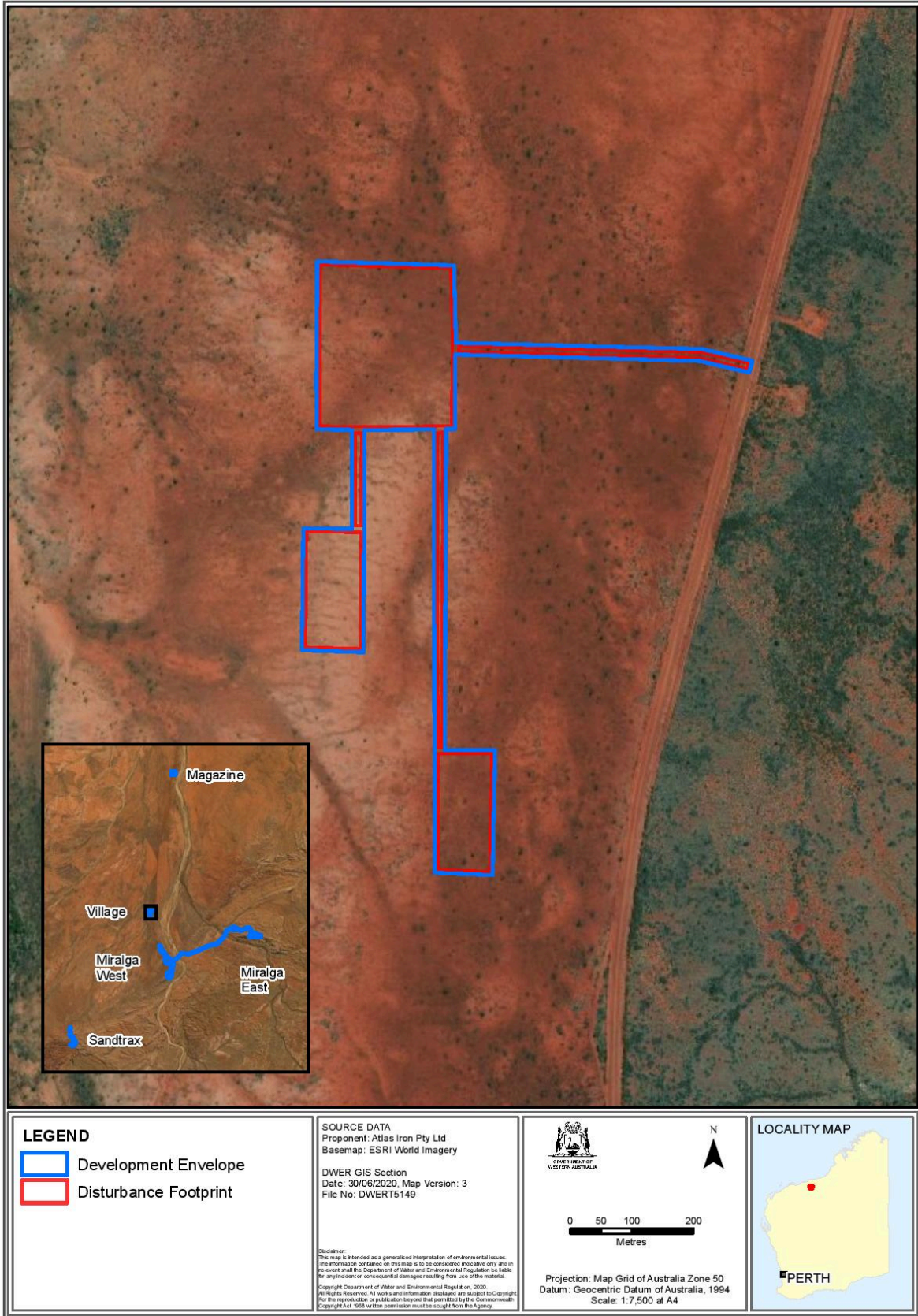
Figure 6: Haul road – Development envelope and indicative disturbance footprint



©:\projects\EA\3812020_DWERT1270670_MiralgaCreekDirectShippingOnDSO\Project0_Assessment\MiralgaCreek_DWERT1270670_Figure7_Stockyards_V02.mxd

Unique Record ID:

Figure 7: Magazine – Development envelope and indicative disturbance footprint



S:\Projects\EA\381020_DWERT270670_MiralgaCreek\DirectShipping\O=D\SO\Project3_Assessment\MiralgaCreek_DWERT270670_Figure12_Village_V03.mxd

Unique Record ID:

Figure 8: Accommodation camp and associated infrastructure – Development envelope and indicative disturbance footprint

2.1 Changes to the proposal during assessment

The proponent requested the EPA consent to a change to the proposal during the assessment on 15 June 2020. The proposed change included:

- relocation of the Miralga West waste rock dump
- addition of an accommodation camp and associated infrastructure
- removal of potential stockyard areas.

The Chairman, as a delegate of the EPA, concluded that the changes were unlikely to significantly increase any impact that the proposal may have on the environment and gave consent under s. 43A of the EP Act to the change on 30 June 2020.

Tables 1 and 2 above include this change.

2.2 Context

The proposal is located within the Shire of East Pilbara, in the Pilbara region of Western Australia. The closest regional centre is Port Hedland located about 100 km to the north-west of the proposal. The closest town is Marble Bar, located about 40 km south-east of the proposal (Figure 1).

The proposal lies within the Chichester subregion of the Pilbara bioregion. The Chichester subregion is characterised by undulating granite and basalt plains with significant areas of basaltic ranges.

The proposal lies within two Native Title areas. Nyamal People #1 (WCD2019/010) across Sandtrax, Miralga East, the southernmost portion of Miralga West and the eastern portion of the new haul road. Nyamal People #10 (WCD2019/011) lies across the magazine area and the majority of Miralga West and the western portion of the new haul road.

3. Consultation

The EPA advertised the referral information for the proposal for public comment in April 2020 and received no public submissions.

The EPA advertised the two-week public consultation on Matters of National Environmental Significance in May 2020 and received no public submissions.

The proponent consulted with government agencies and key stakeholders during the preparation of the supplementary report provided with the referral. The issues raised and the proponent's response are detailed in Table 3.2 of the proponent's supplementary report (Atlas Iron 2020a).

The EPA considers that the consultation process has been appropriate and that reasonable steps have been taken to inform the community and stakeholders about the proposed development. Relevant significant environmental issues identified from this process were considered by the EPA during its assessment of the proposal.

4. Key Environmental Factors

In undertaking its assessment of the proposal and preparing this report, the EPA had regard for the object and principles in s. 4A of the EP Act to the extent relevant to the particular matters that were considered.

The EPA considered the following information during its assessment:

- proponent's referral information and supplementary reports
- stakeholder comments received during the preparation of the proponent's documentation and agency comments received on the additional information
- EPA's own inquiries
- *Statement of Environmental Principles, Factors and Objectives* (EPA 2020d)
- relevant principles, policy and guidance referred to in the assessment of each key environmental factor in sections 4.1 to 4.2.

Having regard to the EP Act principles, the EPA considered that the following principles were particularly relevant to its assessment of the proposal:

1. **The precautionary principle** – investigations on the biological and physical environment undertaken by the proponent have provided sufficient certainty to assess risks and identify measures to avoid or minimise impacts.
2. **The principle of intergenerational equity** – the EPA notes that the proponent has taken measures to avoid and minimise impacts, and this, together with the recommended conditions, will ensure the environment is maintained for future generations.
3. **The principle of the conservation of biological diversity and ecological integrity** – the EPA has concluded that provided the recommended conditions are imposed on the implementation of the proposal, the proposal will not compromise the biological diversity and ecological integrity of the affected areas.
4. **The principle of waste minimisation** – the EPA notes that the proponent will apply the waste hierarchy to operations.

Appendix 1 of this report provides a summary of all the principles and how the EPA considered these principles in its assessment.

Having regard to the above information, the EPA identified the following key environmental factors during the course of its assessment of the proposal:

- **Flora and Vegetation** – potential impacts from clearing of 219.8 ha of native vegetation, including impact to priority species, indirect impacts from dust, hydrocarbon spills, weeds, fragmentation, reduced groundwater levels from borefield operations and changes to fire regimes.
- **Terrestrial Fauna** – direct and indirect impacts to conservation significant habitats and fauna, including ghost bats, Pilbara leaf-nosed bats and northern quolls, as a result of mining.

The EPA considered other environmental factors during its assessment of the proposal. These factors, which were not identified as key environmental factors, are discussed in the proponent's referral documentation (Atlas Iron 2020a). Appendix 3 of this report contains an evaluation of why these other environmental factors were not identified as key environmental factors.

The EPA's assessment of the proposal's impacts on the key environmental factors is provided in sections 4.1 and 4.2. These sections outline whether or not the EPA considers that the impacts on each factor are manageable. Section 8 provides the EPA's recommendation as to whether or not the proposal may be implemented.

Assessment on behalf of the Commonwealth

The EPA assessed the proposal on behalf of the Commonwealth Minister for Environment as an accredited assessment. The EPA has addressed Matters of National Environmental Significance (MNES) under each relevant factor and has summarised its assessment of MNES in section 6.

4.1 Flora and Vegetation

The EPA's environmental objective for Flora and Vegetation is *to protect flora and vegetation so that biological diversity and ecological integrity are maintained.*

Relevant Policy and Guidance

The EPA considers that the following current environmental policy and guidance is relevant to its assessment of the proposal for this factor:

- *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016a)
- *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016c)
- *WA Environmental Offsets Policy* (Government of Western Australia 2011)
- *WA Environmental Offsets Guidelines* (Government of Western Australia 2014).

The considerations for environmental impact assessment for this factor are outlined in *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016a).

EPA Assessment

Under the Interim Biogeographic Regionalisation for Australia (IBRA) classification, the proposal lies within the Chichester subregion.

The proposal would result in clearing of up to 219.8 ha of native vegetation within the indicative disturbance footprint within the 556.8 ha development envelope.

The proponent has undertaken flora and vegetation surveys in 2019 relevant to the proposal. The flora surveys covered a study area of 21,501.4 ha which included the development envelope. A description and map showing the extent of the study area can be found in the *Detailed Flora and Vegetation Survey 2019* (Woodman 2019).

The surveys identified 380 species and subspecies representing 54 families and 157 genera. The flora and vegetation assessment of the development envelope was undertaken at a Level 2 standard as defined by the *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016c).

Existing environment

Surveys within the study area found:

- twenty introduced flora at low densities with no high-risk species identified
- eight Priority (P) flora taxa – one P1, one P2, five P3 and one P4
- two potentially undescribed taxa
- six taxa representing a range extension or outlier of known range
- 80% of the vegetation in 'Excellent' condition
- twelve Vegetation Types (VT)
- VT5 has the potential to support groundwater dependant vegetation.

Threatened and priority flora

There were no threatened species listed under the *Biodiversity Conservation Act 2016* identified during the field surveys.

Habitat for the threatened species *Pityrodia* sp. Marble Bar (G. Woodman & D. Coultas GWDC Opp 4) is present within the study area and the species has been recorded 1 km south of the study area. The surveys did not find any populations or individuals of this species.

The area was burnt in a wildfire in 2018 and has also been subjected to flooding. It is noted that the 2019 surveys may not have found *Pityrodia* sp. Marble Bar. However, *Pityrodia* sp. Marble Bar is an easily recognisable shrub from a distance, therefore it is considered that the likelihood of *Pityrodia* sp. Marble Bar occurring within the development area is low.

The likelihood of *Pityrodia* sp. Marble Bar occurring within the indicative disturbance footprint is also low. Past surveys in the surrounding area have found the species prefer south facing slopes. The proposed pits at Miralga East face south, and the Miralga West pits are both north and south facing. The south facing slopes show less than 25% possible *Pityrodia* sp. Marble Bar potential habitat. Sandtrax, accommodation camp and access roads are mostly located on sandy plain and stony plain habitats and are considered unlikely to support *Pityrodia* sp. Marble Bar species.

The locations of significant flora including Priority flora, unidentified species and range extensions are shown in Figure 9.

Potential impacts

The potential impacts to flora and vegetation from the proposal include:

- Clearing of up to 219.8 ha of native vegetation of 'Good to Excellent condition'.
- Clearing of two P3 species found in the disturbance footprint – one occurrence of *Euphorbia celmentii* and four occurrences of *Triodia basitrichia*.
- Impacts to ten of the twelve VTs found in the development envelope (VT6 and VT9 have been excluded from the development envelope as they support conservation significant flora species).
- Clearing of 8.3 ha of VT5, which is 0.3% of the mapped vegetation type within the study area. VT5 potentially supports groundwater dependent vegetation due to the presence of the obligate phreatophyte *Melaleuca argentea*.
- Clearing of 12.6 ha of VT11, which is 11.3% of the mapped vegetation type within the study area. The occurrence of VT11 is potentially regionally significant.

Mitigation and management

Significant flora

Eight Priority flora, two undescribed species and six range extensions or outliers have been recorded in surveys. These are outlined in Table 3.

The development envelope has been designed to reduce direct impacts to priority taxa. The P3 flora species, *Eragrostis crateriformis*, *Euphorbia clementii* and *Triodia basitricha*, were recorded within the development envelope. *Euphorbia clementii* and *Triodia basitricha* were also located in the indicative disturbance footprint. The impact to the populations of these species is outlined in Table 3. The EPA considers the proposal would have a low level of regional impact to these species, as the numbers of localities individuals to be impacted is low and are all well represented outside of the indicative disturbance footprint and development envelope.

Table 3: Significant flora in the study area, development envelope and indicative disturbance footprint

Species	Conservation status	Study area No. locations and (No. of plants)	Development envelope No. locations and (No. of plants)	Disturbance footprint No. locations and (No. of plants)	% locations in disturbance footprint and (% of total individual plants)	Significance of local impact
<i>Corchorus</i> sp. <i>Yarrie</i>	P1	3 (37)	-	-	No disturbance	Nil
<i>Euphorbia inappendiculata</i> var. <i>inappendiculata</i>	P2	3 (1700)	-	-	No disturbance	Nil
<i>Eragrostis crateriformis</i>	P3	17 (2976)	3 (1800)	-	No disturbance	Nil
<i>Euphorbia clementii</i>	P3	29 (4696)	5 (504)	1 (20)	5 % (0.61 %)	Low
<i>Oldenlandia</i> sp. <i>Hammersley Station</i>	P3	2 (2)	-	-	No disturbance	Nil
<i>Triodia basitricha</i>	P3	31 (13869)	4 (>2101)	4 (>2101)	0.19 % (0.22 %)	Low
<i>Triodia chichesterensis</i>	P3	1 (500)	-	-	No disturbance	Nil
<i>Goodenia nuda</i>	P4	1 (30)	-	-	No disturbance	Nil
<i>Desmodium campylocaulon</i>	Outlier of known range	2 (2)	-	-	No disturbance	Nil
<i>Fimbristylis nuda</i>	Outlier of known range	2 (2)	-	-	No disturbance	Nil

Species	Conservation status	Study area No. locations and (No. of plants)	Development envelope No. locations and (No. of plants)	Disturbance footprint No. locations and (No. of plants)	% locations in disturbance footprint and (% of total individual plants)	Significance of local impact
<i>Scleria rugosa</i>	Outlier of known range	2 (2)	-	-	No disturbance	Nil
<i>Abutilon aff. hannii</i>	Potentially undescribed	1 (1)	-	-	No disturbance	Nil
<i>Polymeria sp.</i>	Potentially undescribed	2 (2)	-	-	No disturbance	Nil
<i>Cyperus microcephalus</i> subsp. <i>saxicola</i>	Range extension	2 (2)	-	-	No disturbance	Nil
<i>Dodonaea petiolaris</i>	Range extension	3 (3)	-	-	No disturbance	Nil
<i>Ophioglossum lusitanicum</i>	Range extension	1 (10)	-	-	No disturbance	Nil

The undescribed flora species *Abutilon aff. hannii* was recorded within the study area, but it was not recorded within the development envelope. A second undescribed species *Polymeria sp.* was recorded during the field survey at two locations, both outside the development envelope. This taxon was found within VT7, of which over 3,000 ha is mapped in the study area. The EPA considers that any potential impact to these species is negligible because all known locations are outside of the development envelope.

Overall, the known risks to priority and potentially significant flora are low. Although there is some uncertainty around the undescribed *Abutilon aff. hannii* and *Polymeria sp.*, there will be no loss of these species as the proponent has revised the development envelope to avoid their known locations, and habitat known to support them.

Introduced flora

Twenty introduced flora, including the declared pest *Calotropis procera*, was recorded within the study area. The proponent's measures to minimise and manage impacts from weeds are outlined in the Weed Hygiene Procedure and Ground Disturbance Permit process, and include:

- weed hygiene procedure to ensure all mobile equipment arriving on site is clean and free of material
- weeds and weed contaminated topsoil to be cleared, handled and stockpiled separately to native vegetation and 'clean' topsoil
- regular and targeted weed control to be undertaken (Atlas Iron 2020a).

