# FI Joint Venture Pty. Ltd.

## Yogi - Magnetite Project

## Environmental Scoping Document

April 2019

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# 1. Introduction

## 1.1 Purpose of this document

The purpose of the Environmental Scoping Document (ESD) is to define the form, content, timing and procedure of the environmental review, required under s 40(3) of the *Environmental Protection Act 1986* (EP Act). FI Joint Venture Pty Ltd (FIJV) has prepared this ESD according to the procedures outlined in the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual* (EPA 2018a, hereafter the Procedures Manual).

## 1.2 Background

FIJV proposes to construct and operate a magnetite iron ore project (Yogi Mine Project, the Proposal) approximately 225 km east-northeast of Geraldton and 15 km northeast of Yalgoo in Mid West, Western Australia (Figure 1).

The Proposal also includes a construction of a magnetite slurry pipeline and a water pipeline to Geraldton Port and a gas supply pipeline from the Dampier to Bunbury Natural Gas Pipeline to the Mine Development Envelope (Figure 2).

On 19 December 2017 the Yogi Mine Project was referred to the Environmental Protection Authority (EPA) under s 38 of the EP Act. The EPA determined on 26 February 2018 that the Proposal requires a Public Environmental Review (PER) level of assessment with a six-week public review period. The EPA identified that the proponent is required to prepare an Environmental Scoping Document (ESD, this document), which is then to be peer reviewed.

The Preliminary Key Environmental Factors identified by the EPA at the referral stage are Flora and Vegetation, Subterranean Fauna, Terrestrial Environmental Quality, Terrestrial Fauna, Hydrological Processes, Inland Waters Environmental Quality, Air Quality and Social Surroundings.

## 1.3 Form

The EPA requires that the form of the report on the environmental review required under s 40 of (Environmental Review Document) is completed according to the *Environmental Review Document Template.*

## 1.4 Content

The EPA requires the environmental review to include the content outlined in Sections 2 to 6 of this document.

## 1.5 Timing

Table 1 sets out the timeline for the assessment of the Proposal agreed between the EPA and the proponent.

Table 1 Assessment timelines

| Key assessment milestones | Completion date |
|---|---|
| EPA approves Environmental Scoping Document | April 2019 |
| Proponent submits first draft Environmental Review Document | May 2019 |
| EPA provides comment on first draft Environmental Review Document | June 2019 |
| EPA authorises release of Environmental Review Document for public review for 6 weeks | July 2019 |
| Close of public review period | September 2019 |
| EPA provides Summary of Submissions | October 2019 |
| Proponent provides Response to Submissions | October 2019 |
| EPA reviews the Response to Submissions | November 2019 |
| EPA prepares draft assessment report and completes assessment | February 2020 |
| EPA finalises assessment report (including two weeks consultation) and gives report to Minister. | April 2020 |

## 1.6 Procedure

The EPA requires the Proponent to undertake the environmental review according to the procedures in the Procedure Manual. The EPA determined that this ESD is not required to be released for public review. The ESD will be available on the EPA website (www.epa.wa.gov.au) following approval by the EPA.

## 1.7 Assessment as accredited assessment

The Proposal has been referred to the Australian Government Department of Environment and Energy (DoEE) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Proposal was referred on 1 February 2018 under the *Environment Protection and Conservation Act 1999* (EPBC Act) and determined a controlled action on 20 April 2018.

The proponent has requested that the EPA assess the Proposal as an accredited assessment under section 45 of the EPBC Act between the Government of Western Australia (GoWA) and the Commonwealth. The relevant matters of national environmental significance (MNES) for this Proposal are Listed Threatened Species and Communities.

This ESD includes works required to be undertaken and reported on in the ERD document for Listed Threatened Species and Communities. Potential impacts of this Proposal on these Listed Threatened Species and Communities are addressed in Table 4, Table 8 and Table 9.

The ERD will include a separate section which will address the matters in Schedule 4 of the *Environment Protection and Biodiversity Conservation Regulations 2000*, and summarises the potential impacts on MNES and describes, to the extent practicable, any feasible alternatives to the proposed action and possible mitigation measures. Proposed offsets to address significant residual impacts on MNES will also to be discussed.

## 1.8 Peer review

This ESD is required to be peer-reviewed. The outcome of the peer review process is summarised in Appendix A.

# 2. The Proposal

## 2.1 Proposal description

FIJV proposes to develop the Yogi Mine Project (the Proposal). The Proposal is located approximately 225 km north-east of Geraldton and 15 km north-east of Yalgoo, within the Shire of Yalgoo, in the Mid-West Region of Western Australia.

The Proposal involves the construction of an iron magnetite mine and associated mining infrastructure with a total Proposal Footprint of 3100 ha within a 9410 ha Mine Development Envelope (as show in Figure 1).

The Proposal also includes a construction of a magnetite slurry pipeline and a return water pipeline to Geraldton Port and a gas supply pipeline from the Dampier to Bunbury Natural Gas Pipeline to the Mine Development Envelope. The pipeline corridor will require a total area of native vegetation clearing of no more than 600 ha within a 75,800.5 ha Pipeline Development Envelope (as shown in Figure 2).