Vegetation types

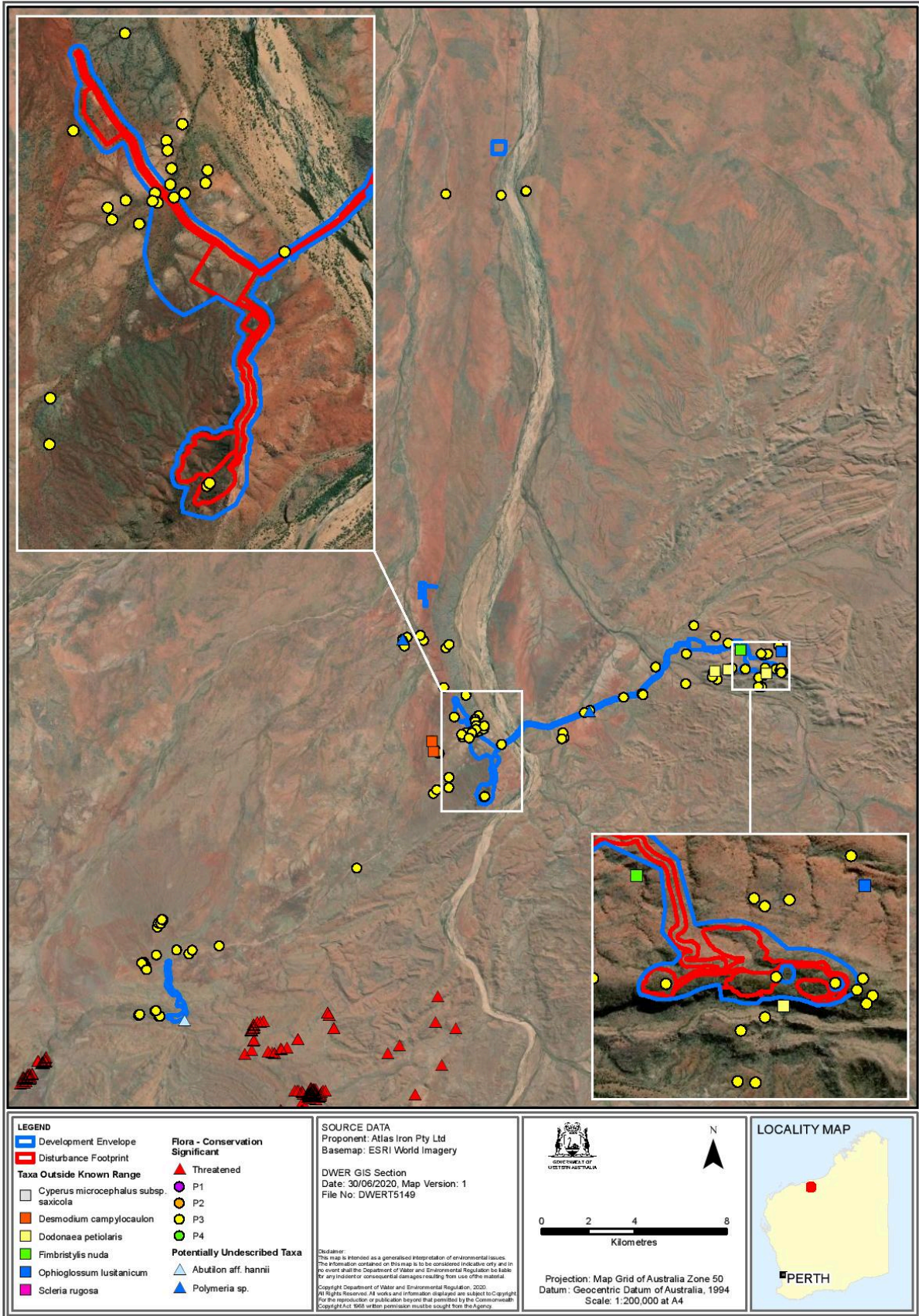
Twelve VTs were mapped in the study area. VT6 and VT9 are of conservation interest due to their limited representation in the study area. VT6 also contains flora species of conservation significance. The EPA notes that the proponent has avoided impacts to VT6 and VT9 by excluding them from the development envelope and indicative disturbance footprint.

VT5 supports some small populations of groundwater dependant vegetation, which includes the obligate phreatophyte *Melaleuca argentea* and facultative phreatophytes. Field surveys assessed the impact of abstraction from the existing licenced bores and concluded that drawdown in exceedance of 0.5 metres (m) is likely to have an impact on groundwater dependant vegetation. The proposal is likely to impact only 8.3 ha of VT5 which is 0.3% of the mapped vegetation type within the study area.

VT2 occurs in shallow gorge/creek areas and provides habitat for significant flora taxa and is of conservation interest. It is potentially locally significant due to supporting flora species of conservation significance. Impacts to VT2 in the indicative disturbance footprint are less than 1% of the mapped vegetation type within the study area.

VT11 was identified as being potentially regionally significant, because of the lack of representation within the proponent's regional vegetation dataset. However it occurs on soil and landform types that are considered relatively common in the region, thus it is likely that the vegetation type is more widely distributed than presented in the study area and the local scale impact is low and regional impact expected to be negligible. Impacts to VT11 in the indicative disturbance footprint are about 11.3% of the vegetation type within the mapped study area.

The EPA considers that a significant residual impact to Flora and Vegetation remain and recommends that the proponent contribute to the Pilbara Environmental Offsets Fund for the clearing of 'Good to Excellent' condition of Chichester vegetation. It is recommended that the proponent contribute to the Pilbara Environmental Offsets Fund, section 5 – Offsets.



S:\Projects\EA\3812020_DWERT\270670_MiralgaCreekDredShippingOrsDSOProject3_Assessment\MiralgaCreek_DWERT\270670_Figures_ConservationSignificantFlora_V01.mxd

Unique Record ID:

Figure 9: Conservation significant flora locations

Summary

The EPA has paid particular attention to:

- *Environmental Factor Guideline – Flora and Vegetation* (EPA 2016a)
- flora and vegetation surveys undertaken within the local and regional context
- the scale of the impact on priority flora species and local vegetation
- the design of the proposal to avoid the majority of priority flora, and avoid VT6 and VT9
- the proponent's application of the mitigation hierarchy to avoid and minimise impacts to priority flora and vegetation
- significant residual impact associated with clearing up to 219.8 ha of native vegetation in 'Good to Excellent'.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Flora and Vegetation that the impacts to this factor are manageable and would no longer be significant, provided there is:

- control through authorised extent in Schedule 1 of the Recommended Environmental Conditions (Appendix 3)
- implementation of offsets (see section 5, condition 7) to counterbalance the significant residual cumulative impact of clearing 219.8 ha of Chichester IBRA subregion vegetation in 'Good to Excellent' condition.

The Department of Mines, Industry Regulation and Safety (DMIRS) would manage mine closure and has advised that the proposal can be managed through principle closure objectives set out in the *Guidelines for Preparing Mine Closure Plans 2020*.

4.2 Terrestrial Fauna

The EPA's environmental objective for Terrestrial Fauna is *to protect terrestrial fauna so that biological diversity and ecological integrity are maintained.*

Relevant Policy and Guidance

The EPA considers that the following current environmental policy and guidance is relevant to its assessment of the proposal for this factor:

- *Environmental Factor Guideline – Terrestrial Fauna* (EPA 2016b)
- *Technical Guidance: Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA 2020e)
- *WA Environmental Offsets Policy* (Government of Western Australia 2011)
- *WA Environmental Offsets Guidelines* (Government of Western Australia 2014).

The considerations for environmental impact assessment for this factor are outlined in *Environmental Factor Guideline – Terrestrial Fauna* (EPA 2016b).

EPA Assessment

Existing environment

The proponent has completed terrestrial fauna surveys in the proposal area. One level 2 vertebrate and short range endemic invertebrate fauna survey was undertaken in 2019, which covered a study area of 7,834.6 ha. A targeted level 2 ghost bat assessment was undertaken in July 2019 and subsequent mapping of four caves indirectly affected by blasting, and loss of foraging habitat, was undertaken in November 2019. An assessment of potential mining activities to affect the structural integrity of the caves was also undertaken. The level of surveys is commensurate with the terrestrial fauna at risk of the project and the results have provided sufficient information to describe the receiving environment and to assess potential impacts.

Seven broad fauna habitat types were identified and mapped within the study area, all of which intersect with the development envelope (Table 4).

Significant vertebrate fauna

Conservation significant fauna includes species listed as:

- Threatened or Migratory under the *Environmental Protection and Biodiversity Act 1999* (EPBC Act)
- Threatened or Specially Protected (includes migratory birds) under the *Biodiversity Conservation Act 2016* (BC Act)
- Priority (P) species listed by the Department of Biodiversity, Conservation and Attractions.

Seven listed conservation significant vertebrate species recorded during the field surveys were:

- northern quoll (*Dasyurus hallucatus*) – Endangered under the BC Act and the EPBC Act
- Pilbara leaf-nosed bat (*Rhinonicteris aurantia*) – Vulnerable under the BC Act and the EPBC Act
- western pebble mound mouse (*Pseudomys chapmani*) – near Threatened under the BC Act
- ghost bat (*Macroderma gigas*) – Vulnerable under the BC Act and the EPBC Act
- northern brushtail possum (*Trichosurus vulpecula arnhemensis*) – Vulnerable under the BC Act, under threatened listing assessment under EPBC Act
- grey falcon (*Falco hypoleucos*) – Vulnerable under the BC Act and EPBC Act
- peregrine falcon (*Falco peregrinus*) – Specially Protected under the BC Act.

Based on regional records and habitats identified within the study area, a further five conservation significant fauna species were considered likely to occur.

- Pilbara olive python (*Liasis olivaceus barroni*) – Vulnerable under the BC Act and the EPBC Act
- ganes blind snake (*Anilius baneji*) – P1 under the DBCA list
- black-lined ctenotus (*Ctenotus nigrilineatus*) – P1 under the DBCA list
- brush tailed mulgara (*Dasyercus blythi*) – near Threatened under the BC Act
- spectacled hare-wallaby (*Lagorchestes conspicillatus*) – Vulnerable under the BC Act.

Fauna habitats

Table 4: Fauna habitat in the study area and development envelope

Fauna habitat	Study area extent (ha)	Proportion of study area (ha)	Development envelope extent (ha)	Proportion of development envelope (%)	Significance of disturbance
Low stony hills	2,586.3	32.8 %	162.7	29.2 %	low
Stony plain	2,282.5	29.1 %	196.7	35.3 %	low
Sand plain	1,535.9	19.6 %	67.4	12.1 %	moderate
Major drainage	996.3	12.7 %	19.8	3.5 %	high
Hillcrest/hillslope	429.8	5.5 %	66.2	11.9 %	high
Gorge/gully	4.6	0.1 %	0.7	0.1 %	high
Spinifex sandplain	-	-	43.2	7.8%	low

Potential impacts

Based on the results of surveys and the presence of species likely to occur, the potential significant impacts to conservation significant fauna from the proposal are:

- Significant impact to ghost bat (11 records from six sites and one opportunistic record) and Pilbara leaf-nosed bat (35 individual records from 14 sites) within the study area.

- Loss of one nocturnal roost for the ghost bat at Miralga West (the category 4 cave CMRC-02).
- Potential impact to the structural integrity of the category 2 diurnal roost/potential maternity roost CMRC-15, which horizontally lies 55 m away from pit 2 at Miralga West.
- Indirect impacts due to blasting activities may result in temporary abandonment of four ghost bat/Pilbara leaf-nosed bat caves close to the Miralga East mining area. The caves are CMRC-01, CMRC-13, CMRC-14, and the potential maternal roost CMRC-15.
- Increased reliance by ghost bat and Pilbara leaf-nosed bat on the permanent bat roost site Lalla Rookh, which is one of the largest known abandoned mine maternal roosting sites, and other nearby roosts as refuges during mining.
- Clearing of 219.8 ha (2.8% of the mapped extent of the study area) of foraging and/or dispersal habitat for the Pilbara leaf-nosed bat, ghost bat and the northern quoll.
- Impact of up to 86.7 ha (6% of the mapped fauna habitat within the mapped study area) of hillcrest/hillslope, gorge/gully and major drainage fauna habitat, which is high quality denning and foraging habitat for the northern quoll within the development envelope.
- Impacts to conservation significant fauna habitats including; Pilbara olive python, grey falcon, peregrine falcon and the northern brushtail possum.
- Altered fauna behaviour, including bat abandonment of caves near Miralga East from artificial lights, noise, and vibration from construction and operational activities.
- Vehicle strike and changes to predation due to biosecurity breaches or changes in food availability from the accommodation camp.

The assessment of the potential impacts and management on terrestrial fauna is discussed below with respect to the key subheadings: bats, northern quoll and other fauna species.

Bats

Direct impacts – Roost sites

Within the study area 17 caves have been recorded. Seven of these are known roost sites that support the Pilbara leaf-nosed bat and/or ghost bat (Table 5). The referral information details each of the roost sites, its values and the level of impact/mitigation from the proposal (Atlas Iron 2020a).

Bat Call WA (2020) has classified ghost bat caves into four categories (Table 5):

- Category 1 – diurnal roosts with permanent occupancy
- Category 2 – diurnal roosts with regular occupancy
- Category 3 – roosts with occasional occupancy
- Category 4 – nocturnal roosts with opportunistic usage.

Table 5: Caves recorded in the study area

Cave	Roost significance: ghost bat	Roost significance: Pilbara leaf-nosed bat	Category	Distance to nearest pit
CMRC-01	Nocturnal roost	Potential opportunistic usage	4	50 m
CMRC-02	Nocturnal roost	Potential opportunistic usage	4	Within pit
CMRC-03	Nocturnal roost	Nocturnal refuge	3	185 m
CMRC-04	Nocturnal roost	Nocturnal refuge	4	340 m
CMRC-06	Diurnal roost	Nocturnal refuge	2	400 m
CMRC-07	Diurnal roost	Potential opportunistic usage	3	225 m
CMRC-08	Nocturnal roost	Potential opportunistic usage	3	470 m
CMRC-10	Nocturnal roost	Potential opportunistic usage	3	450 m
CMRC-12	No usage	Potential opportunistic usage	4	340 m
CMRC-13	Nocturnal roost	Potential opportunistic usage	4	95 m
CMRC-14	Diurnal roost	Potential opportunistic usage	3	117 m
CMRC-15	Diurnal roost/ possible maternity roost	Nocturnal refuge	2	55 m
CMRC-16	No usage	Potential opportunistic usage	4	>1,000 m
CMRC-17	No usage	Potential opportunistic usage	4	>1,000 m
CMRC-18	Potential diurnal roost	Potential opportunistic usage	3	>1,000 m
CMRC-19	Nocturnal roost	No usage	4	385 m
Unsurveyed cave	Potential diurnal roost	Potential opportunistic usage		

The footprint has been developed to mitigate direct impacts to the majority of the bat roosts. Proposed clearing at Miralga West will directly impact cave CMRC-02, a nocturnal roost for ghost bat and nocturnal refuge for Pilbara leaf-nosed bat. It is an isolated shallow overhang category 4 cave. The proposal will indirectly impact a further four caves (CMRC-01, CMRC-13, CMRC-14 and CMRC-15) from mining activities.

Located approximately 3 km southwest of Miralga West and 9 km northeast of Sandtrax is a permanent bat roost – a category 1 significant maternity cave known as Lalla Rookh. Lalla Rookh is an historical underground gold mine that lies 700 m south of the unsealed Abydos haul road. The Lalla Rookh roost is a known significant roost for the Pilbara leaf-nosed bat, with numbers of individuals over 1,500 and ghost bat numbers were reported as over 200 (with anecdotal / unpublished data indicating 600+). Lalla Rookh will not be affected by the proposal and it is expected to serve as an important refuge for the bats exhibiting short-term abandonment from caves within the development envelope area as a result of mining activities.

In recent years both the Pilbara leaf-nosed bat and ghost bat have been confirmed to travel long distances from their diurnal roosts for foraging. The Pilbara leaf-nosed bat has been regularly detected up to 20 km and occasionally over 30 km from their roosts. The Pilbara leaf-nosed bat has been proven to forage out to 12 km and beyond from its roost caves. Lalla Rookh is located approximately 19 km from the Miralga East caves CMRC-01, CMRC-13, CMRC-14 and CMRC-15, and bats are thought to relocate here during mining activities.

Figure 10 shows the location of the roosts in relation to the proposal.

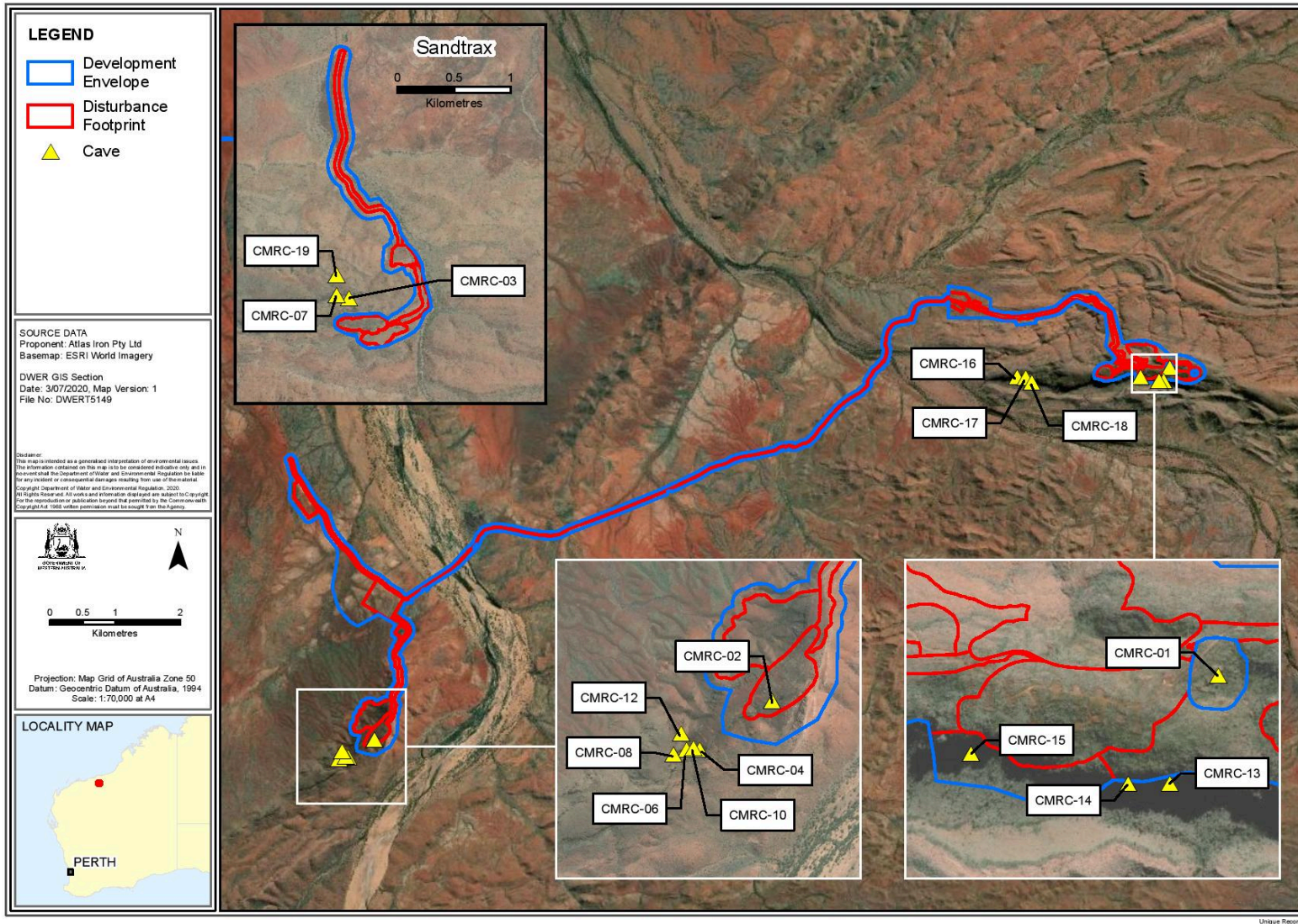


Figure 10: Cave locations

Indirect impacts to bats

Light

Thirteen caves are located within 500 m, two of them being within 50 m, of any pit and may be indirectly impacted by light. Artificial light may affect fauna foraging, reproduction, migration and communication. Light sensitive fauna species will avoid illuminated areas previously used for foraging, resulting in changes to foraging behaviour.

Light monitoring and management are included in the Significant Species Management Plan (Atlas Iron 2020c).

Noise

The proposal will generate noise from blasting, heavy machinery, ore removal, processing and power generation. The impact on bats from the alteration in behaviour from noise, largely associated with blasting, will be restricted to daytime operations.

Predicted noise emissions generated by mine operations (process plant, power plants and the general mining operations), were modelled at the Abydos camp to represent operations in ore bodies at Miralga East, Miralga West and Sandtrax. Talis (2019) modelled noise and vibration impacts at Abydos Camp and predicted that they would be within acceptable limits, no additional mitigation is proposed.

Vibration

Vibrations from uncontrolled blasting could result in collapse of roosts close to the proposal. Large blasts could significantly damage roosts. Vibrations from blasting also have the potential to disturb roosting bats.

A blast assessment was undertaken to predict the effects of blasting on the structural integrity of caves CMRC-01, CMRC-13, CMRC-14 and CMRC-15. A computer model was developed to study the potential ground vibration, levels of flyrock impact zones and to determine a safe set of parameters for drilling and blasting activities. Blast criteria were established to set thresholds of vibration levels experienced at caves, based on results from the ground vibration and flyrock modelling for blasting. Blast criteria are recommended to ensure the caves are not destroyed, and entrances are not obstructed or altered to affect the internal microclimate (for example through the creation of a new entrance allowing airflow) (Blast It Global, 2020) The objective of the blast criteria is to limit vibration levels such that the caves remain viable as diurnal roosts for ghost bats in the future once mining has ceased.

Blast It Global recommended the following specific vibration criteria to be applied at CMRC-13, CMRC-14 and CMRC-15:

- all blasts to be designed to achieve 85 mm/s at the cave
- blast vibration not to exceed 100 mm/s at the cave.

Management measures and monitoring were recommended to validate predicted vibration and measure vibration received at caves CMRC-01, CMRC-13, CMRC-14

and CMRC-15. The proponent has committed to adopt the recommendations to ensure that blasting is carried out appropriately and has incorporated these into the Significant Species Management Plan (Atlas Iron 2020c).

Northern quoll (*Dasyurus hallucatus*)

Within the study area there is high quality denning and foraging habitat for the species within the gorge/gully and hillcrest/hillslope habitats. This is core habitat and is critical to the survival of the northern quoll. Foraging and dispersal habitat is found in the major drainage line habitats. The proposal will result in clearing of up to 86.7 ha (15.5% of mapped vegetation type within the study area) of northern quoll denning and foraging habitat.

Within the study area 89 individuals were records at 15 sites. This number of records is considered to represent a permanent and important population of northern quoll (Figure 11).

Northern quoll records at Miralga East mostly recorded high quality denning and foraging habitat on the southern slopes of the escarpment which are not going to be directly disturbed. Records at Miralga West show a high density in areas that will be directly impacted, this population extends to the west and includes undisturbed areas. The Shaw River riparian area will have a minimal footprint, where the proposed haul road crosses on northern quoll habitat.

The Significant Species Management Plan (Atlas Iron 2020c) includes the species-specific management measures for the northern quoll.

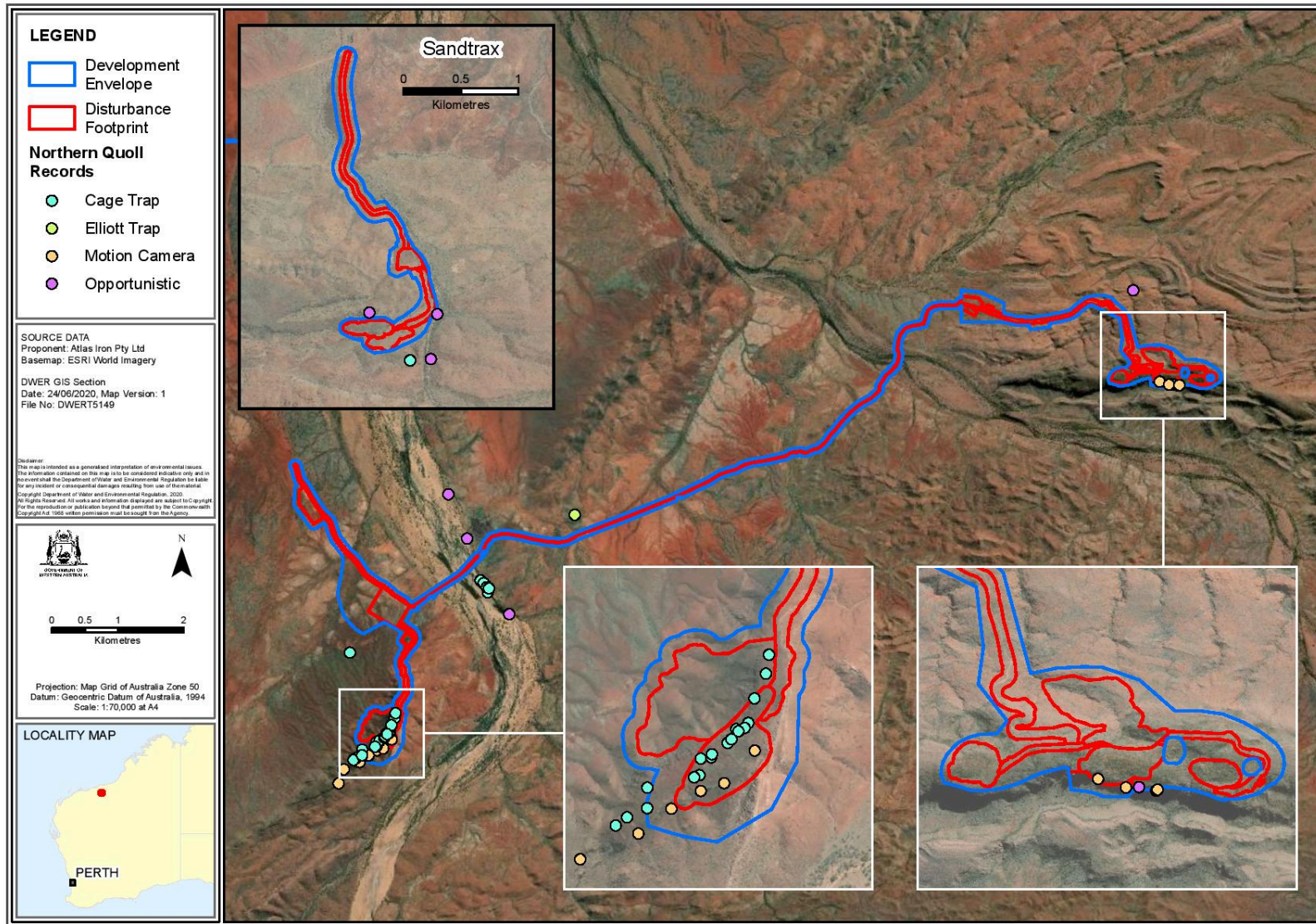


Figure 11: Northern quoll records

Other fauna species

Western pebble-mound mouse (Pseudomys chapmani)

Fifteen records were recorded within the study area, all within stony plain habitats. The species is likely to occur in stony plain and low stony plain habitat throughout the study area where suitable burrowing substrate and mound materials (pebbles and small rocks) are present.

Core habitat type for the western pebble-mound mouse are hillcrest/hillslope and stony plain (66.2 ha and 196.7 ha respectively within the development envelope). The total potential disturbance area for the preferred habitat for the western pebble-mound mouse is 262.9 ha. This habitat is well represented in the region and a small percentage (9.6% of the mapped fauna habitat within the study area) of this habitat will be disturbed. This species is not restricted to this habitat type and the habitat is broadly represented within the broader study area. The proposal is not likely to have a significant impact on the species on a local and regional scale.

Northern brushtail possum (Trichosurus vulpecula arnhemensis)

One northern brushtail possum was recorded in the study area along Miralga Creek's riparian vegetation within major drainage habitat. Suitable habitat for the species includes major drainage habitat (3.6% of the development envelope) and rocky gorge/gully habitat (2% of the development envelope) and is likely to be impacted by the proposal. This extent of disturbance is not likely to have a significant impact on the species on a local and regional scale.

Grey falcon (Falco hypoleucos)

The grey falcon was recorded three times during the survey. All records were within or close to major drainage habitat (3.5% potential impact within the development envelope). This species uses all habitat types within the development envelope, however major drainage lines provides nesting habitat.

The species is likely to occur as a resident within the study area or part of a broader area. The proposal is not likely to have a significant impact on the species on a local and regional scale.

Peregrine falcon (Falco peregrinus)

The peregrine falcon was recorded once during the two field surveys within the study area. Potential breeding areas include cliff areas within the habitat type of hillcrest/hillslope and foraging habitat includes sand plain, major drainage and stony plain (6.7% fauna habitat type in the mapped study area). The impact considered to be of most significance for this species is loss of habitat. The proposal is not likely to have a significant impact on the species on a local and regional scale.

Short Range Endemic (SRE) invertebrates

SRE invertebrate fauna habitat exists within the development envelope. Habitat loss and degradation is expected to occur throughout most of the habitats present, including those considered high to moderate significance (gorge/gully, hillcrest/hillslope and major drainage). The habitat most important for SRE fauna is about 6% of the potential disturbance area within the study area.

Two SRE taxa were recorded within the survey area. The millipede species *Antichiropus apricus* and *Antichiropus forcipatus* were found within the development envelope and are likely to occur throughout the local extent of connected gorge/gully and hillcrest/hillslope habitat where other records are known and are considered to be at low risk of impact by the current proposal.

The potential SRE species *Karaops* sp. indet, was recorded within the development envelope in gorge/gully and hillcrest/hillslope habitat and is regarded as being at moderate risk of impact from the proposal.

All three taxa of conservation significance have a potential range of connected habitat that extends well beyond the development envelope and the study area.

Mitigation and management

The proponent has provided mitigation and management measures within the Significant Species Management Plan (Atlas Iron 2020c). These mitigation and management measures have been developed from baseline surveys, potential impacts, specialist advice (Blast It Global 2020 and Bat Call WA 2020) and industry best practice. The following key management measures will be implemented:

- Bats
 - Avoiding direct disturbance of all caves except the category 4 cave CMRC-02 at Miralga West.
 - Validating predicted vibration and measuring vibration at receiving caves (CMRC-13, CMRC-14 and CMRC-15) including:
 - Designing blasts to perform to the blast criteria (that is, limit to 100 mm/s but design to achieve 85 mm/s) using the reference values set out in Blast It Global (2020).
 - Establishing vibration monitors in the nearest cave to all blasting at Miralga East pits 2 and 3.
 - Conducting a cave inspection after each blast that exceeds 85 mm/s. If damage is noted, conduct an investigation to determine the source for the exceedance. Re-establish controls and/or lower blast vibration limits.
 - Avoiding blasting within 100 m of a cave until the results of monitoring validate predictions with a reasonable degree of confidence.
 - If vibration monitoring exceeds 100 mm/s, blasting should cease until the cause has been determined and steps to prevent a reoccurrence have been taken. A cave inspection is required to assess any impacts.
 - Monitoring ghost bat usage of the category 2 caves CMRC-06 and CMRC-15 annually during operations and for one year following operations.
- Northern quoll
 - Annual monitoring within the development envelope using remote camera monitoring.

- Four monitoring locations within close proximity to the indicative disturbance footprint have been selected based on habitat type and presence of the northern quoll during baseline sampling.
- Four control sites will be established in key habitats including denning and foraging/dispersal habitat outside of these potential impact areas to provide regional context to any observed declines at the potential impact sites.
- Habitat
 - No more than 219.8 ha of vegetation/habitat within the 556.8 ha development envelope will be cleared/ disturbed.

The EPA recognises that the proponent has taken measures to reduce the impact on terrestrial fauna through avoidance and minimisation where possible.

The highest number of ghost bat records within the survey area were recorded in the vicinity of CMRC-15 (no more than 34 records). However, high records of this species have been detected at Lalla Rookh which is located within 19 km of the cave and is thought to be a refuge. By implementing the Significant Species Management Plan for the ghost bat monitoring, incidental records of the Pilbara leaf-nosed bat at CMRC-15 are likely to be picked up and noted. CMRC-15 will have appropriate management and mitigation measures applied by implementing the Plan.

As noted in the section addressing potential impacts above, other fauna species will be subject to a small loss of local habitat and have large areas of habitat represented regionally. With regards to the SRE species, the local habitat extends beyond the impact areas. Given the above, the EPA does not consider impacts to these other fauna species to be significant.

The EPA notes the clearing of habitat for conservation significant fauna (northern quoll, ghost bat and Pilbara-leaf nosed bat will still occur as a result of implementing the proposal, which would result in a significant residual impact. The proponent has proposed an offset for this residual impact.

Summary

The EPA has paid particular attention to:

- relevant principles, guidance and policy
- application of the mitigation hierarchy (avoidance) to the majority of fauna habitat, other than roosts which is predicted to have a low level of impact on the availability of roost sites available to bats
- direct impacts to potential short range endemic fauna habitat being limited in scale.

The EPA considers, having regard to the relevant EP Act principles and environmental objective for Terrestrial Fauna that the impacts to this factor are manageable and would no longer be significant, provided there is:

- control through authorised extent in Schedule 1 of the Recommended Environmental Conditions (Appendix 4).

- preparation and implementation of a revised version of the Significant Species Management Plan (180-LAH-EN-PLN-0001, Rev 0, April 2020) (condition 6), including baseline monitoring and a staged approach to blasting, avoiding blasting within 100 m of a cave until the results of monitoring validate predictions with a reasonable degree of confidence.
- implementation of offsets (condition 7) to counterbalance the significant residual impact of clearing 219.8 ha of Chichester IBRA subregion vegetation which is foraging and denning habitat for northern quoll, Pilbara leaf-nosed bat and the ghost bat.

5. Offsets

Relevant Policy and Guidance

The EPA considers that the following policy and guidance is relevant to its assessment of offsets for the proposal:

- *WA Environmental Offsets Policy* (Government of Western Australia 2011)
- *WA Environmental Offset Guidelines* (Government of Western Australia 2014)
- *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA 2020c).

The EPA also considered its strategic advice on *Cumulative environmental impacts of development in the Pilbara Region – Advice of the Environmental Protection Authority to the Minister for Environment under Section 16 (e) of the Environmental Protection Act 1986* (EPA 2014), for the assessment of offsets.

EPA Assessment

Environmental offsets are actions that provide environmental benefits which counterbalance the significant residual impacts of a proposal. The EPA may apply environmental offsets where it determines that the residual impacts of a proposal are significant, after avoidance, minimisation and rehabilitation have been pursued.

Mitigation measures are assessed under the relevant environmental factor (see section 4.1 – Flora and Vegetation). In applying the residual impact significance model (Government of Western Australia 2014), the EPA considers that the proposal would have a significant residual impact from:

- clearing of up to 219.8 ha of Chichester IBRA subregion vegetation which is in 'Good to Excellent' condition
- clearing of up to 219.8 ha of foraging and denning habitat for northern quoll, Pilbara leaf-nosed bat and ghost bat.

In its advice on the cumulative impacts in the Pilbara (EPA 2014), the EPA considered that without intervention, the increasing cumulative impacts of development and land use in the Pilbara region will significantly impact on biodiversity and environmental values.

The EPA considers that the clearing of native vegetation and impacts on other associated environmental values in the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) bioregion is significant where the cumulative impact may reach critical levels if not managed.

The proposal is located within the Chichester IBRA subregion. Only four per cent of the Chichester subregion is currently reserved for conservation.

Consistent with the Residual Impact Significance Model in the *WA Environmental Offsets Guidelines*, where the cumulative impact may reach critical levels if not

managed, the clearing of native vegetation in 'Good to Excellent' condition within the Chichester IBRA subregion, and impacts to foraging/roosting habitat requires an offset to counterbalance the significant residual impact of the clearing. Consistent with this, the clearing of 219.8 ha of 'Good to Excellent' condition native vegetation, constitutes a significant residual impact that requires an offset.

Conservation areas in the Pilbara bioregion total approximately eight per cent of the area, with the remainder mostly Crown Land overlain with mining tenements and pastoral leases. The EPA recognises that the opportunity for proponents to undertake individual offsets in the Pilbara Region is constrained by overlapping land tenure arrangements and limited land access to undertake on-ground offset actions. As such, traditional approaches to offsets, namely land acquisition and management offsets, are therefore limited.

In its advice on cumulative impacts in the Pilbara (EPA 2014), the EPA proposed the establishment of a strategic conservation initiative for the Pilbara as a mechanism to pool offset funds to achieve biodiversity conservation outcomes. Such an approach would provide a mechanism to overcome some of the offset implementation constraints. A pooled offset approach is consistent with the *WA Environmental Offsets Policy*, which states that environmental offsets will be focused on longer term strategic outcomes (Principle 6). Strategic approaches, such as the use of a fund, can provide a coordinating mechanism to implement offsets across a range of land tenures (Government of Western Australia 2014).

A contribution to a strategic conservation initiative focused on these or similar types of actions would allow for an outcome that counterbalances the significant residual impacts from this proposal. The EPA considers that there should be a clear target outcome for each offset project supported by the offset funds. A clear link must be drawn between the outcomes and the significant residual impacts of the individual proposal. Funds should be used for landscape scale on-ground actions in the Pilbara IBRA region and indirect actions (such as research) that will directly counterbalance the significant residual impacts and contribute to biodiversity conservation outcomes in the region.

The EPA has stated that the type of environmental offsets in the Pilbara that contribute to a strategic conservation initiative will ensure a consistent and transparent approach and contribute to longer term strategic outcomes, with contributions based on an assessment of the significance of environmental impacts.

The EPA's view is that project funding for offsets should not be used to provide substitute funding for existing government programs or proponent obligations.