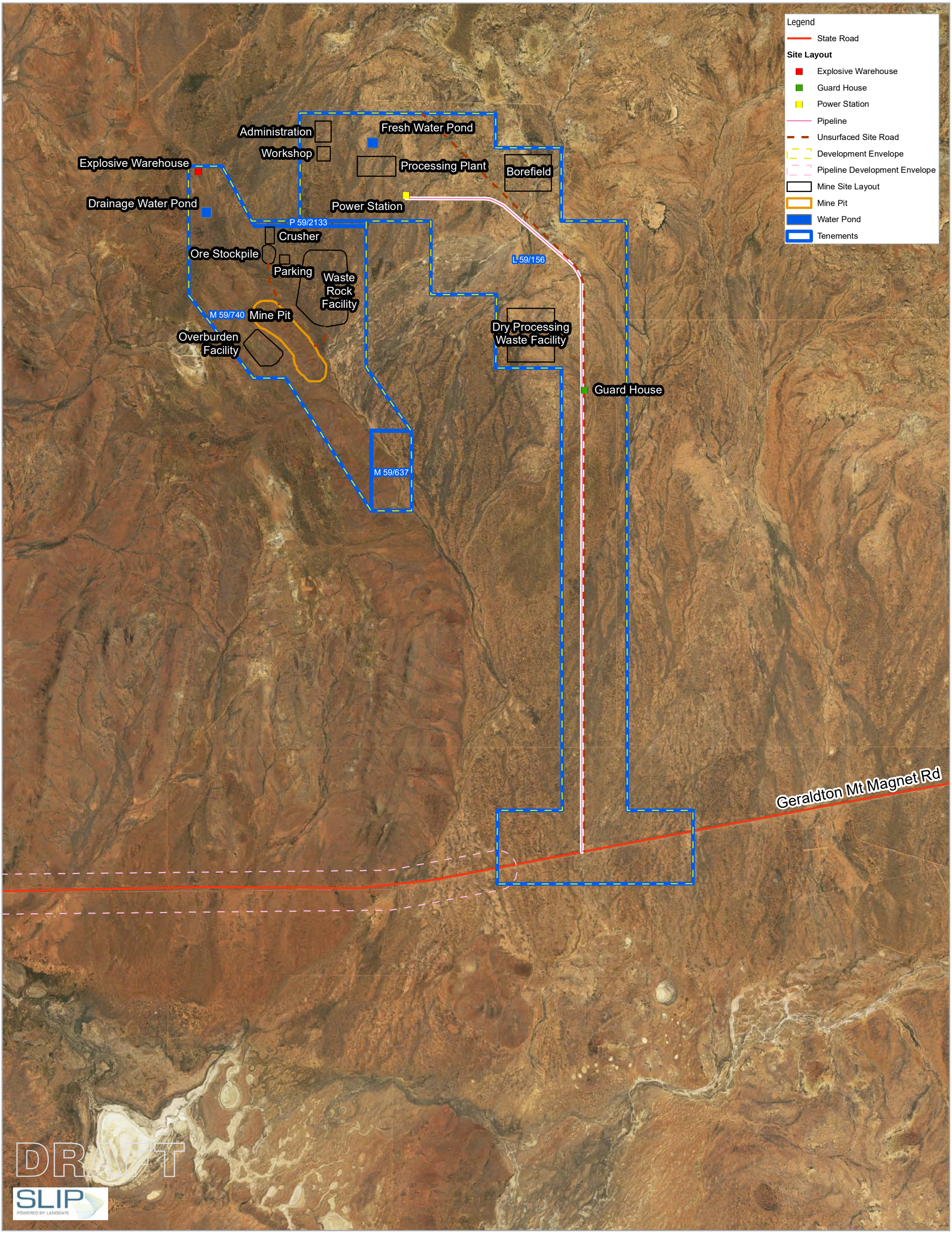
The key characteristics of this Proposal are detailed in Table 2 and Table 3.

Table 2 Summary of the Proposal

| Proposal title | Yogi Mine Project |
|---|---|
| Proponent name | FI Joint Venture Pty Ltd |
| Short description | **Yogi Mine**<br>The Proposal is to construct and operate an open-cut mine referred to as the Yogi Mine Project and will include construction of all relevant mining infrastructure (such as haul roads, processing plant, processing waste containment facility, run mine pad, crusher, electricity generation, fuel storage site, treated ore stockpile pad, crusher, explosive warehouse and general onsite buildings).<br>Mining of magnetite will occur below groundwater and will include open cut mine operation. The operation will involve clearing and topsoil stockpiling, overburden drilling and blasting, followed by removal of material by truck.<br><br>**Pipeline corridor**<br>The Proposal also includes construction of a pipeline corridor for a slurry pipeline, water pipeline and gas pipeline.<br>The gas pipeline will supply gas from the Dampier to Bunbury Gas Pipeline Network to the Yogi Mine.<br>The slurry and water pipeline will extend from the Mid West Ports to the Yogi Mine. The water pipeline will supply water from the Port Dewatering Plant to the Yogi mine for re-use in the processing plant. |

Table 3 Location and proposed extent of physical and operational elements

| Element | Location | Proposed extent |
|---|---|---|
| **Physical elements** | | |
| Mine Pits | Figure 1 | Clearing of no more than 200 ha within the 9410 ha Mine Development Envelope |
| Mining Overburden and Waste Facilities | Figure 1 | Clearing of no more than 400 ha within the 9410 ha Mine Development Envelope |
| Processing Waste Contaminant Facility | Figure 1 | Clearing of no more than 500 ha within the 9410 ha Mine Development Envelope |
| Mine and Processing Support Infrastructure | Figure 1 | Clearing of no more than 2000 ha within the 9410 ha Mine Development Envelope. (including: internal site roads, electricity generation and reticulation, fuel storage sites, stockpiles and conveyors, crusher, processing plant, explosives warehouse, onsite buildings such as offices, storage, guard house, workshops and accommodation, sewage treatment facilities, landfill, water supply/monitoring bores, equipment parking and laydown areas, ponds (fresh, recycle and drainage), slurry pipeline and gas pipeline. |
| Magnetite Slurry Pipeline, Water Pipeline and Gas Pipeline | Figure 2 | Clearing of no more than 600 ha within the 75,800.5 ha Pipeline Development Envelope. |
| **Operational elements** | | |
| Groundwater Abstraction | Figure 1 | Up to 5 gigalitres per annum (GLpa) from water supply borefield |
| Mine Site Dewatering | Figure 1 | Up to 5 GLpa (to be used for processing) |
| Power Supply | Figure 1 | 70 MW to be supplied by on-site Gas Power Station |
| Gas Supply | Figure 2 | Gas supply via underground steel pipeline |
| Overburden/Waste Rock | Figure 1 | Disposal of up to 800 million tonnes (life of mine) |
| Ore Processing Waste Disposal | Figure 1 | Disposal of up to 40 million cubic metres ($m^3$) of wet processing waste.<br>Disposal of up to 80 $m^3$ of dry processing waste (life of mine). |