Commensurate with other decisions within the Chichester IBRA subregion, the EPA recommends that the following offset rates should apply in the form of a contribution to a Pilbara strategic conservation initiative for landscape-scale actions to protect biodiversity in the Pilbara:

- \$781 AUD (excluding GST) per hectare of 'Good' to 'Excellent' condition native vegetation, **cleared** as a result of the **proposal** within the Chichester **IBRA** subregion.

- \$1,562 AUD (excluding GST) per hectare of riparian vegetation and denning and foraging habitat for northern quoll and ghost bats, **cleared** as a result of the **proposal** within the Chichester **IBRA** subregion.

Summary

The EPA recommends that an offset (condition 7) is imposed to counterbalance the significant residual impacts of the proposal. The EPA recommends that offset contribution rate of \$781 per ha in the Chichester subregion be applied for the clearing of 219.8 ha of 'Good to Excellent' condition native vegetation and the higher offset contribution rate (\$1,562 per ha) be applied for the clearing of 219.8 ha of foraging and denning habitat for northern quolls, Pilbara leaf-nosed bat, ghost bat.

6. 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 matter 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).
- Hill, B. and S. Ward (2010). National Recovery Plan for the Northern Quoll *Dasyurus hallucatus*. Department of Natural Resources, Environment, the Arts and Sport, Northern Territory.
- Threatened Species Scientific Committee (2016). Approved Conservation Advice for *Macroderma gigas* (ghost bat). Canberra: Department of the Environment.
- Department of Sustainability, Environment, Water, Population and Communities, (2012) Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy. Canberra, ACT: Commonwealth of Australia.
- Department of Sustainability, Environment, Water, Population and Communities (2011). Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads. Canberra, ACT: Commonwealth of Australia.
- Department of the Environment (2015). Threat abatement plan for predation by feral cats. Canberra, ACT: Commonwealth of Australia.
- Department of Sustainability, Environment, Water, Population and Communities (2012). Threat abatement plan to reduce the impacts on northern Australia's biodiversity by the five listed grasses. Canberra, ACT: Commonwealth of Australia.
- Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008). Threat abatement plan for predation by the European red fox. DEWHA, Canberra.

EPA Assessment

Impacts to the environment are covered under the key environmental factors of Flora and Vegetation, and Terrestrial Fauna, where relevant.

Fauna habitat

The proponent has described seven broad habitat types according to landforms and their importance to, and use by, MNES within the proposal area:

- **low stony hills** – dispersal habitat for the northern quoll and foraging habitat for the ghost bat
- **stony plain** – foraging habitat for the ghost bat
- **sand plain** – dispersal habitat for the northern quoll, primary foraging habitat for the ghost bat, Pilbara leaf-nosed bat and grey falcon
- **major drainage** – high density denning and foraging habitat for the northern quoll, dispersal habitat for the northern quoll, foraging and dispersal habitat for the ghost bat and the Pilbara leaf-nosed bat, Pilbara olive python and northern brushtail possum, foraging and breeding habitat for the grey falcon
- **hillcrest/hillslope** – denning and foraging habitat for the northern quoll, breeding habitat for the northern quoll, foraging and roosting habitat for the ghost bat and Pilbara leaf-nosed bat and habitat for the Pilbara olive python
- **gorge/gully** – high density denning and foraging habitat for the northern quoll, primary foraging habitat for the ghost bat and the Pilbara leaf-nosed bat, potential roosting habitat for the ghost bat and potential nocturnal refuges for the Pilbara leaf-nosed bat.
- **spinifex/sandplain** – foraging habitat for the ghost bat.

The most significant habitat types for MNES within the development envelope are gorge/gully, hillcrest/hillslope and major drainage. The proposal has been designed to avoid impacts to these habitat types where possible, with disturbance to gorge/gully limited to 0.7 ha, hillcrest/hillslope limited to 66.2 ha and disturbance to major drainage to 19.8 ha. The design of the proposal reduced the development envelope and the total clearing area and the overall impact to MNES.

Northern quoll (*Dasyurus hallucatus*)

Eighty-nine records of northern quoll were recorded from fifteen sites, including nine opportunistic locations in the study area during field surveys. Evidence of the northern quoll (from scats and individuals) was identified in gorge/gully, major drainage line, low stony hills, hillcrest/hillslope and sand plain habitats. The hillcrest/hillslopes and gorge/gully habitat provides foraging and denning habitat, while the other habitats provide foraging and dispersal habitat.

Limited areas within the proposal area would support permanent and high-density populations of the northern quoll. Their core habitat is gorge/gully, major drainage and hillcrest/hillslope, which would have a minimal disturbance (153.6 ha). Habitat mapping has shown the key habitat type of gorge/gully, major drainage and hillcrest/hillslope habitat extends outside the development envelope.

The Significant Species Management Plan includes the following specific management measures for the northern quoll:

- implementation of a Northern Quoll Monitoring Program, with requirements for an annual northern quoll monitoring report
- implementation of inductions to provide detailed information about the northern quoll, including the identification of employee and contractor responsibilities.
- reporting of northern quoll sightings, injuries and mortalities to the Miralga Creek environmental advisor in accordance with the proponents HSE Incident Management Procedure.

Ghost bat (*Macroderma gigas*)

Ghost bats were detected twenty-five times during the most recent fauna survey with eight-night roost sites, three confirmed diurnal roosts (of which one is possibly a maternity roost) and two potential diurnal roosts recorded. Of these roosts, four are located within the development envelope and will be impacted by the proposal.

The loss of one nocturnal roost for ghost bat cave CMRC-02 at Miralga West, will be cleared as a result of the proposal. CMRC-02 is a category 4 isolated cave and the roost is of least value to the ghost bat and is not considered important for the long-term presence of the ghost bat locally. There is a risk of abandonment of the diurnal roost/possible maternity roost roosting cave (CMRC-15) at Miralga East for the ghost bat. This risk is believed to be low with blasting controls put in place, these mitigation measures are to ensure the cave stays viable once the activity is complete.

The proposal requires clearing of 219.8 ha of foraging and/or dispersal habitat for ghost bats. The field survey recorded ghost bat across four habitat types: major drainage, hillcrest/hillslope, gorge/gully and stony plain. Ghost bats have a nightly foraging range of 10 km radius, travelling up to 25 km in a single night (Bat Call WA, 2020). All caves that may be impacted by implementation of the proposal are within 25 km of Lalla Rookh.

Pilbara leaf-nosed bat (*Rhinoicteris aurantia*)

The Pilbara leaf-nosed bat was detected thirty-five times at fourteen sites within the study area. The proposal will result in the removal of one nocturnal roost cave CMRC-02, disruption of cave CMRC-01 and potentially cause disruption to a further eleven caves located within 500 m of proposed pits. The majority of these caves are thought to be used opportunistically. Alternate roosts are available in the vicinity, including CMRC-15 located in habitat where the number of Pilbara leaf-nosed bat calls was greatest. CMRC-15 may be impacted by noise and vibration; these impacts will be managed in accordance with the Significant Species Management Plan.

All habitat types in the study area are used by this species, hillslope/hillcrest and major drainage line habitats are especially frequented. Records of Pilbara leaf-nosed bats during the field survey originated from the Lalla Rookh roost which is also a known permanent diurnal roost for the species.

The proposal requires clearing of 219.8 ha of foraging and/or dispersal habitat for

Pilbara leaf-nosed bat. All habitats within the development envelope are used by the Pilbara leaf-nosed bat, hillcrest/hillslope and major drainage habitats are frequently visited, these habitats are broadly found outside of the development envelope. It is unlikely that the proposal will have a significant impact on the species.

Northern brushtail possum (*Trichosurus vulpecula arnhemensis*)

A single northern brushtail possum was trapped twice within the study area, both records were recorded at the one location, along Miralga Creek in the major drainage line habitat. The development envelope has two permanent drainage lines where the haul road will cross – the Shaw River and Miralga Creek. The nearest record of the species to the study area is located approximately 80 km southwest.

Grey falcon (*Falco hypoleucos*)

Grey falcon was recorded three times within the study area, all recorded within close proximity to major drainage habitat. The species is likely to occur as a resident within or within a broader area encompassing the study area, with nesting potentially occurring within the continuous major drainage habitat occurring within the study area. Due to the large foraging range of the species, the species is likely to occur within the study area to forage, particularly within sand plain, stony plain and major drainage habitats.

Pilbara olive python (*Liasis olivaceus barroni*)

No evidence of Pilbara olive python was recorded within the study area. However it is considered likely to occur due to presence of habitats known to support the species in gorge/gully, hillcrest/hillslope and major drainage habitats. Occurrence within the development envelope is likely to be associated with waterbodies, particularly permanent or long-standing waterbodies such as spring-fed systems which occur within gorge/gully and major drainage habitats. The species has previously been recorded multiple times within approximately 11 km southwest from the proposal.

Summary

The EPA has assessed the potential impacts from the proposal on MNES and notes the proposal has been designed to avoid habitat important to MNES. The EPA recommends the following environmental conditions to minimise impacts on MNES:

- limit the location and authorised extent of the clearing of vegetation to 219.8 ha in Table 2 of Schedule 1
- condition 6 to implement a Significant Species Management Plan.

The EPA considers that there will be a significant residual impact from the clearing of 219.8 ha of foraging and denning habitat. The EPA has recommended an offset in condition 7 (see section 5) which takes into account the significant residual impact to listed fauna species.

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 listed threatened species.

7. Conclusion

The EPA has considered the proposal for the Miralga Creek DSO Project and has taken a holistic view of the likely residual impacts of the proposal. The EPA has considered the degree of connectivity and inter-relatedness of processes operating across systems and communities that make up the environment.

Application of the Mitigation Hierarchy

Consistent with relevant policies and guidance, the proponent has addressed the mitigation hierarchy by identifying measures to avoid, minimise and rehabilitate environmental impacts including:

- designing the development envelope to avoid two vegetation types of conservation interest, Priority flora and fauna habitat where possible
- avoidance and minimisation through a Significant Species Management Plan and exclusion zones.

Offsets

The EPA considers that the proposal's significant residual impact in the Chichester IBRA subregion due to clearing of 219.8 ha and will require contribution to the Pilbara Offsets fund at \$781/ha of 'Good' to 'Excellent' condition native vegetation and \$1,562/ha (2019/2020) of foraging and denning habitat of northern quoll, Pilbara olive python and bat foraging habitat.

The EPA has recommended condition 7 (Offsets) specifying the offset requirements and requiring the implementation of an Impact Reconciliation Procedure.

Conclusion

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

- impacts to all the key environmental factors
- EPA's confidence in the proponent's proposed mitigation measures
- relevant EP Act principles and the EPA's objectives for the key environmental factors
- EPA's view that the impacts to the key environmental factors are manageable, provided the recommended conditions are imposed.

Given the above, the EPA recommends that the proposal may be implemented subject to the conditions recommended in Appendix 4.

8. Recommendations

The EPA recommends that the Minister for Environment notes:

1. The proposal assessed is for the construction and operation of the Miralga Creek Direct Shipping Ore (DSO) Project, which would require up to 219.8 ha of clearing within the development envelope of 556.8 ha.
2. The key environmental factors identified by the EPA in the course of its assessment are Flora and Vegetation and Terrestrial Fauna, set out in section 4 of this report.
3. The EPA has recommended that the proposal may be implemented, provided that implementation is carried out in accordance with the recommended conditions and procedures set out in Appendix 4. Matters addressed in the conditions include the following:
 - a) control through authorised extent in Schedule 1 of the Recommended Environmental Conditions
 - b) preparation and implementation of a revised version of the Significant Species Management Plan (180-LAH-EN-PLN-0001, Rev 0, April 2020) (condition 6), including baseline monitoring and a staged approach to blasting, avoiding blasting within 100 m of a cave until the results of monitoring validate predictions with a reasonable degree of confidence
 - c) implementation of offsets (condition 7) to counterbalance the significant residual impact of clearing 219.8 ha of Chichester IBRA subregion vegetation, which is foraging and denning habitat for the northern quoll, ghost bat and Pilbara-leaf nosed bat.

References

Atlas Iron 2020a, *EPA Referral Document Miralga Creek DSO Project, Revision 0*, Atlas Iron Pty Ltd 2020, Perth WA.

Atlas Iron 2020b, *Request to Change Proposal during Assessment under section 43A of the Environmental Protection Act 1986, 15 June 2020*, Atlas Iron Pty Ltd, Perth WA.

Atlas Iron 2020c, *Significant Species Management Plan Miralga Creek DSO Project (180-LAH-EN-PLN-0001, Revision 0)*, Atlas Iron Limited, unpublished.

Bat Call WA 2020, *Miralga Creek Review – March 2020*, Bat Call WA Pty Ltd, Perth WA.

Blast It Global 2020, *Assessment of Blasting at Miralga Creek Project: Preservation of Ghost Bat Habitats Post Mining Activities*, Perth, WA.

EPA 2014, *Cumulative environmental impacts of development in the Pilbara region - Advice of the Environmental Protection Authority to the Minister for Environment under Section 16 (e) of the Environmental Protection Act 1986*, Environmental Protection Authority, Perth, WA.

EPA 2016a, *Environmental Factor Guideline – Flora and Vegetation*, Environmental Protection Authority, Perth, WA.

EPA 2016b, *Environmental Factor Guideline – Terrestrial Fauna*, Environmental Protection Authority, Perth, WA.

EPA 2016c, *Technical Guidance – Flora and vegetation surveys for environmental impact assessment*, Environmental Protection Authority, Perth, WA.

EPA 2020a, *Environmental Factor Guideline – Air Quality*, Environmental Protection Authority, Perth, WA.

EPA 2020b, *Environmental Factor Guideline – Greenhouse Gas Emissions*, Environmental Protection Authority, Perth, WA.

EPA 2020c, *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual*, Environmental Protection Authority, Perth, WA.

EPA 2020d, *Statement of Environmental Principles, Factors and Objectives*, Environmental Protection Authority, Perth, WA.

EPA 2020e, *Technical Guidance – Terrestrial vertebrate fauna surveys for environmental impact assessment*, Environmental Protection Authority, Perth, WA.

Government of Western Australia 2011, *WA Environmental Offsets Policy*, Government of Western Australia, Perth, WA.

Government of Western Australia 2014, *WA Environmental Offsets Guidelines*, Government of Western Australia, Perth, WA.

Iron Bridge 2020, *Pilbara Leaf Nosed Bat Summary of North Star Ecological Investigations 2014-2019 Report*, 28 May 2020, 662NS-0000-RP-EN-0015, Iron Bridge, Perth, WA.

State of Western Australia 2016, *Western Australian Government Gazette, No. 223*, 13 December 2016.

Woodman 2019, *Miralga Creek Iron Ore Project Detailed Flora and Vegetation Survey 2019*, prepared for Atlas Iron Pty Ltd by Woodman Environmental Consulting Pty Ltd, Perth, WA.

Appendix 1: List of submitters

Organisations

Department of Mines, Industry Regulation and Safety
Department of Biodiversity, Conservation and Attractions
Department of Water and Environmental Regulation

Appendix 2: Consideration of Environmental Protection Act Principles

Principle of the <i>Environmental Protection Act 1986</i>	Consideration
<p>1. The precautionary principle</p> <p><i>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 –</i></p> <p>a) <i>careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and</i></p> <p>b) <i>an assessment of the risk-weighted consequences of various options.</i></p>	<p>In considering this principle, the EPA notes that Flora and Vegetation and Terrestrial Fauna could be significantly impacted by the proposal. The assessment of these impacts is provided in this report.</p> <p>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 or minimise impacts and prepared a significant species management plan to avoid and minimise impacts. The EPA has considered these measures during its assessment.</p> <p>The EPA has also recommended an offsets condition to counterbalance the significant residual impact to flora and vegetation.</p> <p>From its assessment of this proposal the EPA has concluded that there is no threat of serious or irreversible harm.</p>
<p>2. The principle of intergenerational equity</p> <p><i>The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.</i></p>	<p>In considering this principle, the EPA notes that Flora and Vegetation and Terrestrial Fauna could be significantly impacted by the proposal. The assessment of these impacts is provided in this report.</p> <p>In assessing the proposal, the EPA has recommended conditions to manage impacts to Flora and Vegetation and Terrestrial Fauna, in particular the ghost bat, Pilbara leaf-nosed bat and northern quoll habitat.</p> <p>From its assessment of this proposal the EPA has concluded that provided the recommended conditions are imposed on the implementation of the proposal, the environmental values will be protected and that the health, diversity and productivity of the environment will be maintained for the benefit of future generations.</p>

Principle of the <i>Environmental Protection Act 1986</i>	Consideration
<p>3. The principle of the conservation of biological diversity and ecological integrity</p> <p><i>Conservation of biological diversity and ecological integrity should be a fundamental consideration.</i></p>	<p>This principle is a fundamental and relevant consideration for the EPA when assessing and considering the impacts of the proposal on the environmental factors of Flora and Vegetation and Terrestrial Fauna.</p> <p>The EPA notes that the proponent has identified measures to avoid or minimise impacts by avoiding, most bat roosts and known locations of Priority flora. The EPA has considered these measures during its assessment.</p> <p>The EPA notes that impacts may affect biological diversity and ecological integrity in regards to cumulative impacts to the Chichester IBRA subregion. The EPA has considered to what extent the potential impacts from the proposal can be ameliorated by recommended conditions, including offsets. The EPA has concluded that given the nature of the impacts that the proposed offsets are likely to ameliorate the impacts of the loss of biological diversity and ecological integrity as the Pilbara Environmental Offsets Fund is part of a broader conservation program for the region.</p>
<p>4. Principles relating to improved valuation, pricing and incentive mechanisms</p> <p>(1) <i>Environmental factors should be included in the valuation of assets and services.</i></p> <p>(2) <i>The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.</i></p> <p>(3) <i>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 waste.</i></p> <p>(4) <i>Environmental goals, having been established, should be pursued in the most cost effective way, by establishing</i></p>	<p>In considering this principle, the EPA notes that the proponent will take responsibility for preventing pollution and ensuring the rehabilitation and ongoing management of the proposal.</p> <p>The integration of rehabilitation and closure planning into operating mine planning will ensure cost-effective measures and mechanisms to reduce liability and risks with mine closure are identified and implemented.</p> <p>The EPA has had regard to this principle during the assessment of the proposal.</p>

Principle of the <i>Environmental Protection Act 1986</i>	Consideration
<p><i>incentive structure, including market mechanisms, which enable those best placed to maximise benefits and/or minimize costs to develop their own solution and responses to environmental problems.</i></p>	
<p>5. The principle of waste minimisation</p> <p><i>All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.</i></p>	<p>In considering this principle, the EPA notes that the proponent proposes to apply a waste hierarchy to the project operations via a Waste Management Procedure. The Procedure is centred around the three key principles:</p> <ul style="list-style-type: none"> • stewardship (i.e. avoiding unnecessary waste generation through the lifecycle of a product) • waste hierarchy (i.e. avoid, reduce, reuse, recycle) • resource efficiency (i.e. getting the most out of a resource). <p>This procedure ensures waste minimisation and recycling opportunities are explored throughout the lifecycle of products used, appropriate waste management practices are in place and compliance with relevant legislation and standards.</p> <p>Major waste streams for this proposal include waste rock, waste for landfill (inert and putrescible) treated wastewater and hydrocarbon/hazardous waste.</p> <p>The EPA has had regard to this principle during the assessment of the proposal.</p>

Appendix 3: 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			
Subterranean Fauna	<p>Potential impacts include:</p> <ul style="list-style-type: none"> • indirect impacts to troglofauna and stygofauna from shock and vibration of blasting, changes to infiltration beneath stockpiles and waste dumps, and habitat desiccation from pit walls or groundwater drawdown • direct troglofauna and stygofauna disturbance of habitat through mining • dewatering of habitat • pollution of habitat. 	There were no agency or public comments on subterranean fauna.	<p>Subterranean Fauna was not identified as a preliminary key environmental factor when the EPA decided to assess the proposal.</p> <p>Having regard to:</p> <ul style="list-style-type: none"> • 5,266 subterranean fauna specimens found in field sampling (96% stygofauna and 4% troglofauna). • Risk assessment based on current taxonomic and ecological information, habitat information (including habitat modelling based on detailed drill log data) and the likelihood that any species of troglofauna or stygofauna would be limited to habitats directly impacted by the proposed development. The risk assessment indicated that: <ul style="list-style-type: none"> - Troglofauna: the direct impact area comprised the proposed pit boundaries. Although indirect impacts such as shock and vibration from blasting, changes to infiltration beneath stockpiles and waste dumps, and habitat desiccation from pit walls or groundwater drawdown may extend beyond the pit boundaries, these risks are generally considered minor, manageable, and/or difficult to measure and assess.