Paper Size ISO A3

0 0.5 1 1.5 2

Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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FI Joint Venture Pty Ltd
Yogi-Magnetite Project

Mine Site

Project No. 61-37117
Revision No. A
Date 01 Aug 2018

FIGURE 1

G:\61\37117\GIS\Maps\Working\Yogi Mine\6137117_001_MineSite_revA.mxd
Print date: 01 Aug 2018 - 17:20

Data source: MRWA: State Roads - 20171024; FIJV: Mine Tenements, Mine Site Layout, Development Envelope, Pipeline Development Envelope - 20171025; Landgate: Imagery. Created by: artermulo

Legend

- City
- Local Road
- State Road
- Railways
- Yogi Mine Project Area
- Pipeline Corridor (Approx. Location)
- Pipeline Development Envelope (Approx. Location)

**DBCA Managed Lands and Waters**

- Conservation Park
- Nature Reserve
- Section 5(1)(h) Reserve
- Timber Reserve

Ogilvie Nature Reserve
Wandana Nature Reserve
Urawa Nature Reserve
Weirmonger Nature Reserve
McGauran Nature Reserve
Bella Vista Nature Reserve
Oakajee Nature Reserve
The Forty Four Mile Nature Reserve
Kockatea Nature Reserve
Erangy Spring Nature Reserve
Canna Nature Reserve
Wongoondy Nature Reserve
Burma Road Nature Reserve
Coalseam Conservation Park

NORTHAMPTON
MULLEWA
DRUMMOND COVE
GERALDTON
MINGENEW
DONGARA

Elphick Rd
Wickens Rd
Dartmoor - Lake Nerramyne Rd
Camarvon - Mullewa Rd
Woolgorong - Yuin Rd
Tardie - Yuin Rd
Gabyon - Tardie Rd
Yalgoo North Rd
Dalgaranga Rd
Balla - Whelarra Rd
Reynolds Rd
Dartmoor Rd
East Dartmoor Rd
Ogilvie East Rd
Chilhnony Rd
Wundi Rd
Blue Well Rd
Nolba Rd
Elliott Rd
Murrays L
Wandana Rd
Coonawa Rd
Wandin Rd
Nubberoo Rd
Urawa Rd
Beringarra - Pindar Rd
Gabyon - Pindathuna Rd
Noongal Rd
Morcom
East Bowes Rd
Teakle Rd
Hatch Rd
Rose St
Marrah Rd
East Nabawa
Yuna - Tenindewa Rd
Byron North Rd
Ullrich's L
Tiley Rd
Fegan Rd
Geraldton - Mt Magnet Rd
Barmong - Wuraga Rd
Badja Woolshed Rd
Morawa - Yalgoo Rd
Bunnawarra Rd
Badja Rd
Yalgoo - Ninghan Rd
Indialla Rd
Durawah Rd
Station Rd
Baugh Rd
Bone Rd
Peter Rd
Nunguiya Rd
Pindar Rd
Tardun
Barrabarra Rd
Dean Rd
Kelly Rd
Simon Rd
Grima Rd
Jenkins Rd
Sullivan Rd
Mindage Spring Rd
Wilroy Kockatea Rd
Valentine Rd
Eradu North Rd
Eradu South Rd
Yangetup Rd
Giles Rd
Fairfax Dr
Casuarinas Rd
Moore Rd
Eves Rd
Ardingly South Rd
Freeman Rd
Wongoondy - Tardun Rd
Pallotine Rd
Gerber Rd
Antinoka Rd
Minnenooka Rd
Ellendale Rd
Mill Rd
Fabling Rd
Kowald Rd
Wubin Mullewa Rd
Sts Rd
Mickie Rd
Indar Rd
Nanekine Rd
Gutha East Rd
Bore Rd
Tasefin Rd
Ludlow Rd
Kadji Rd
Kadji Lake Rd
Pintharuka West Rd
White Rd
Bell Rd
Moffet Rd
Mingenew
Midlands
Wicks Rd
Milo Rd
Mooriary Rd
School Rd
Pinchers Rd
Tabletop Rd
Allanooka Springs Rd
Mt Horner West Rd
Bookara East Rd
Burma Rd
Erangy Spring Rd
Depot Hill Rd
Byro Rd
Coalseam Rd
Michael Rd
Walkaway - Nangetty Rd
Geraldton - Walkaway
Phelps Rd
Arthur Rd
Brand Hwy
Ceralton

SLIP

Paper Size ISO A3
0 2 4 6 8 10
Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 50

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FI Joint Venture Pty Ltd
Yogi-Magnetite Project

Pipeline Route

Project No. 61-37117
Revision No. 0
Date 23 Aug 2018

FIGURE 2

G:\61\37117\GIS\Maps\Working\Pipeline\6137117_002_PipelineRoute_rev0.mxd
Print date: 23 Aug 2018 - 09:15

Data source: GHD: Pipeline Development Envelope, Pipeline Corridor; DBCA: Managed Lands and Waters - 20170730; Landgate: Cadastre - 20180709, Imagery - Accessed 20180705. Created by: artermulo

# 3. Preliminary Key Environmental Factors and required work

The EPA identified the following eight Preliminary Key Environmental factors to be included in the ESD:

- Flora and Vegetation
- Subterranean Fauna
- Terrestrial Environmental Quality
- Terrestrial Fauna
- Hydrological Processes
- Inland Waters Environmental Quality
- Air Quality
- Social Surroundings

Subsequent to the EPA Level of Assessment decision and identification of Preliminary Key Environmental Factors, the EPA consolidated Hydrological Processes and Inland Waters Environmental Quality into Inland Waters. To ensure consistency with current guidance this ESD has been structured to include only Inland Waters. The consolidation of the two Preliminary Key Environmental Factors into one factor does not change the scope or amount of work required in the assessment.