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
			<p>Four troglofauna taxa at low risk and two troglofauna taxa at low-moderate risk from mining.</p> <ul style="list-style-type: none"> - Stygofauna: the impact area comprised the estimated groundwater drawdown from the existing, licensed borefields. Twelve stygofauna taxa at low risk. • The management of water abstraction from existing bores in accordance with 5C licence requirements to take groundwater under the <i>Rights in Water and Irrigation Act 1914</i> and associated water management plan and site water operating plan. • The implementation of the ground disturbance permit and the clearing and grubbing procedure. • The significance of considerations in the <i>Statement of Environmental Principles, Factors and Objectives</i> (EPA 2020d), <p>the EPA considers it is unlikely that the proposal would have a significant impact on Subterranean Fauna and that the impacts to this factor are manageable.</p> <p>Accordingly, the EPA did not consider Subterranean Fauna to be a key environmental factor at the conclusion of its assessment.</p>
Landforms	Potential impacts from removal or degradation of landforms include:	There were no agency or public comments on landforms.	<p>Landforms was not identified as a preliminary key environmental factor when the EPA decided to assess the proposal.</p> <p>Having regard to:</p>

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
	<ul style="list-style-type: none"> • reduced landform diversity • reduced landform integrity • loss or degradation of associated ecological and social values. 		<ul style="list-style-type: none"> • The development envelope avoiding significant landforms. • A ground disturbance permit and clearing and grubbing procedure to be implemented to minimise impacts to landforms. • Disturbance of no more than 219.8 ha of vegetation/habitat within the 556.8 ha development envelope. • Clearing in sensitive habitats including caves, gorges and drainage lines to be kept to the minimum necessary for safe construction and operation of the proposal. • Separate stockpiling of topsoil, for future use in rehabilitation, during ground disturbance and clearing: <ul style="list-style-type: none"> - Low hills / scree slopes together with Ridgelines/Rocky outcrops can be stockpiled together for future use on rehabilitated slopes - Stony plain and Sandy plain material are suitable only for flat areas of the rehabilitated landform. The proponent will develop a mine closure plan to meet the current mine closure guidelines as required by Department of Mines, Industry Regulation and Safety (DMIRS). • The significance of considerations in the <i>Statement of Environmental Principles, Factors and Objectives</i> (EPA 2020d),

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
			<p>the EPA considers it is unlikely that the proposal would have a significant impact on Landforms and that the impacts to this factor are manageable.</p> <p>Accordingly, the EPA did not consider Landforms to be a key environmental factor at the conclusion of its assessment.</p>
Terrestrial Environmental Quality	<p>Potential impacts include:</p> <ul style="list-style-type: none"> • soil contamination from inappropriate transport, handling and storage of hydrocarbons and chemicals • erodible waste dump surfaces from poor management of problematic waste rock material (limited to shale) • changes in soil quantity, quality and structure from ground disturbance • accelerated soil erosion from inadequate surface water management. 	<p>DMIRS comments</p> <ul style="list-style-type: none"> • <u>Baseline surface water</u> – East Pit 3 is within surface water drainage line. There has been consideration of the availability of the pit to hold water at a 72 hour 1 in 100 ARI event, however the probable maximum Precipitation/Probable Maximum Flood (PMP/PMF) is the requirement for water holding structure at closure and has not been considered. Pits may prevent the flow of surface water and impact down gradient receptors. • Closure outcomes and completion criteria requires some refinement (conservation significant 	<p>Terrestrial Environmental Quality was not identified as a preliminary key environmental factor when the EPA decided to assess the proposal.</p> <p>Having regard to:</p> <ul style="list-style-type: none"> • Proponent's design of the proposal, and intention to operate the proposal, to minimise risk of impacts to Terrestrial Environmental Quality. • Surface water management incorporated into the final mine design include: <ul style="list-style-type: none"> - diverting naturally occurring surface water around mine infrastructure using drainage channels, earth bunds, road culverts. - Isolating waste rock dump areas from external runoff by bunding around the perimeter and encouraging the minimal internal flows to be retained and infiltrate and/or evaporate. Internal flows will be directed to a sedimentation pond, the bulk of the suspended material will be settled out prior to discharge downstream.

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
		<p>fauna, watering holes and permanent pools).</p> <ul style="list-style-type: none"> • <u>Closure risk assessment</u> – The following may benefit from being conditional to approval of the project: <ul style="list-style-type: none"> - Functionality and integrity of bat habitat caves. - Functionality and integrity of watering holes - Re-establishment of habitat for conservation significant fauna. 	<ul style="list-style-type: none"> - Waste rock dumps will be designed to resist erosion and sediment migration to the downstream environment. • With the implementation of the appropriate hydrocarbon and waste rock management the risk of contamination from hydrocarbon and/or chemical spills is considered low. • That the proposal can be managed to meet the DMIRS principle closure objectives and meet requirements set out in the <i>Guidelines for Preparing Mine Closure Plans 2020</i>. • The significance of considerations in the <i>Statement of Environmental Principles, Factors and Objectives (EPA 2020d)</i>, <p>the EPA considers it is unlikely that the proposal would have a significant impact on Terrestrial Environmental Quality and that the impacts to this factor are manageable.</p> <p>Accordingly, the EPA did not consider Terrestrial Environmental Quality to be a key environmental factor at the conclusion of its assessment.</p>
Water			
Inland Waters	<p>Potential impacts include:</p> <ul style="list-style-type: none"> • changes to hydrological flow regimes 	<p>There were no agency or public comments on inland waters.</p>	<p>Inland Waters was not identified as a preliminary key environmental factor when the EPA decided to assess the proposal.</p> <p>Having regard to:</p>

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
	<ul style="list-style-type: none"> • contamination from hydrocarbons or metals • sheet flow in major rainfall events • disruption to downstream or offsite sedimentation • dewatering of habitat • pollution of habitat • potential for altered hydrological regimes from the loss of a small proportion of the Strelly and Shaw catchments. The development envelope covers less than 0.25% of each catchment. Changes are not significant and localised drainage will be managed via appropriate engineering and management controls. • two waterway crossings – the haul 		<ul style="list-style-type: none"> • Fifteen water features were recorded in the study area, five were considered permanent • Haul road impacts on localised drainage • The proponent has designed the river crossing at the Shaw River to be over-top during periods of major stream flow, enabling water to flow past the crossing points and prevent significant amounts of water ponding up stream, also preventing water shadow effects. • The haul road crossing at Miralga Creek will be designed and constructed to enable water flow past the crossing point and prevent significant amounts of water ponding up stream, as well as prevent water shadow effects downstream. Enabled through an over-topping design, or the installation of appropriate under road draining (Atlas Iron 2020a). • The significance of considerations in the <i>Statement of Environmental Principles, Factors and Objectives</i> (EPA 2020d), <p>the EPA considers it is unlikely that the proposal would have a significant impact on Inland Waters and that the impacts to this factor are manageable.</p> <p>Accordingly, the EPA did not consider Inland Waters to be a key environmental factor at the conclusion of its assessment.</p>

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
	road over the Shaw River and the haul road over Miralga Creek – which have the potential to cause an impact to upstream and downstream environments, if flow is impeded.		
Air			
Air Quality	<p>Potential impacts include:</p> <ul style="list-style-type: none"> • reduced air quality from dust emissions by construction, blasting, haulage and general traffic activities • Increased emissions of greenhouse gases. 	There were no agency or public comments on air quality	<p>Air Quality was not identified as a preliminary key environmental factor when the EPA decided to assess the proposal.</p> <p>Having regard to:</p> <ul style="list-style-type: none"> • Air quality impacts that were modelled (2019) by assessing dust concentrations and comparing these to ambient air quality assessment criteria in order to determine the potential impact to the region and key sensitive receptor locations. With standard dust mitigation actions in place, the proposal will have no significant impact on the air quality in the region or at receptor locations. • No sensitive receptors surrounding the proposal. • Compliance with the works approval and operating licence, implementation of the Ground disturbance permit procedure (950-HSE-EN-PRO-0001), Clearing and Grubbing procedure (950-HSE-EN-PRO-0004) and

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
			<p>Dust management procedure (950-HSE-EN-PRO-0026) to ensure dust emissions and impacts are minimised.</p> <ul style="list-style-type: none"> • <i>Environmental Factor Guideline – Air Quality</i> (EPA 2020a). • The significance considerations in the <i>Statement of Environmental Principles, Factors and Objectives</i> (EPA 2020d), <p>the EPA considers it is unlikely that the proposal would have a significant impact on Air Quality and that the impacts to this factor are manageable.</p> <p>Accordingly, the EPA did not consider Air Quality to be a key environmental factor at the conclusion of its assessment.</p>
Greenhouse Gas Emissions	<p>The proposal is estimated to produce on average about 10,900 tCO₂e annually.</p> <p>Clearing of 219 ha of spinifex and open shrublands (<10t CO₂e/ha) will result in <3,000 tCO₂e.</p>	There were no agency or public comments on greenhouse gas emissions	<p>The proponent is investigating greenhouse gas efficiency measures such as the camp to be part powered by renewable energy, solar lighting, solar panels and modern equipment.</p> <p>Having regard to:</p> <ul style="list-style-type: none"> • The significance considerations in the <i>Statement of Environmental Principles, Factors and Objectives</i> (EPA 2020d) • The scope 1 emissions do not exceed 100,000 t/pa CO₂-e • <i>Environmental Factor Guideline – Greenhouse Gas Emissions</i> (EPA 2020b)

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
			<ul style="list-style-type: none"> The small scale and short-term nature of the mine, the EPA consider it is unlikely the proposal would have a significant impact on Greenhouse Gas Emissions and that the impacts to this factor are manageable. <p>Accordingly, the EPA did not consider Greenhouse Gas Emissions to be a key environmental factor at the conclusion of its assessment.</p>
People			
Social Surroundings	<p>Potential impacts include:</p> <ul style="list-style-type: none"> disturbance to significant heritage sites from mining activities noise impacts on the proposals camp disturbance on pastoral activities, such as loss of grazing area, pressure on water resources, vehicle interaction with cattle. <p>There are no registered Aboriginal sites or other heritage places located</p>	There were no agency or public comments on social surroundings or registered heritage sites.	<p>Social Surroundings was not identified as a preliminary key environmental factor when the EPA decided to assess the proposal.</p> <p>Having regard to:</p> <ul style="list-style-type: none"> The development envelope was refined to exclude sites and buffers of interest to the Traditional Owners. No registered Aboriginal sites or other heritage places located within the development envelope. Ongoing heritage surveys and consultation with Traditional Owners and where possible protect identified sites. Noise modelling indicated no impact on surrounding population and noise levels at camp within guidelines. The significance of considerations in the <i>Statement of Environmental Principles, Factors and Objectives</i> (EPA 2020d),

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
	<p>within the development envelope.</p> <p>Heritage surveys undertaken by the proponent have found potential heritage sites at Miralga West and Miralga East. The development envelope has been developed to exclude these areas.</p> <p>Ongoing consultation and involvement with the Nyamal Traditional Owners.</p> <p>Noise impacts on sensitive receptors such as accommodation camp, Marble Bar town site and any residences located along access route.</p>		<p>the EPA considers it is unlikely that the proposal would have a significant impact on Social Surroundings and that the impacts to this factor are manageable.</p> <p>Accordingly, the EPA did not consider Social Surroundings to be a key environmental factor at the conclusion of its assessment.</p>

Appendix 4: Identified Decision-Making Authorities and Recommended Environmental Conditions

Identified Decision-Making Authorities

Section 44(2) 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.

Section 45(1) of the *Environmental Protection Act 1986* requires the Minister for Environment to consult with decision-making authorities (DMAs), and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following DMAs have been identified:

Decision-Making Authority	Legislation (and Approval)
1. Minister for Environment	<i>Biodiversity Conservation Act 2016</i> (Permit to take flora and fauna)
2. Minister for Water	<i>Rights in Water and Irrigation Act 1914</i> (Groundwater abstraction licence / Licence to construct bores)
3. Minister for Mines and Petroleum	<i>Mining Act 1978</i> (Granting of mining lease)
4. Chief Executive Officer, Department of Water and Environmental Regulation	<i>Environmental Protection Act 1986</i> (Part V works approval and licence / Clearing permit)
5. Executive Director, Resource and Environmental Compliance Division, Department of Mines, Industry Regulation and Safety	<i>Mining Act 1979</i> (Approval of mining proposal)
6. State Mining Engineer, Department of Mines, Industry, Regulation and Safety	<i>Mines Safety and Inspection Act 1994</i> (Mine safety) Mines Safety and Inspection Regulations 1995 (Approval to commence mining operations)
7. Chief Dangerous Goods Officer, Department of Mines, Industry, Regulation and Safety	<i>Dangerous Goods Safety Act 2004</i> (Storage and handling of dangerous goods)
8. Chief Executive Officer, Shire of East Pilbara	<i>Building Act 2011</i> (Building permit for worker accommodation)

	<i>Planning and Development Act 2005</i> (Planning approval for accommodation)
9. Chief Health Officer, Department of Health	<i>Health Act 1911 and Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974</i> (Approval for construction or installation of apparatus for treatment of sewage)

Note: In this instance, agreement is only required with DMAs 1 - 3 since these DMAs are Ministers.

Recommended Environmental Conditions

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

MIRALGA CREEK DSO PROJECT

Proposal: The proposal is to develop above watertable mining of iron ore from Sandtrax, Miralga West and Miralga East, located about 100 kilometres south-east of Port Hedland.

Proponent: Atlas Iron Pty Ltd
Australian Company Number 110 396 168

Proponent Address: Level 17, 300 Murray St
PERTH WA 6000

Assessment Number: 2246

Report of the Environmental Protection Authority: 1689

Pursuant to section 45 of the *Environmental Protection Act 1986*, it has been agreed that the proposal described and documented in Tables 1 and 2 of Schedule 1 may be implemented and that the implementation of the proposal is subject to the following implementation conditions and procedures:

1 Proposal Implementation

1-1 When implementing the proposal, the proponent shall not exceed the authorised extent of the proposal as defined in Table 2 of Schedule 1, unless amendments to the proposal and the authorised extent of the proposal have been approved under the EP Act.

2 Contact Details

2-1 The proponent shall 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.

3 Time Limit for Proposal Implementation

3-1 The proponent shall not commence implementation of the proposal after five (5) years from the date of this Statement, and any commencement, prior to this date, must be substantial.

3-2 Any commencement of implementation of the proposal, on or before five (5) years from the date of this Statement, must be demonstrated as substantial by providing the CEO with written evidence, on or before the expiration of five (5) years from the date of this Statement.

4 Compliance Reporting

4-1 The proponent shall prepare, and maintain 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 4-6, or prior to implementation of the proposal, whichever is sooner.

4-2 The Compliance Assessment Plan shall indicate:

- (1) the frequency of compliance reporting;
- (2) the approach and timing of compliance assessments;
- (3) the retention of compliance assessments;
- (4) the method of reporting of potential non-compliances and corrective actions taken;
- (5) the table of contents of Compliance Assessment Reports; and
- (6) public availability of Compliance Assessment Reports.

4-3 After receiving notice in writing from the CEO that the Compliance Assessment Plan satisfies the requirements of condition 4-2 the proponent shall assess compliance with conditions in accordance with the Compliance Assessment Plan required by condition 4-1.

4-4 The proponent shall retain reports of all compliance assessments described in the Compliance Assessment Plan required by condition 4-1 and shall make those reports available when requested by the CEO.

4-5 The proponent shall advise the CEO of any potential non-compliance within seven (7) days of that non-compliance being known.

4-6 The proponent shall submit to the CEO the first Compliance Assessment Report fifteen (15) months from the date of issue of this Statement addressing the twelve (12) month period from the date of issue of this Statement and then annually from the date of submission of the first Compliance Assessment Report, or as otherwise agreed in writing by the CEO.

The Compliance Assessment Report shall:

- (1) be endorsed by the proponent's Chief Executive Officer or a person delegated to sign on the Chief Executive Officer's behalf;

- (2) include a statement as to whether the proponent has complied with the conditions;
- (3) identify all potential non-compliances and describe corrective and preventative actions taken;
- (4) be made publicly available in accordance with the approved Compliance Assessment Plan; and
- (5) indicate any proposed changes to the Compliance Assessment Plan required by condition 4-1.