In addition to the above, Landforms have also been considered as the Proposal will involve mining a Banded Iron Formation (BIF) range. While the location of the mine is not subject to extensive existing mining projects, based on anticipated community interest in BIF ranges a decision has been made by the Proponent to include an assessment of impacts to landforms for completeness.

For each of the Preliminary Key Environmental Factors (Sections 3.1 to 3.8) the following are identified; EPA objective, relevant activities, potential risk and impacts likely to be pertinent to this assessment, as well as the work required.

## 3.1 Flora and Vegetation

### Table 4 Flora and Vegetation

| Flora and Vegetation | |
|---|---|
| EPA objective | *To protect flora and vegetation so that biological diversity and ecological integrity are maintained.*<br>For the purposes of the EIA, EPA defines flora as native vascular plants and vegetation as groupings of different flora patterned across the landscape. |
| Relevant activities | • Clearing of native vegetation for mine, pipelines and infrastructure<br>• Construction and mining operation activities<br>• Construction of pipelines<br>• Groundwater abstraction<br>• Closure and decommissioning |

| | |
|---|---|
| Potential impacts and risks | • Direct clearing of flora and vegetation during mining and pipeline construction activities<br>• Indirect impacts on flora and vegetation from:<br>– Dust generation during construction and operations<br>– Introduction and spread of environmental weeds<br>– Increased edge effect<br>– Habitat loss and fragmentation from vegetation clearing<br>– Alteration of fire regimes<br>– Decline of species abundance and diversity<br>– Alteration to surface and groundwater flows and quality |
| Required work | **Yogi Mine Project**<br>1. Historical reports and government databases will be reviewed to identify the environmental values and potential issues that may be present to refine survey design.<br>2. Flora and vegetation will be identified and characterised in accordance with the standards of Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA, December 2016a). The detailed survey will take into account areas that are likely to be directly or indirectly impacted as a result of the Proposal. Survey will include:<br>a. Desktop assessment of relevant databases.<br>If the desktop study indicates there is inadequate local and regional context, a detailed survey may be necessary beyond the proposal area<br>b. Targeted significant flora searches within the Development Envelope<br>c. Delineation of vegetation units<br>d. Assessment of significant flora habitat and significant ecological communities<br>e. Assessment of vegetation condition<br>f. Opportunistic searches for introduced flora<br>g. Mapping vegetation units, condition and significant flora, landforms, introduced flora species.<br>3. Figure (s) will be provided showing the extent of flora and vegetation in relation to the Proposal and distribution of flora and vegetation.<br>4. The extent of potential direct, indirect and cumulative risks and impacts as a result of implementation of the Proposal will be described, quantified and assessed during both construction, operations and closure to flora and vegetation, taking into consideration the significance of flora and habitat. This will include noting whether these impacts are unknown, unpredictable or irreversible, or combination or contrary to that thereof. Tables will be provided quantifying direct, indirect and cumulative |

| | |
|---|---|
| | impacts, including relative proportion of the local and regional occurrence of significant flora and vegetation. Reporting of significant species should include quantum of individuals and populations.<br>5. The residual impacts of the Proposal on flora and vegetation will be quantified after considering and applying avoidance and minimisation, and through applying the Residual Impact Significance Model and WA Offset Template in the *WA Environmental Offsets Guidelines* (GoWA 2014), and the Environmental Offsets Policy (DSEWPC 2012) as appropriate.<br>6. An environmental management plan will be provided to address significant residual impacts to flora and vegetation. The following will be addressed in the plan:<br>a. Invasive species control - control of weeds, in particular through construction of infrastructure, transport and/or entry and exit points, riparian and GDE areas, vegetation units considered to have high local significance (e.g. locally rare units, habitat for conservation significant species) and in areas identified as in 'Excellent condition'.<br>b. Monitoring program - to monitor the significant flora and vegetation communities identified.<br>c. Management program - develop adaptive management actions to be triggered should monitoring show a decline as a result of implementing the Proposal.<br>d. Management of offset (if applicable).<br>7. Determine the extent and degree of any significant residual impacts on the identified environmental values by applying the Residual Impact Significance Model (page 11) and WA Offset Template (Appendix 1) in the WA Environmental Offsets Guidelines (GoWA 2014). Spatial data will be provided defining the area of significant residual impacts.<br>8. Where significant residual impacts remain, an appropriate offsets package will be proposed, consistent with the WA Environmental Offsets Policy and Guidelines and where residual impacts relate to EPBC Act-listed threatened species and Communities the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* and Commonwealth Assessment guide. Spatial data will be provided defining the area of significant residual impacts.<br>9. Prepare a mine closure plan consistent with the Department of Mines, Industrial Regulation and Safety (DMIRS) and EPA Guidelines.<br>10. The ERD will demonstrate and document how the EPA's objective for this factor can be met and how proposed offsets are consistent with the EPBC Act. |
| | **Pipeline corridor** |

11. Historical reports and government databases will be reviewed to identify the environmental values and potential issues that may be present to refine survey design.
12. Conduct a targeted reconnaissance flora and vegetation survey in accordance with EPA Technical guidance - Flora and Vegetation Survey (EPA 2016a).
13. Figure (s) will be provided showing the extent of flora and vegetation in relation to the Proposal and distribution of flora and vegetation.
14. The extent of potential direct, indirect and cumulative risk and impacts as a result of implementation of the Proposal will be described and assessed during both construction, operations and closure to flora and vegetation, taking into consideration the significance of flora and habitat. This will include noting whether these impacts are unknown, unpredictable or irreversible, or combination or contrary to that thereof.
15. The residual impacts from the Proposal will be predicted on flora and vegetation after considering and applying avoidance and minimisation actions.
16. The extent and degree of any significant residual impacts will be determined on the identified environmental values by applying the Residual Impact Significance Model (page 11) and WA Offset Template (Appendix 1) in the WA Environmental Offsets Guidelines (GoWA 2014). Spatial data will be provided defining the area of significant residual impacts.
17. Where significant residual impacts remain, an appropriate offsets package will be proposed, consistent with the WA Environmental Offsets Policy and Guidelines and where residual impacts relate to EPBC Act-listed threatened species and Communities the EPBC Act *Environmental Offsets Policy*. Spatial data will be provided defining the area of significant residual impacts.
18. Management measures for the Proposal will be identified to ensure residual impacts to flora and vegetation are not greater than predicted.
19. An environmental management and rehabilitation plan will be prepared for the pipeline corridor to address significant residual impacts to flora and vegetation. The following will be addressed in the plan:
    a. Invasive species control - control of weeds, in particular through construction of infrastructure, transport and/or entry and exit points, riparian and GDE areas, vegetation units considered to have high local significance (e.g. rare units, habitat for conservation significant species) and in areas identified as in 'Excellent condition'.
    b. Management of offset (if applicable).

| | |
|---|---|
| | 20. The ERD will demonstrate and document how the EPA's objective for this factor can be met and how proposed offsets are consistent with the EPBC Act. |
| Relevant policy and guidance | **EPA Policy and Guidance**<br>*Statement of Environmental Principles, Factors and Objectives* (EPA 2018b)<br>*Instructions on how to prepare an Environmental Review Document,* (EPA 2016b)<br>*Environmental Factor Guideline Flora and Vegetation* (EPA 2016c)<br>*Technical Guidance Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016a)<br>**Other policy and guidance**<br>DBCA (2006) *Recommended Interim Protocol for Flora Surveys of Banded Ironstone Formations of the Yilgarn Craton*. Unpublished. Department of Environment and Conservation, Perth, Western Australia.<br>*WA Environmental Offsets Policy* (GoWA 2011)<br>*WA Environmental Offsets Guidelines* (GoWA 2014)<br>*Environmental Offsets Policy,* Department of Sustainability, Environment, Water, Population and Communities (DSEWPC 2012).<br>*Eucalypt Woodlands of the Western Australian Wheatbelt – a nationally protected ecological community* (DotEE 2016)<br>Relevant recovery plans, conservation advices and/or threat abatement plans for conservation significant species that are known to occur, or a likely to occur within vicinity of the Proposal. |

## 3.2 Landforms

### Table 5 Landforms

| Landforms | |
|---|---|
| EPA objective | *To maintain the variety and integrity of distinctive physical landforms so that environmental values are protected.*<br>For the purposes of the EIA, EPA defines landform as a distinctive, recognisable physical feature of the earth's surface having characteristic shape produced by natural processes. A landform includes a cliff or dune or dune field. |
| Relevant activities | • Mining activities (i.e. excavation or blasting), construction and earthworks |
| Potential impacts and risks | • Alteration to landform structure (either temporary or permanent)<br>• Alteration to ecological function of the landform (either temporary or permanent)<br>• Impacts on environmental values of the landform (either temporary or permanent) |
| Required work | **Yogi Mine Project**<br>21. The geology and morphology of the Yalgoo BIF will be described.<br>22. The cumulative impacts on landforms from the Proposal in the vicinity of the Development Envelope will be assessed. This will include noting whether these impacts are unknown, unpredictable or irreversible, or combination or contrary to that thereof. |

| | |
|---|---|
| | 23. An environmental management plan will be prepared that describes the proposed management, and monitoring methods to be implemented to mitigate potential impacts to landforms.<br>24. The residual impacts on landforms for direct, indirect and cumulative impacts will be quantified, after considering avoidance and minimisation measures, and through applying the Residual Impact Significance Model and WA Offset Template in the *WA Environmental Offsets Guidelines* (GoWA 2014), and the Environmental Offsets Policy (DSEWPC 2012) as appropriate..<br>25. A mine closure plan will be prepared, consistent with the DMIRS and EPA Guidelines.<br>26. The ERD will demonstrate and document how the EPA's objective for this factor can be met. |
| Relevant policy and guidance | **EPA Policy and Guidance**<br>*Statement of Environmental Principles, Factors and Objectives* (EPA 2018b)<br>*Instructions on how to prepare an Environmental Review Document,* (EPA 2016b)<br>*Environmental Factor Guideline Landforms* (EPA 2016d)<br>**Other policy and guidance**<br>*WA Environmental Offsets Guidelines* (GoWA 2014)<br>*WA Environmental Offsets Policy* (GoWA 2011). |

## 3.3 Subterranean fauna

### Table 6 Subterranean fauna

| Subterranean Fauna | |
|---|---|
| EPA objective | *To protect subterranean fauna so that biological diversity and ecological integrity are maintained.*<br>For the purposes of EIA, the EPA defines subterranean fauna as animals living their entire lives below the surface of the earth. These include stygofauna and troglofauna. |
| Relevant activities | • Construction and mining operation activities<br>• Clearing of native vegetation<br>• Groundwater abstraction<br>• Closure and decommissioning |
| Potential impacts and risks | • Loss or degradation of habitat or species population from construction and operations<br>• Impacts to subterranean fauna from:<br>– Abstraction of groundwater<br>– Changes to hydrological regimes and water quality<br>– Groundwater contamination<br>– Loss of food/nutrient sources |