5 Public Availability of Data

5-1 Subject to condition 5-2, within a reasonable time period approved by the CEO of the issue of this Statement and for the remainder of the life of the proposal, the proponent shall make publicly available, in a manner approved by the CEO, all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g. maps)), management plans and reports relevant to the assessment of this proposal and implementation of this Statement.

5-2 If any data referred to in condition 5-1 contain particulars of:

- (1) a secret formula or process; or
- (2) confidential commercially sensitive information,

the proponent may submit a request for approval from the CEO to not make these data publicly available. In making such a request the proponent shall provide the CEO with an explanation and reasons why the data should not be made publicly available.

6 Significant Species Management Plan

6-1 The proponent shall ensure implementation of the proposal achieves the following **environmental objective**:

- (1) avoid where possible, otherwise minimise direct and indirect impacts to significant fauna and their habitat, including:
 - (a) northern quoll (*Dasyurus hallucatus*);
 - (b) ghost bat (*Macroderma gigas*);
 - (c) Pilbara leaf-nosed bat (*Rhinoicteris aurantia*);
 - (d) Pilbara olive python (*Liasis olivaceus barroni*);

- (e) northern brushtail possum (*Trichosurus vulpecula arnhemensis*);
and
- (f) grey falcon (*Falco hypoleucos*).

6-2 To achieve the objective in condition 6-1 and prior to ground disturbing activities, the proponent shall update and submit a revision of the Significant Species Management Plan (180-LAH-EN-PLN-0001, Rev 0, April 2020) to the requirements of the CEO. The Plan shall:

- (1) specify **trigger criteria; threshold criteria; trigger level actions; threshold contingency actions**; monitoring locations, methodologies, indicators and timing; investigations in the event of a failure to meet a criteria or action; and reporting to demonstrate that the objective in condition 6-1(1) will be met;
- (2) specify **management actions** and reporting to demonstrate that the objective in condition 6-1(2) will be met;
- (3) show significant fauna monitoring sites presented in a figure;
- (4) design blasts to perform to the blast criteria at threshold 100 mm/s at caves CMRC-13, CMRC-14 and CMRC-15, and any other category 1 and 2 caves in the development envelope where ghost bats are found to roost;
- (5) avoid blasting within 100 metres of the lateral extent of caves CMRC-13, CMRC-14 and CMRC-15 until the results of monitoring validate predictions with a reasonable degree of confidence;
- (6) ensure no significant damage to caves CMRC-13, CMRC-14 and CMRC-15, or any other diurnal roosting cave, such that the caves remain viable as habitat (including for diurnal roosting) for ghost bats and Pilbara leaf-nosed bats in the future once mining has ceased;
- (7) minimise disturbance to significant fauna habitats; hillcrest/hillslope, gorge/gully and low stony hills;
- (8) ensure decline of northern quoll activity does not exceed 50 % of the baseline population levels at of any monitoring site, during an annual monitoring period; and
- (9) include a threshold criterion that northern quoll is not absent from more than 50 percent of monitoring sites for more than two consecutive annual monitoring periods.

- 6-3 The proponent shall not implement the proposal until the CEO has confirmed in writing that the Significant Species Management Plan satisfies the requirements of condition 6-2.
- 6-4 The proponent:
- (1) may review and revise the Significant Species Management Plan; or
 - (2) shall review and revise the Significant Species Management Plan as and when directed by the CEO by a notice in writing.
- 6-5 The proponent shall implement the latest revision of the Significant Species Management Plan approved by the CEO.
- 6-6 The proponent shall continue to implement the Significant Species Management Plan until the CEO has confirmed by notice in writing that the proponent has demonstrated that the objective in condition 6-1 has been met.
- 6-7 Where monitoring or investigations indicate a failure to meet or implement management action(s) or target(s) detailed in the approved Significant Species Management Plan, the proponent shall meet the requirements of condition 4-5 (Compliance Reporting) and shall implement the measures outlined in the approved Significant Species Management Plan, including, but not limited to, actions and investigations to be undertaken.
- 6-8 The proponent shall provide the results of ongoing monitoring to the agency responsible for the administration of the *Biodiversity Conservation Act 2016* (being at the time of this Statement to the Department of Biodiversity, Conservation and Attractions).

7 Offsets

- 7-1 The proponent shall contribute funds to the **Pilbara Environmental Offsets Fund** calculated pursuant to condition 7-2, to achieve the objective of counterbalancing the significant residual impacts to 'Good' to 'Excellent' condition native vegetation, riparian vegetation, critical habitat for the northern quoll and ghost bat, subject to any reduction approved by the CEO under condition 7-10.
- 7-2 The proponent's contribution to the **Pilbara Environmental Offsets Fund** shall 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 highest applicable rate specified in condition 7-3. The first biennial reporting period shall commence from **ground disturbing activities** of the environmental value(s) identified in condition 7-3.
- 7-3 Calculated on the 2019–2020 financial year, the contribution rates are:

- (1) \$781 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) \$1,562 AUD (excluding GST) per hectare of riparian vegetation and denning and foraging habitat for northern quoll and roosting and foraging habitats for ghost bat, **cleared** as a result of the **proposal** within the Chichester **IBRA** subregion.
- 7-4 From the commencement of the 2019–2020 financial year, the rates in condition 7-3 will be adjusted annually each subsequent financial year in accordance with the percentage change in the **CPI** applicable to that financial year.
- 7-5 Subject to, and consistent with conditions 7-1, 7-2, 7-3 and 7-4, the proponent shall implement:
- (1) Atlas Iron, Impact Reconciliation Procedure Miralga Creek DSO Project (180-LAH-EN-PLN-0004, Revision 3, September 2020); or
 - (2) if that plan has been revised, the latest version of the plan that the CEO has confirmed in writing meets the requirements of condition 7-1.
- 7-6 If the proponent wishes to or is directed to revise an Impact Reconciliation Procedure, the proponent shall submit a revised plan to the CEO that:
- (1) spatially defines the environmental value(s) identified in condition 7-3;
 - (2) spatially defines the areas where offsets required by condition 7-1 are to be exempt;
 - (3) includes 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 7-3;
 - (4) states that clearing calculations for the first biennial reporting period will commence from **ground disturbing activities** in accordance with condition 7-2 and end on the second 30 June following commencement of **ground disturbing activities**;
 - (5) states 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;
 - (6) indicates the timing and content of the Impact Reconciliation Reports; and
 - (7) is 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).

- 7-7 The proponent:
- (1) may review and revise the Impact Reconciliation Procedure; or
 - (2) shall review and revised the Impact Reconciliation Procedure as and when directed by the CEO by a notice in writing.
- 7-8 The proponent shall submit an Impact Reconciliation Report in accordance with the Impact Reconciliation Procedure approved in condition 7-5.
- 7-9 The Impact Reconciliation Report required pursuant to condition 7-8 shall provide the location and spatial extent of the clearing undertaken as a result of the **proposal** during each year of each biennial reporting period.
- 7-10 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 7-2 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 identified in condition 7-1.

Table 1: Summary of the proposal

Proposal title	Miralga Creek DSO Project
Short description	<p>The proposal is to develop above watertable mining of iron ore from Sandtrax, Miralga West and Miralga East, located about 100 kilometres south-east of Port Hedland.</p> <p>The proposal includes the development of mine pits and associated infrastructure including but not limited to processing facilities, waste landforms and access roads. The proposal will include an accommodation camp and utilise some existing ancillary infrastructure from the nearby Abydos DSO Project.</p>

Table 2: Location and authorised extent of physical and operational elements

Element	Location	Authorised Extent
<i>Physical elements</i>		
Pits	Three at Miralga East (Figure 3) One at Miralga West (Figure 4) One at Sandtrax (Figure 5)	Clearing of no more than 219.8 hectares of native vegetation within a 556.8 hectare development envelope.
Waste dumps	Miralga East (Figure 3) Miralga West (Figure 4) Sandtrax (Figure 5)	
Supporting infrastructure: <ul style="list-style-type: none"> • Access roads • Mine operation centre • Laydown areas • Administration areas • Explosives magazine • Fuel storage area • Haulage route • ROM stockyard 	Figures 2 to 7	
<ul style="list-style-type: none"> • Accommodation camp • Wastewater treatment plant • Irrigation sprayfield • Landfill 	Within tenement L45/562 (Figure 8)	
<i>Operational elements</i>		
Groundwater abstraction	Existing borefields	Abstraction of no more than 0.9 gigalitres per annum of groundwater.

Table 3: Abbreviations and definitions

Acronym or abbreviation	Definition or term
CEO	The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the <i>Environmental Protection Act 1986</i> , or his delegate.
Cleared/clearing	Has the meaning of 'clearing' given by section 51A of the <i>Environmental Protection Act 1986</i> .
CPI	The All Groups Consumer Price Index numbers for Perth compiled and published by the Australian Bureau of Statistics.
Environmental objective	The proposal-specific desired state for an environmental factor/s, to be achieved from the implementation of management-based Condition EMP provisions, as required in a management-based implementation condition.
EP Act	<i>Environmental Protection Act 1986</i>
Ground disturbing activity	Activities that are associated with the substantial implementation of a proposal including but not limited to, digging (with mechanised equipment), blasting, earthmoving, vegetation clearance, grading, gravel extraction, construction of new or widening of existing roads and tracks.
IBRA	Interim Biogeographic Regionalisation for Australia
Pilbara Environmental Offsets Fund	The special purpose account that has been created pursuant to section 16(1)(d) of the <i>Financial Management Act 2006</i> by the Department of Water and Environmental Regulation.
proposal	As defined in Tables 1 and 2 of Schedule 1 and delineated by the geographic coordinates in Schedule 2.
Threshold contingency actions	Threshold contingency actions are implemented in the event that the threshold criteria are exceeded. Threshold contingency actions must be decisive actions that will bring the impact back below the threshold criteria and trigger criteria quickly.
Threshold criteria	Threshold criteria represent the limit of acceptable impact beyond which there is likely to be a significant effect on the environment. This indicates that the environmental outcome is not being met. Where the EMP is a requirement of a condition, any failure to meet threshold criteria constitutes a non-compliance with the implementation conditions.
Trigger level actions	Trigger level actions are the actions that will be implemented if trigger criteria are exceeded, to avoid reaching the threshold criteria and bring the impact back below the trigger criteria.
Trigger criteria	Trigger criteria are set at levels to forewarn of the approach of the threshold criteria and 'trigger' response actions. Trigger criteria must be set at a conservative level to ensure trigger level actions are implemented well in advance of the threshold criteria to avoid non-compliance and to avoid compromising the environmental outcome.

Figures (attached)

- Figure 1 Regional location
- Figure 2 Proposal - Development envelope and indicative disturbance footprint
- Figure 3 Miralga East - Development envelope and indicative disturbance footprint
- Figure 4 Miralga West - Development envelope and indicative disturbance footprint
- Figure 5 Sandtrax - Development envelope and indicative disturbance footprint
- Figure 6 Haul road - Development envelope and indicative disturbance footprint
- Figure 7 Magazine - Development envelope and indicative disturbance footprint
- Figure 8 Accommodation camp and associated infrastructure - Development envelope and indicative disturbance footprint
- Figure 9 Miralga West, Miralga East and accommodation camp - Good to Excellent Condition Vegetation in the Chichester Sub-region, Riparian Vegetation and Critical Habitat for the northern quoll and bats
- Figure 10 Sandtrax - Good to Excellent Condition Vegetation in the Chichester Sub-region, Riparian Vegetation and Critical Habitat for the northern quoll and bats
- Figure 11 Magazine - Good to Excellent Condition Vegetation in the Chichester Sub-region, Riparian Vegetation and Critical Habitat for the northern quoll and bats

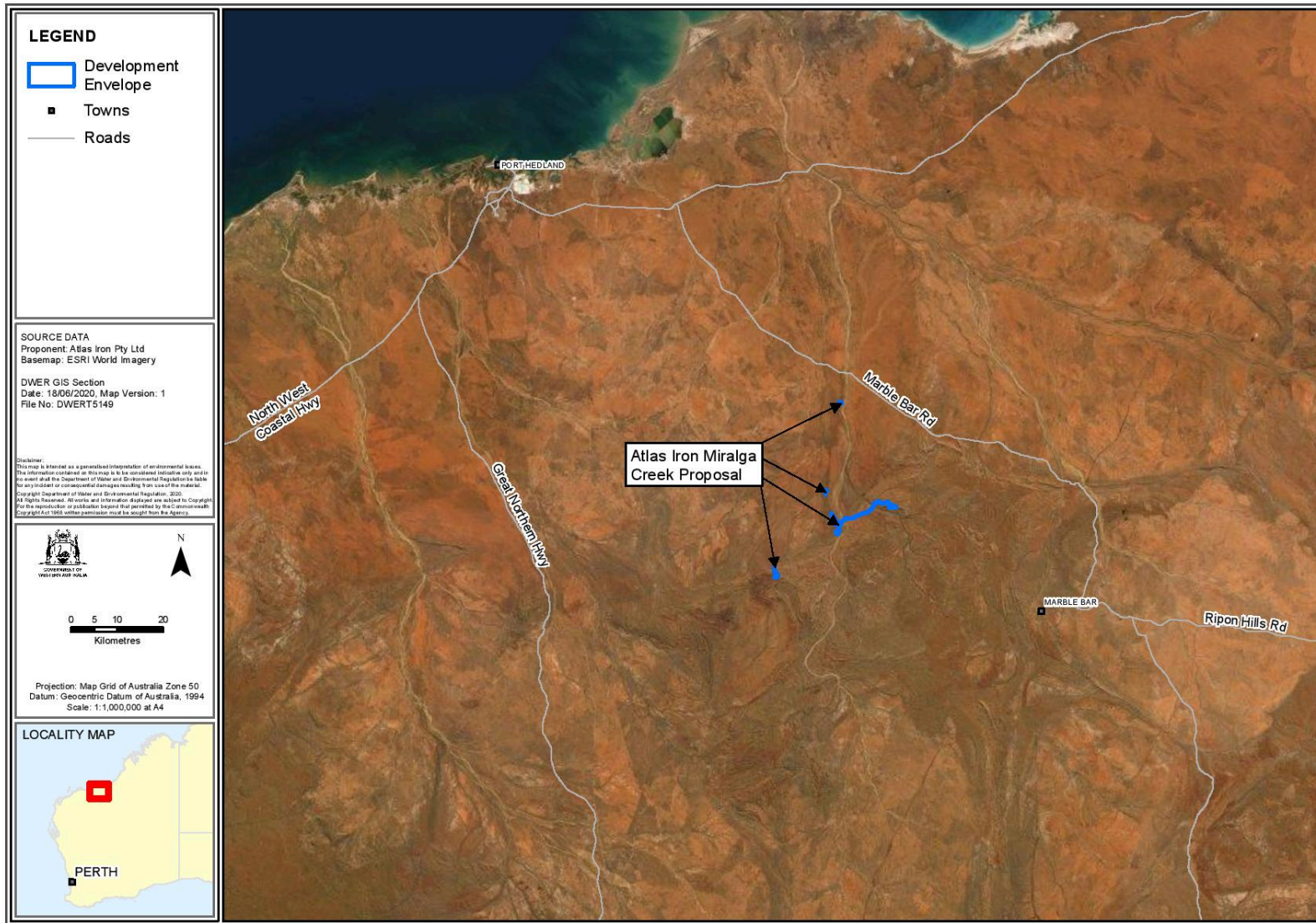


Figure 1: Regional location

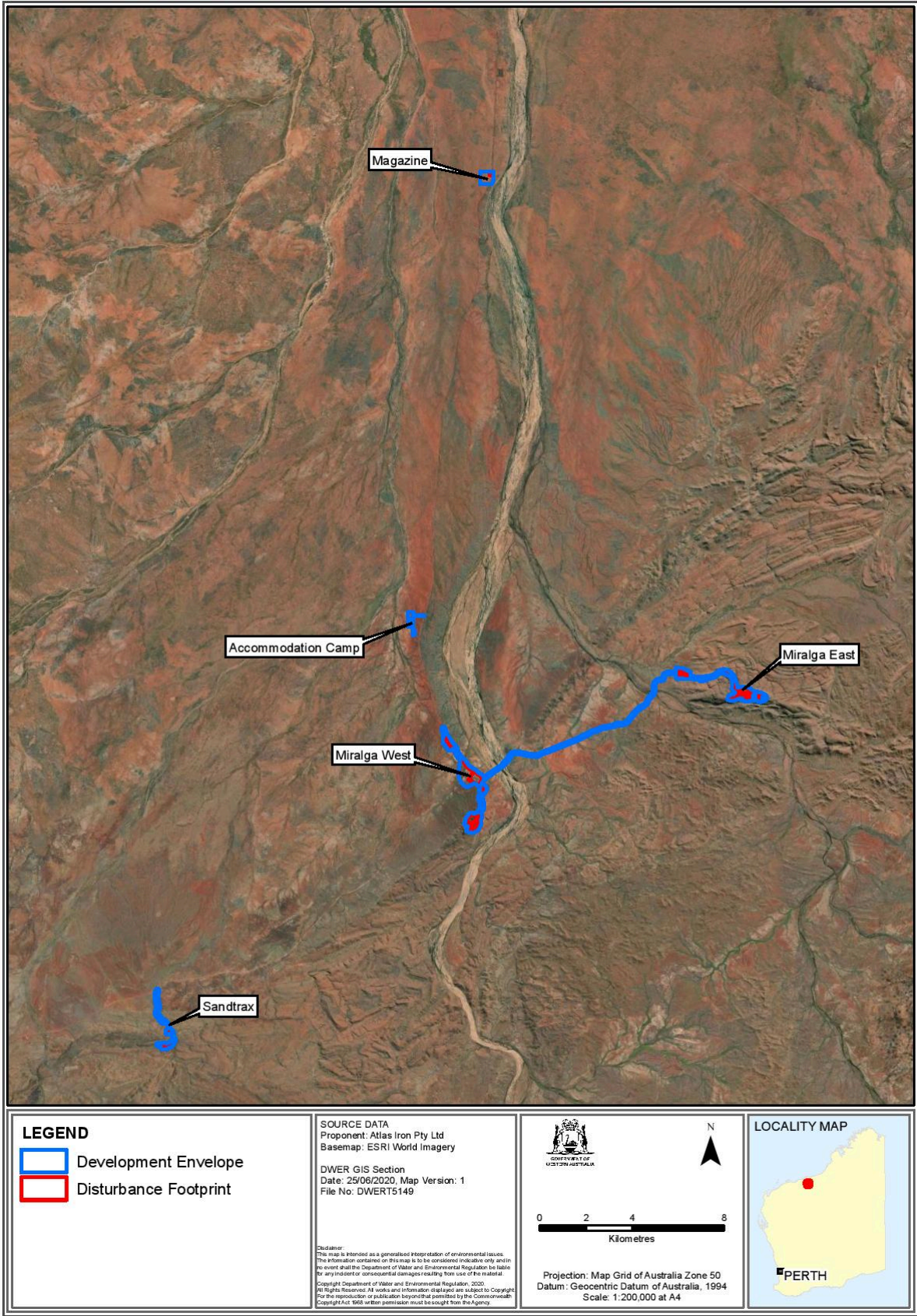


Figure 2: Proposal – Development envelope and indicative disturbance footprint overview