| | |
|---|---|
| Required work | **Yogi Mine Project**<br>27. A desktop study will be undertaken to document the regional context of the subterranean fauna of the Proposal area including, but not limited to, existing regional subterranean fauna surveys, and assessment of the likely presence and characteristics of subterranean fauna habitat.<br>28. A Level 2 survey will be conducted inside and outside areas subject to direct and indirect impacts, in accordance with EPA Environmental Factor Guideline - Subterranean Fauna (EPA 2016e), Technical Guidance - Subterranean Fauna Survey (2016) and Technical Guidance - Sampling Methods for Subterranean Fauna (EPA 2016f).<br>29. The results of the relevant subterranean fauna survey will include mapping of the distributions of species in relation to the proposed disturbance (including groundwater drawdown), and of the geology or hydrology predicted to support subterranean fauna habitats (including its extent outside the Development Envelope).<br>30. Habitat prospectively will be discussed to demonstrate habitat connectivity within and outside the proposed disturbance area.<br>31. Figure(s) will be provided showing the extent of subterranean fauna habitat in relation to the Proposal and species distribution.<br>32. The extent of direct, indirect and cumulative impacts as a result of implementation of the Proposal will be described and assessed during both construction and operations to subterranean fauna, taking into consideration the significance of subterranean fauna and subterranean fauna habitat. This will include noting whether these impacts are unknown, unpredictable or irreversible, or combination or contrary to that thereof.<br>33. The residual impacts to subterranean fauna in regards to relevant impacts from the Proposal will be quantified, after considering avoidance and minimisation measures, and through applying the Residual Impact Significance Model and WA Offset Template in the *WA Environmental Offsets Guidelines* (GoWA 2014), and the Environmental Offsets Policy (DSEWPC 2012) as appropriate..<br>34. Management measures for the Proposal will be identified to ensure residual impacts to subterranean fauna are not greater than predicted.<br>35. The significance of any significant residual impacts on the identified environmental values will be determined by applying the Residual Impact Significance Model (page 11) and WA Offset Template (Appendix 1) in the WA Environmental Offsets Guidelines (GoWA 2014). Spatial data will be provided defining the area of significant residual impacts.<br>36. Where significant residual impacts remain, and relate to MNES, an appropriate offsets package will be provided, consistent with WA Environmental Offsets Policy and Guidelines and the *Environment Protection and Biodiversity Conservation Act 1999* |

| | |
|---|---|
| | Environmental Offsets Policy and . Spatial data will be provided defining the area of significant residual impacts.<br>37. The ERD will demonstrate and document how the EPA's objective for this factor can be met. |
| Relevant policy and guidance | **EPA Policy and Guidance**<br>*Statement of Environmental Principles, Factors and Objectives* (EPA 2018b)<br>*Instructions on how to prepare an Environmental Review Document,* (EPA 2016b)<br>*Environmental Factor Guideline Subterranean Fauna* (EPA 2016e)<br>*Technical Guidance Terrestrial Subterranean Fauna Surveys* (EPA 2016f)<br>*Technical Guidance: Sampling of short range endemic invertebrate fauna* (EPA, 2016k)<br>**Other policy and guidance**<br>*WA Environmental Offsets Guidelines* (GoWA 2014)<br>*WA Environmental Offsets Policy* (GoWA 2011)<br>*Environmental Offsets Policy,* Department of Sustainability, Environment, Water, Population and Communities (DSEWPC 2012). |

## 3.4 Terrestrial Environmental Quality

### Table 7 Terrestrial Environmental Quality

| Terrestrial Environmental Quality | |
|---|---|
| EPA objective | *To maintain the quality of land and soils so that environmental values are protected.*<br>For the purposes of EIA, the EPA defines the factor 'Terrestrial Environmental Quality' as the chemical, physical, biological and aesthetic characteristics of soils. |
| Relevant activities | • Waste disposal<br>• Storage and handling of contaminants (hydrocarbons)<br>• Construction, mining and operational activities<br>• Closure and decommissioning |
| Potential impacts and risks | • Contamination of soils as a result of Acid and Metalliferous Drainage<br>• Contamination of soils through spillage of reagents, chemicals, hydrocarbons<br>• Soil acidification as a result of disturbance of soil |
| Required work | **Yogi Mine Project**<br>38. Mine plan documentation and information on the geochemical properties of the geology will be reviewed to develop estimates of overburden and waste rock quantities.<br>39. Broad characterisation of overburden and waste rock properties will be provided, in particular acid generating properties will be quantified. The characterisation will be used to identify any specific requirements needed to mitigate potential impacts associated with overburden and waste rock storage. If acid generating properties are detected, additional characterisation of |

| | |
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| | the overburden and waste rock will be completed to assess potential reactivity and buffering capacity.<br>40. Chemical and diesel storage, and power generation and management measures, including contingencies in the event of a spill, will be provided to ensure that contamination of land does not occur.<br>41. An environmental management plan will be prepared to address significant residual impacts to Terrestrial Environmental Quality that describes the proposed management, monitoring and mitigation methods to be implemented demonstrating that the design of the Proposal has addressed the mitigation hierarchy in relation to impacts (direct and indirect) on soils/lands/receiving environment. This description will contain recommendations for soil handling to minimise erosion of stockpiled soils.<br>42. The residual impacts on terrestrial environmental quality for direct, indirect and cumulative impacts will be quantified, after considering avoidance and minimisation measures after considering avoidance and minimisation measures. This will include noting whether these impacts are unknown, unpredictable or irreversible, or combination or contrary to that thereof.<br>43. A mine closure plan will be prepared, consistent with the DMIRS and EPA Guidelines.<br>44. The ERD will demonstrate and document in how the EPA's objective for this factor can be met. |
| Relevant policy and guidance | **EPA Policy and Guidance**<br>*Statement of Environmental Principles, Factors and Objectives* (EPA 2018b)<br>*Instructions on how to prepare an Environmental Review Document,* (EPA 2016b)<br>*Environmental Factor Guideline Terrestrial Environmental Quality* (EPA 2016g)<br>*Guidance Statement 6 – Rehabilitation of Terrestrial Ecosystems (*EPA 2006)<br>**Other policy and guidance**<br>*WA Environmental Offsets Guidelines* (GoWA 2014)<br>*WA Environmental Offsets Policy* (GoWA 2011). |

## 3.5 Terrestrial fauna

### Table 8 Terrestrial fauna

| Terrestrial Fauna | |
|---|---|
| EPA objective | *To protect terrestrial fauna so that biological diversity and ecological integrity are maintained*<br>For the purposes of EIA, the EPA defines terrestrial fauna as animals living on land or using land for all or part of their lives. Terrestrial fauna includes vertebrate and invertebrate groups. |
| Relevant activities | • Clearing of native vegetation for mine, pipelines and infrastructure<br>• Construction and mining operation activities |