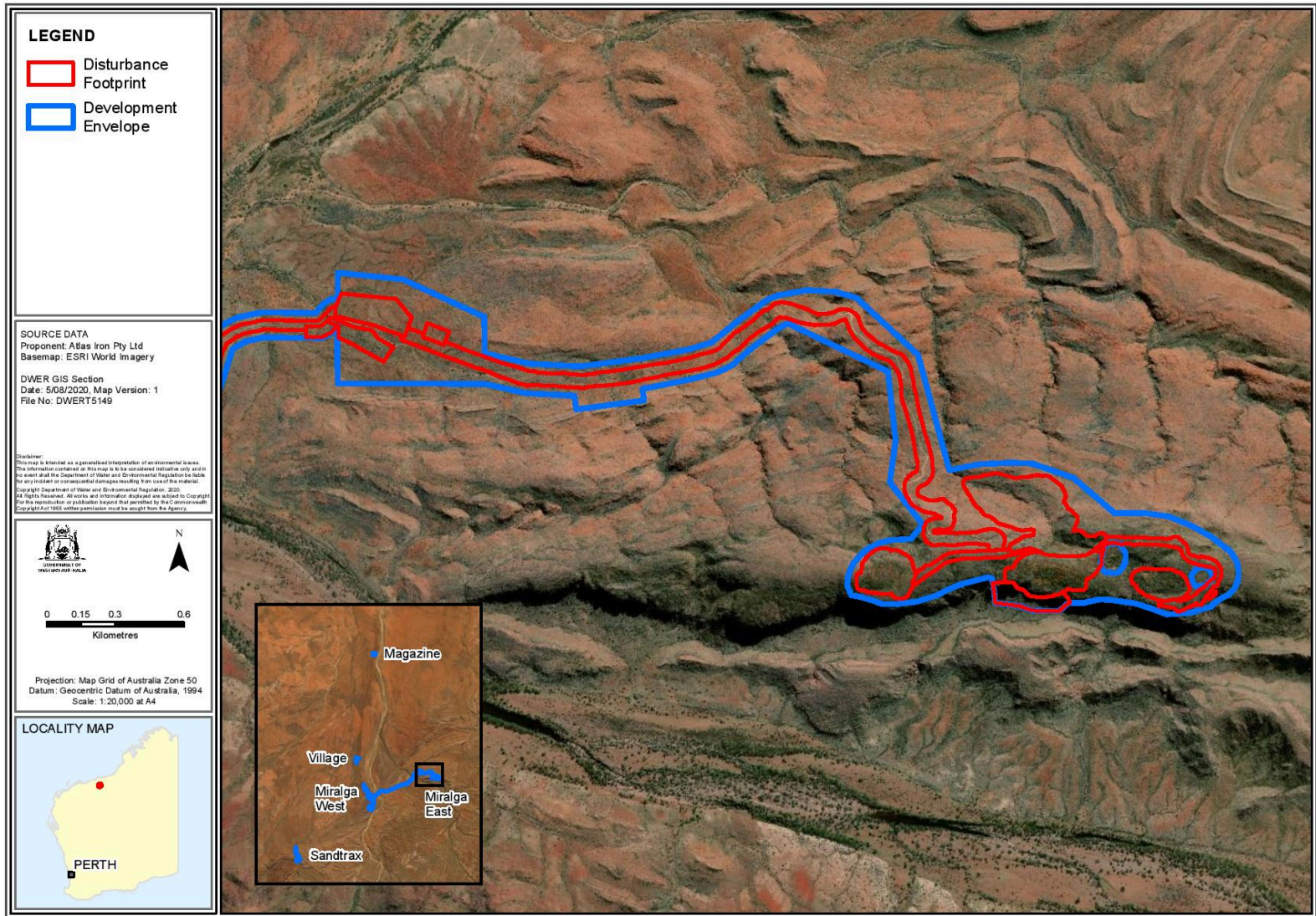


Figure 3: Miralga East – Development envelope and indicative disturbance footprint

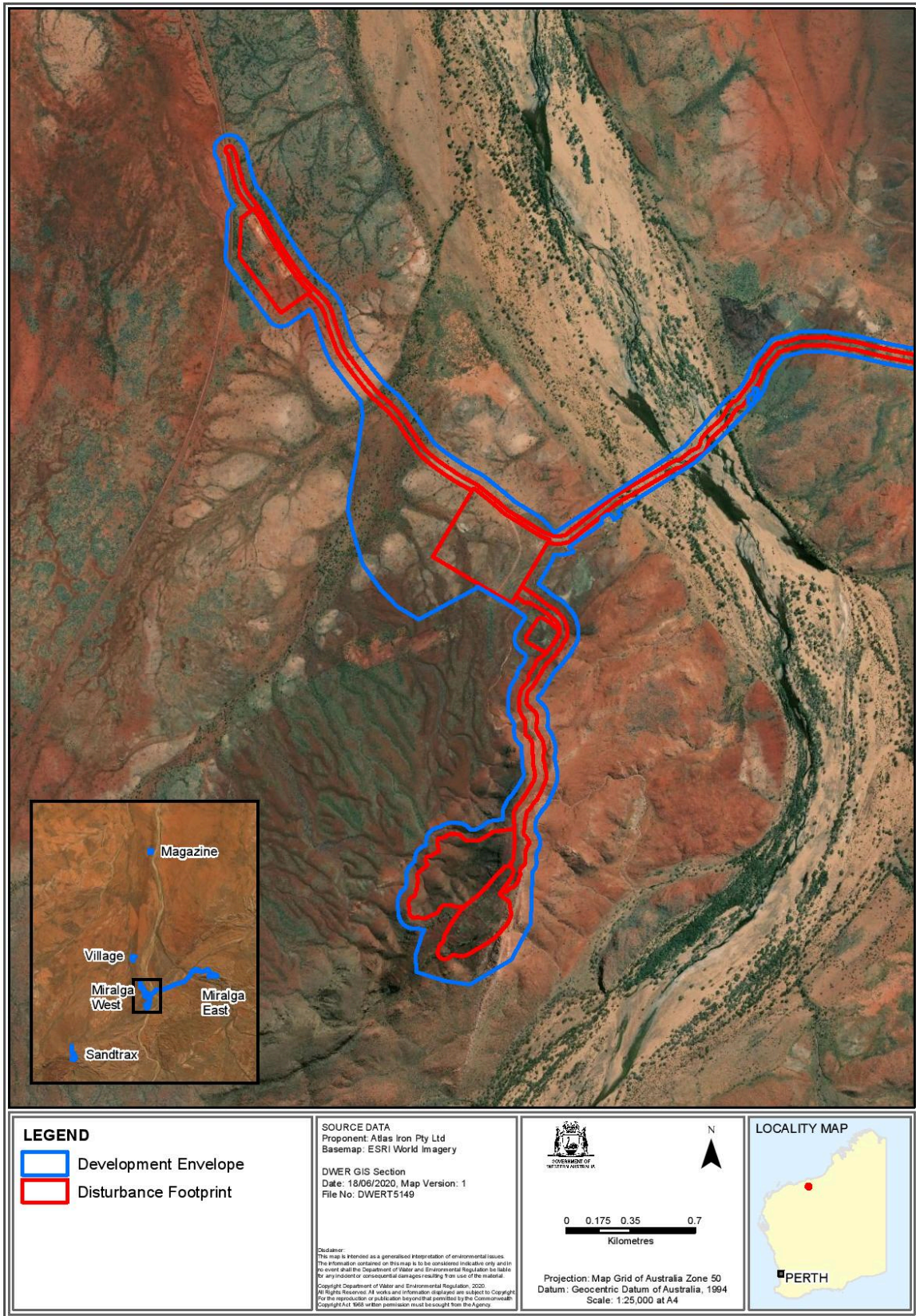
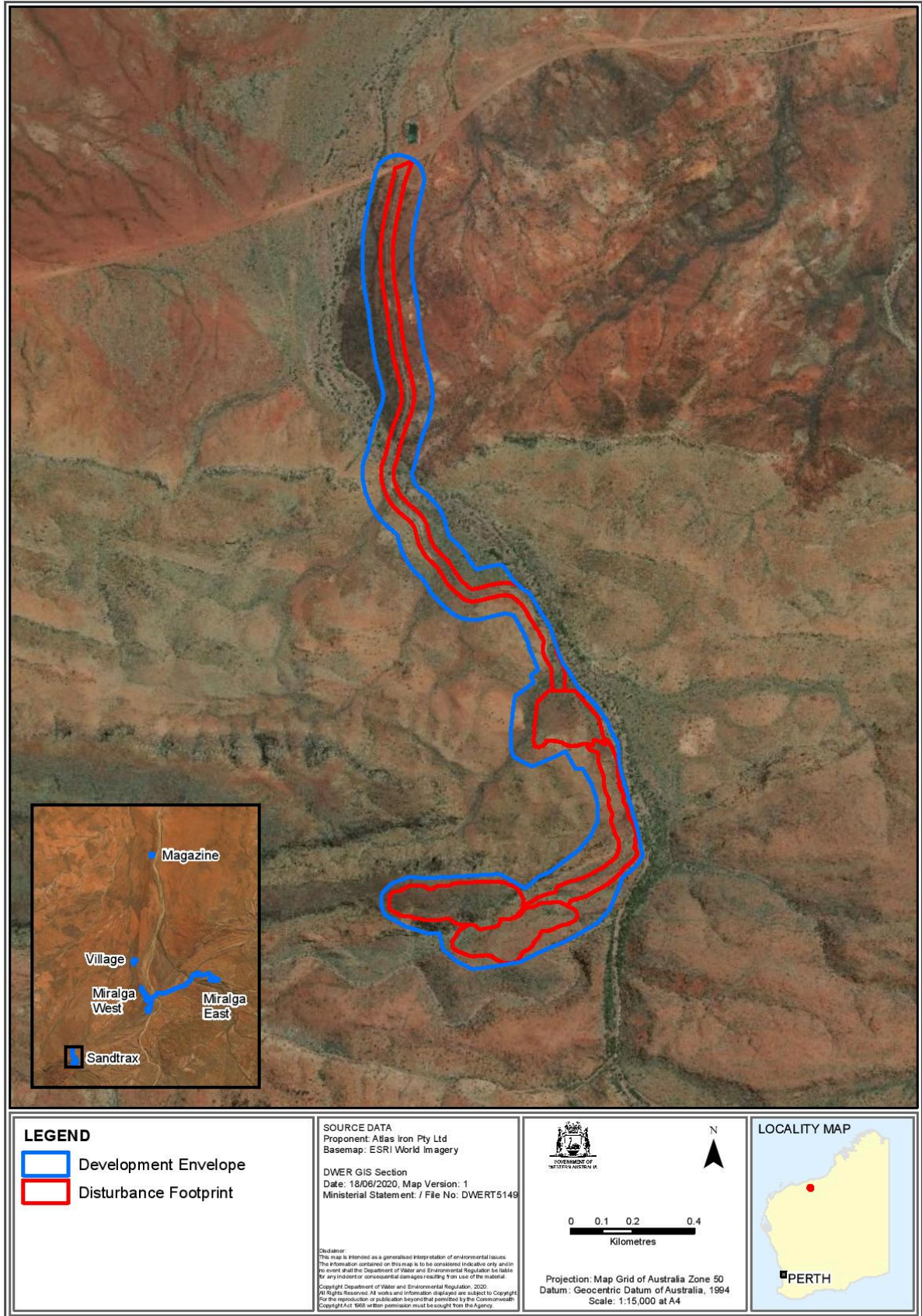


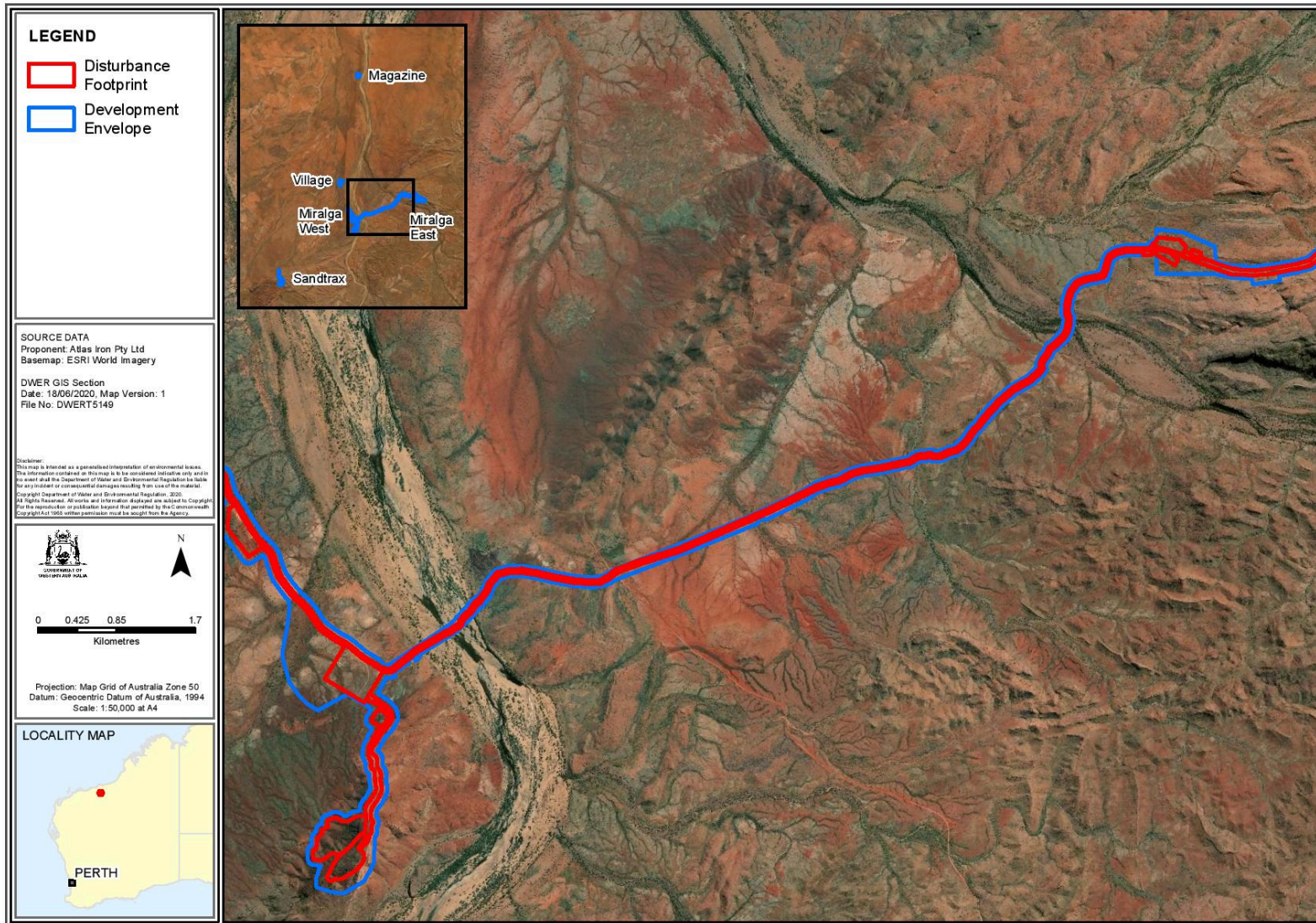
Figure 4: Miralga West – Development envelope and indicative disturbance footprint



S:\Project\EIA\381020_DWERT270670_MiralgaCreekDirectShippingOre\SO\Project3_Assessment\MiralgaCreek_DWERT270670_Figure5_Sandtrax_V02.mxd

Unique Record ID:

Figure 5: Sandtrax – Development envelope and indicative disturbance footprint



Unique Record ID:

Figure 6: Haul road – Development envelope and indicative disturbance footprint

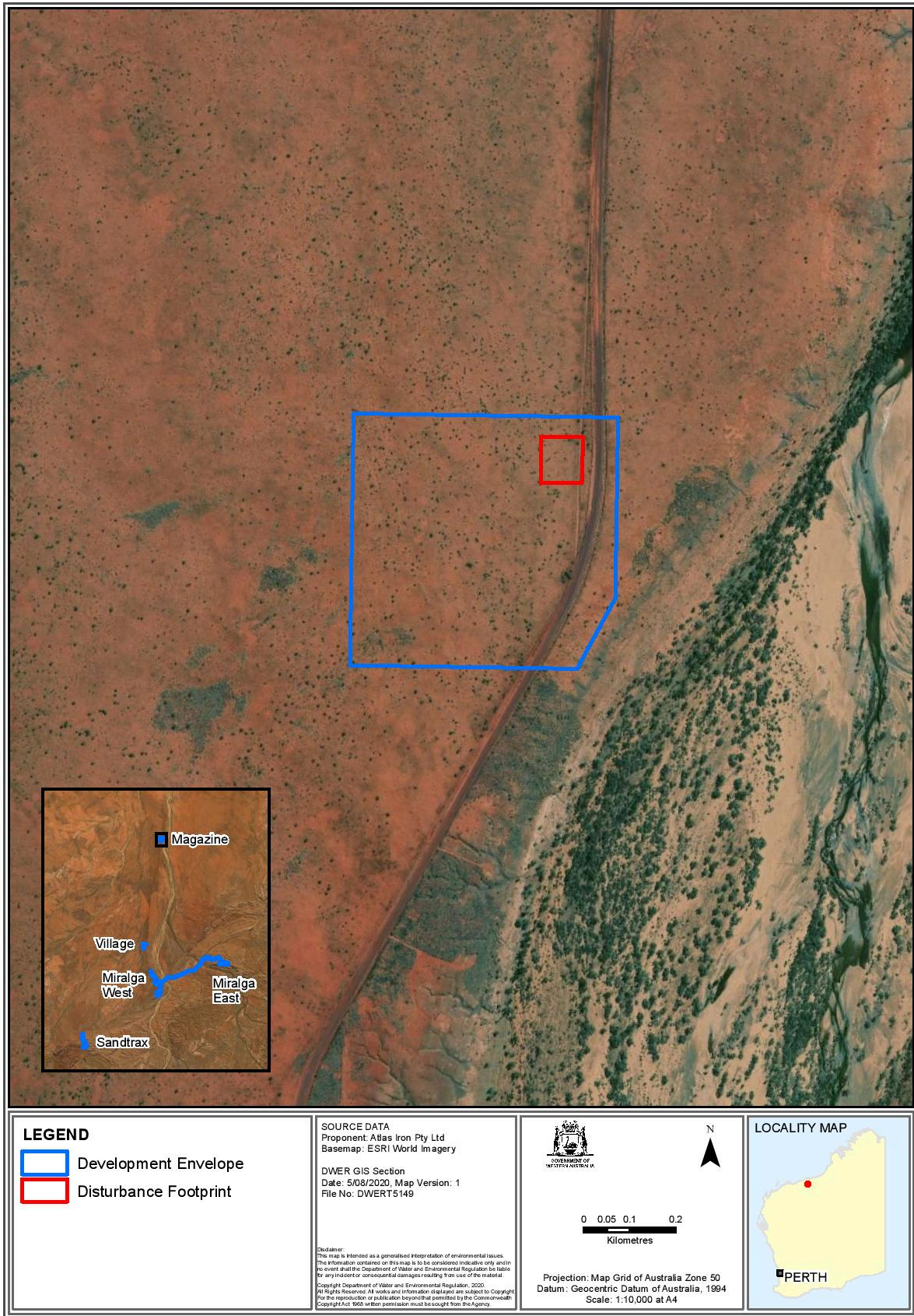
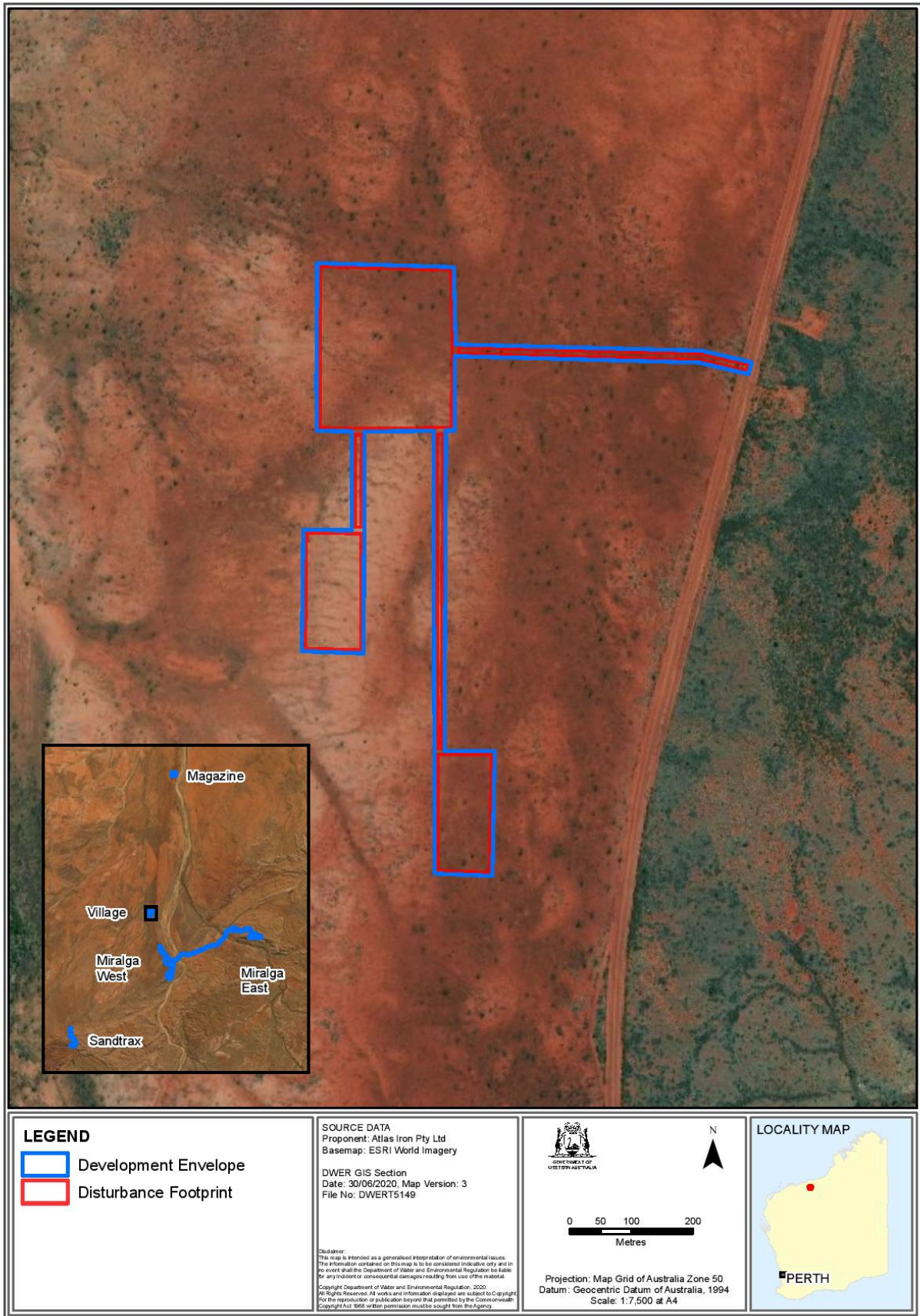


Figure 7: Magazine – Development envelope and indicative disturbance footprint



S:\Projects\EA\63812020_DWERT270670_MiralgaCreek DirectShipping Ore DSO Project\3_Assessment\MiralgaCreek_DWERT270670_Figure12_Village_V03.mxd

Unique Record ID:

Figure 8: Accommodation camp and associated infrastructure – Development envelope and indicative disturbance footprint

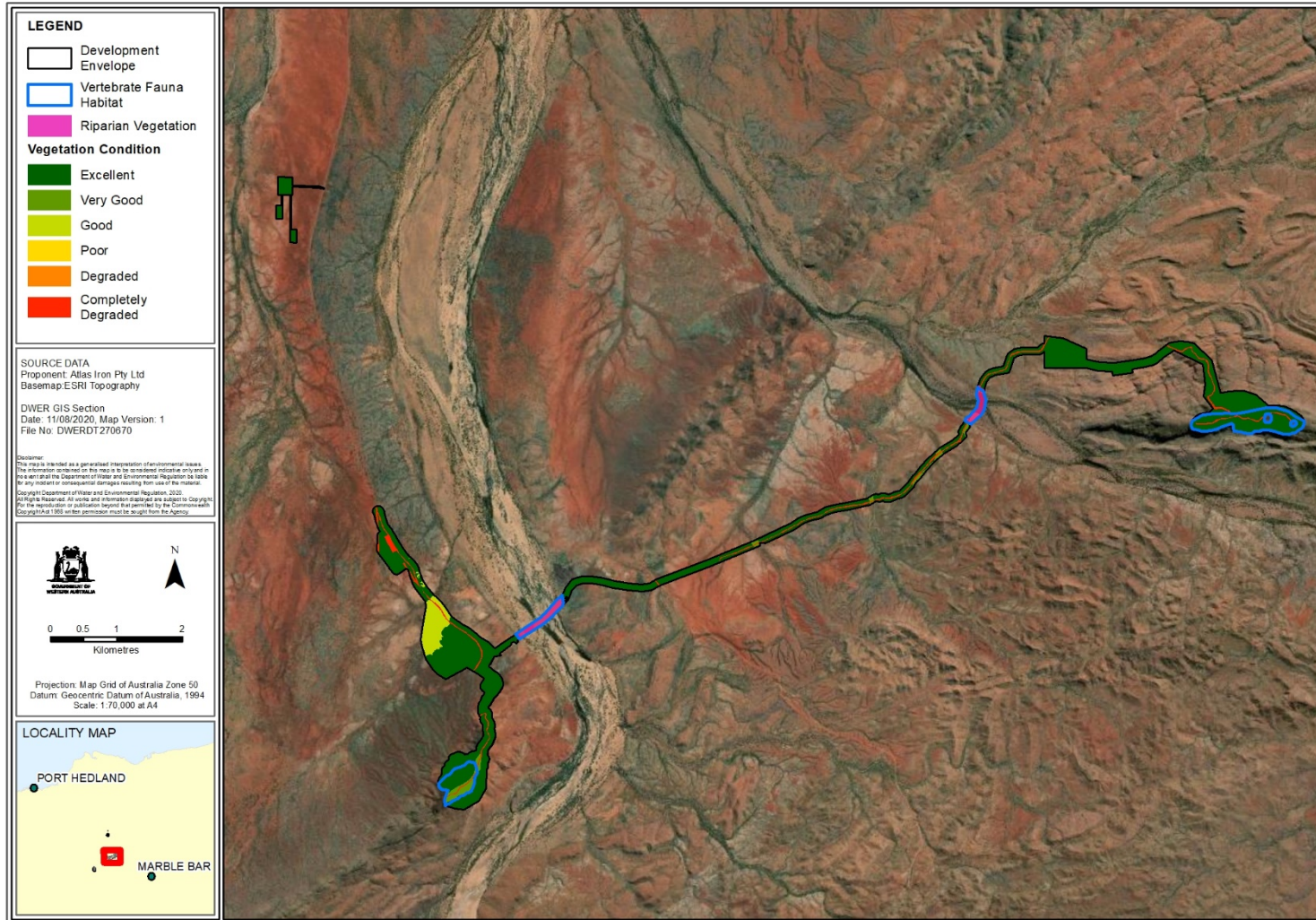


Figure 9: Miralga West, Miralga East and accommodation camp – Good to Excellent Condition Vegetation in the Chichester Sub-region, Riparian Vegetation and Critical Habitat for the northern quoll and bats

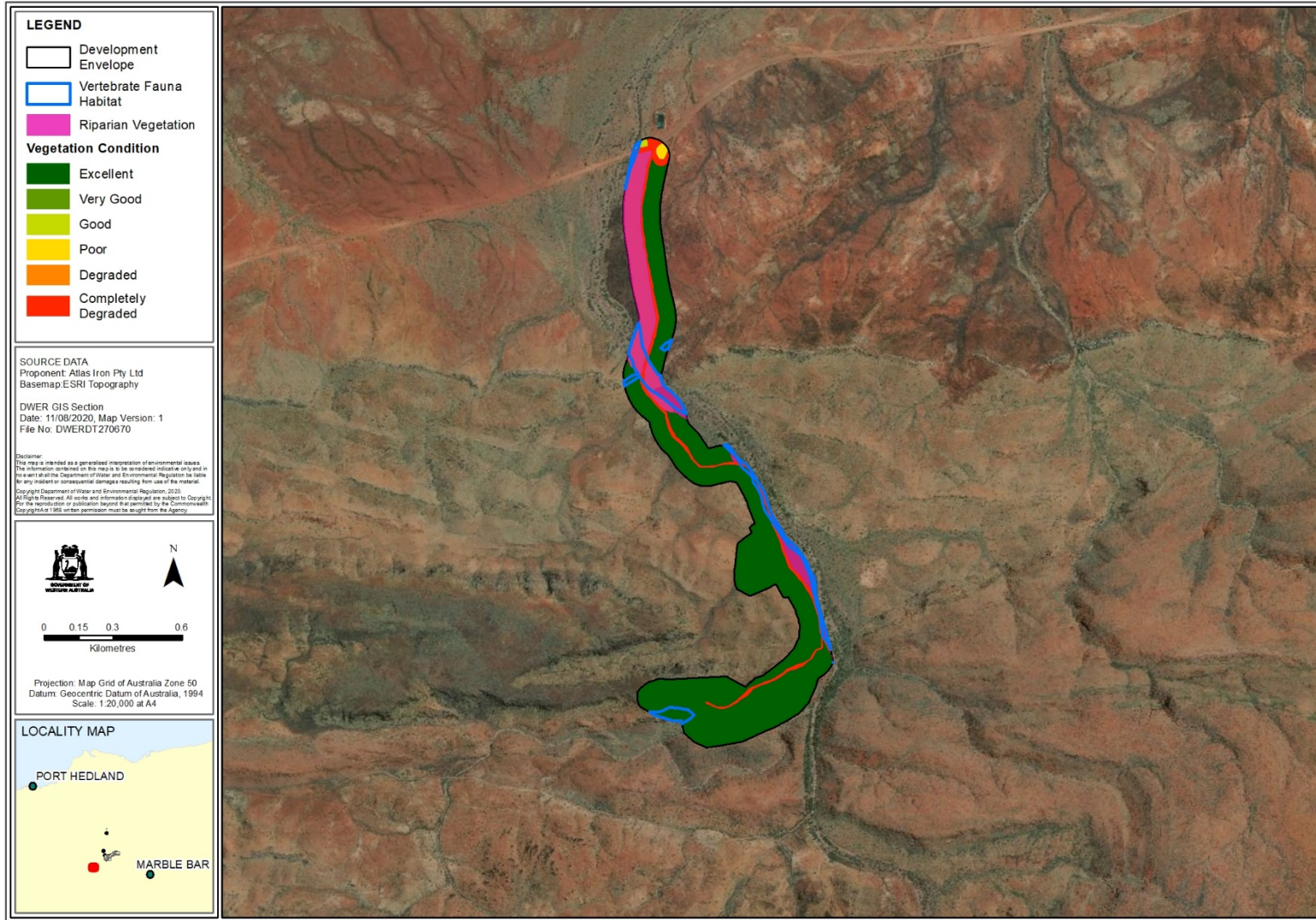


Figure 10: Sandtrax – Good to Excellent Condition Vegetation in the Chichester Sub-region, Riparian Vegetation and Critical Habitat for the northern quoll and bats

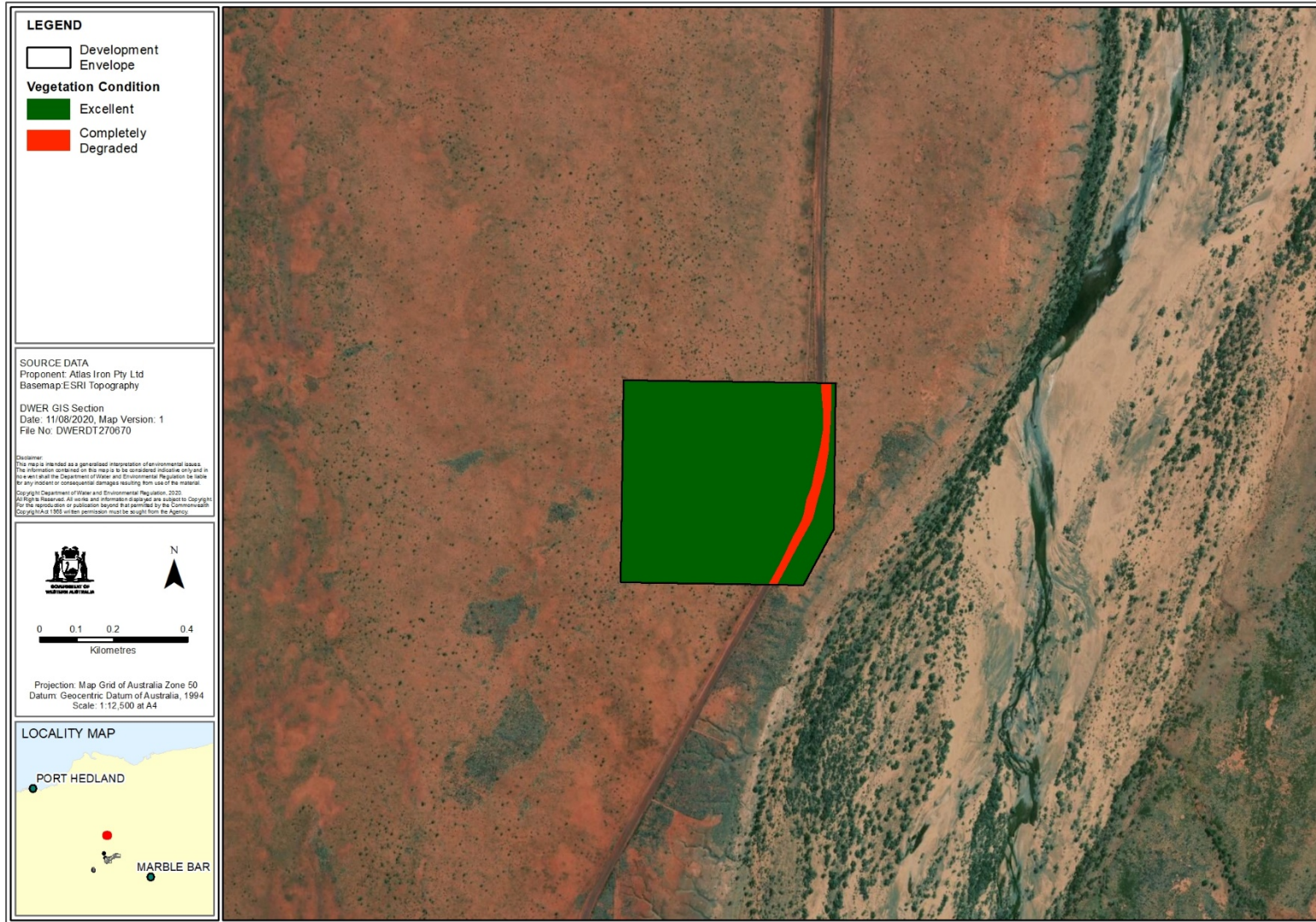


Figure 11: Magazine – Good to Excellent Condition Vegetation in the Chichester Sub-region, Riparian Vegetation and Critical Habitat for the northern quoll and bats

Schedule 2

Coordinates defining the areas shown in Figures 2 - 8 are held by the Department of Water Environmental Regulation, under reference numbers DWERDT300925.

All coordinates are in metres, listed in Map Grid of Australia Zone 50 (MGA Zone 50), datum of Geocentric Datum of Australia 1994 (GDA94).