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|---|---|
| | • Construction of pipelines<br>• Dust, vibration, noise and lighting<br>• Closure and decommissioning |
| Potential impacts and risks | • Loss of fauna habitat<br>• Displacement and death of fauna<br>• Indirect impacts to fauna habitat as a result of:<br>– Reduction of abundance, genetic diversity and dispersal success of species as a result of habitat fragmentation or patch isolation from clearing<br>– Habitat degradation from introduction and spread of environmental weeds<br>– Alteration of fire regimes<br>– introduction and spread of feral animals resulting in increased competition and predation |
| Required work | **Yogi Mine Project**<br>45. Historical reports and government databases will be reviewed to identify the environmental values and potential issues that may be present to refine survey design, and to characterise the potential terrestrial fauna of the area, identify likely habits and any significant fauna that may be present.<br>46. Conduct a Level 2 fauna surveys over two seasons and one SRE survey in accordance with EPA Technical guidance - Terrestrial Fauna Survey (EPA 2016h) as well as those listed below, survey will include:<br>a. Delineating, describing and assessing fauna habitat quality.<br>b. Opportunistic searches for terrestrial fauna and introduced fauna within and outside the Development Envelope that are known or likely to occupy the Development Envelope.<br>c. Targeted surveys for conservation significant fauna within and in close proximity to the Development Envelope using methods suitable for each species. The requirement for a targeted survey will be based on the desktop assessment and habitats identified during the initial fauna survey.<br>d. Fauna trapping, spot lighting (nocturnal searching), hand foraging (diurnal searching), acoustic surveys, and camera traps.<br>e. Opportunistic searches for introduced fauna.<br>f. Mapping fauna habitat and significant fauna locations and habitat, and introduced fauna.<br>g. Describing the values and significance of fauna and fauna habitat that maybe directly or indirectly affected by the Proposal implementation during both construction and operation activities. |

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| | 47. Matters of National Environmental Significances being assessed as part of the accredited assessment will be specified.<br>48. Figure(s) will be provided illustrating the known recorded locations of conservation significant species, short-range endemic invertebrate species or other significant fauna and fauna habitat in relation to the Proposal.<br>49. The extent of direct, indirect and cumulative impacts as a result of implementation of the Proposal will be described and quantified and assessed during both construction and operations to fauna and SRE, taking into consideration the significance of fauna and SRE, and habitat. This will include noting whether these impacts are unknown, unpredictable or irreversible, or combination or contrary to that thereof.<br>50. The residual impacts from the Proposal will be predicted for fauna and SRE after considering and applying avoidance and minimisation measures.<br>51. Management measures for the Proposal will be identified to ensure residual impacts to fauna and SRE are not greater than predicted.<br>52. An environmental management plan will be provided to address significant residual impacts to terrestrial fauna. The plan will describe management measures and monitoring to be undertaken (in terms of the mitigation hierarchy) to achieve predicted outcomes. Measures will be technically and practically feasible.<br>53. The extent and significance of any significant residual impacts will be determined on the identified environmental values by applying the Residual Impact Significance Model (page 11) and WA Offset Template (Appendix 1) in the WA Environmental Offsets Guidelines (GoWA 2014). Spatial data will be provided defining the area of significant residual impacts.<br>54. Where significant residual impacts remain, an appropriate offsets package will be proposed, consistent with the WA Environmental Offsets Policy and Guidelines and where residual impacts relate to EPBC Act-listed threatened species and Communities the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*. Spatial data will be provided defining the area of significant residual impacts.<br>55. A mine closure plan will be provided, consistent with the DMIRS and EPA Guidelines.<br>56. The ERD will demonstrate and document how the EPA's objective for this factor can be met and how proposed offsets are consistent with the EPBC Act. |
| | **Pipeline corridor**<br>57. Historical reports and government databases will be reviewed to identify the environmental values and potential issues that may be present to refine survey design, and to characterise the |

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|---|---|
| | potential terrestrial fauna of the area, identify likely habits and any significant fauna that may be present.<br>58. A Level 1 fauna survey will be conducted in accordance with EPA Technical guidance - Terrestrial Fauna Survey (EPA 2016h), survey will include:<br>a. Opportunistic searches for conservation significant fauna within and outside the Development Envelope that are known or likely to occupy the Development Envelope.<br>b. Opportunistic searches for introduced fauna including hand foraging, spotlighting, and observational survey.<br>59. Figure(s) will be provided illustrating the known recorded locations of conservation significant species, short-range endemic invertebrate species or other significant fauna and fauna habitat in relation to the Proposal.<br>60. Matters of National Environmental Significances being assessed as part of the accredited assessment will be specified.<br>61. An environmental management plan will be provided to address significant residual impacts to terrestrial fauna. The plan will describe management measures and monitoring to be undertaken (in terms of the mitigation hierarchy) to achieve predicted outcomes. Measures will be technically and practically feasible.<br>62. The extent and degree of any significant residual impacts on the identified environmental values will be determined by applying the Residual Impact Significance Model (page 11) and WA Offset Template (Appendix 1) in the WA Environmental Offsets Guidelines (GoWA 2014). Spatial data will be provided defining the area of significant residual impacts. This will include noting whether these impacts are unknown, unpredictable or irreversible, or combination or contrary to that thereof.<br>63. Where significant residual impacts remain, an appropriate offsets package will be provided, consistent with the WA Environmental Offsets Policy and Guidelines and where residual impacts relate to EPBC Act-listed threatened species and Communities the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*. Spatial data will be provided defining the area of significant residual impacts.<br>64. An environmental management and rehabilitation plan will be provided for the pipeline corridor.<br>65. The ERD will demonstrate and document how the EPA's objective for this factor can be met and how proposed offsets are consistent with the EPBC Act. |
| Relevant policy and guidance | **EPA Policy and Guidance**<br>*Statement of Environmental Principles, Factors and Objectives* (EPA 2018b)<br>*Instructions on how to prepare an Environmental Review Document,* (EPA 2016b) |

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|---|---|
| | *Technical Guidance Terrestrial Fauna Surveys* (EPA 2016h)<br>*Environmental Factor Guideline Terrestrial Fauna* (EPA 2016i)<br>*Technical Guidance Sampling methods for terrestrial vertebrate fauna* (EPA 2016j)<br>*Technical Guidance: Sampling of short range endemic invertebrate fauna* (EPA, 2016k)<br>**Other policy and guidance**<br>*Threat abatement plan for predation of feral cats* (Department of the Environment 2015)<br>*WA Environmental Offsets Policy* (GoWA 2011)<br>*WA Environmental Offsets Guidelines* (GoWA 2014)<br>*Threat Abatement Plan for Predation by the European Red Fox* (Department of the Environment, Water, Heritage and the Arts (DEWHA) 2008)<br>*Survey Guidelines for Australia's Threatened Reptiles* (DSEWPAC 2011a)<br>*Survey Guidelines for Australia's Threatened Mammals* (DSEWPAC 2011b)<br>*Environmental Offsets Policy* (DSEWPC 2012).<br>Relevant recovery plans, conservation advices and/or threat abatement plans for conservation significant species that are known to occur, or a likely to occur within vicinity of the Proposal. |

## 3.6 Inland Waters

### Table 9 Hydrological Processes

| Inland Waters | |
|---|---|
| EPA objective | *To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.*<br>For the purposes of EIA, the EPA defines the factor 'Inland Waters' as the occurrence, distribution, connectivity, movement, and quantity (hydrological regimes) of inland water including its chemical, physical, biological and aesthetic characteristics (quality). |
| Relevant activities | • Pit dewatering and groundwater abstraction<br>• Alteration of natural drainage regimes, including from road construction and potential alteration of over wash and drainage pathways.<br>• Construction, mining and operational activities<br>• Waste disposal<br>• Storage and handling of contaminants (hydrocarbons)<br>• Closure and decommissioning |
| Potential impacts and risks | • Alteration to surface water flows as a result of mining and infrastructure construction and operations, including potentially altering natural erosion and deposition patterns which could increase the surface water turbidity<br>• Alteration of the hydrology of the area from groundwater abstraction<br>• Impacts to inland wetland communities or groundwater dependent ecosystems as a result of groundwater drawdown |

| Inland Waters | |
|---|---|
| | • Contamination of surface water associated with Acid and Metalliferous Drainage<br>• Groundwater contamination from Acid and Metalliferous Drainage<br>• Impacts to inland wetland communities or groundwater dependent ecosystems as a result of groundwater drawdown and changes to groundwater quality |
| Required work | **Yogi Mine Project**<br>66. The key hydrogeological features relevant to the Development Envelope will be characterised including: aquifer system, aquifer recharge, discharge, flow direction, hydraulic parameters, hydrochemistry, from regional and site specific perspectives.<br>67. Hydrogeological field investigation will be conducted including groundwater monitoring and aquifer testing.<br>68. An initial conceptual and numerical groundwater flow model and water balance will be developed for predictive purposes (dewatering rates and impact assessment).<br>69. Potential impacts of the Proposal will be identified (for the borefield and mine dewatering) including changes to groundwater levels, flows and quality, including:<br>a. Assessing potential impacts to creeks, springs/soaks, salt lake ecology, water flats, groundwater dependant ecosystems (GDEs), subterranean fauna and other users.<br>b. Identifying appropriate management measures to mitigate the impacts of the Proposal.<br>c. This will include noting whether these impacts are unknown, unpredictable or irreversible, or combination or contrary to that thereof.<br>70. The potential for the formation of mine pit lakes after mine closure will be assessed. The pit lake risk assessment will determine the potential impact to hydrological regimes and water quality.<br>71. A preliminary surface water assessment will be prepared for the construction and operation of the mine including:<br>a. Identifying and delineating catchments and drainage lines / waterways intersected by the proposed mine plan.<br>b. Assessing the potential risk of flooding associated with the construction of the mine and progression of mining.<br>c. Assessing the potential impacts that the anticipated changes in flow regimes and/or surface water quality may have on sensitive receptors and endpoints and recommend mitigation measures.<br>72. Waste characterisation will be undertaken for the waste material to assess potential for AMD, including leachate assessment. |

| Inland Waters | |
|---|---|
| | 73. The residual impacts on inland water quality for direct, indirect and cumulative impacts will be predicted, after considering avoidance and minimisation measures. This will include an assessment of all potential pathways and the risk of impact to receptors for worst case scenarios.<br>d. The extent and significance of any significant residual impacts will be determined on the identified environmental values by applying the Residual Impact Significance Model (page 11) and WA Offset Template (Appendix 1) in the WA Environmental Offsets Guidelines (GoWA 2014). Spatial data will be provided defining the area of significant residual impacts.<br>74. An environmental management plan will be prepared that describes the proposed management, and monitoring methods to be implemented to mitigate potential impacts to inland waters and the surrounding environment.<br>75. Where significant residual impacts remain, an appropriate offsets package will be provided, consistent with the WA Environmental Offsets Policy and Guidelines and where residual impacts relate to EPBC Act-listed threatened species and Communities the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy*. Spatial data will be provided defining the area of significant residual impacts.<br>76. A mine closure plan will be prepared consistent with the DMIRS and EPA Guidelines.<br>77. The ERD will demonstrate and document how the EPA's objective for this factor can be met. |
| | **Pipeline corridor**<br>78. A preliminary surface water assessment for the construction of the pipeline(s) will be provided.<br>79. A detailed description will be provided of the design and location of the water crossings and any other Proposal elements with the potential to impact surface water or groundwater. This will include noting whether these impacts are unknown, unpredictable or irreversible, or combination or contrary to that thereof.<br>80. A detailed description will be provided of appropriate management measures to be implemented at water crossings.<br>81. An environmental management plan will be provided that describes the proposed management, and monitoring methods to be implemented to mitigate potential impacts to hydrological processes and the surrounding environment, including those related to pipeline failures.<br>82. The residual impacts on hydrological processes will be predicted for direct, indirect and cumulative impacts, after considering avoidance and minimisation measures. |

| Inland Waters | |
|---|---|
| | 83. A preliminary erosion and sediment control plan will be prepared for construction of the pipelines.<br>84. The ERD will demonstrate and document how the EPA's objective for this factor can be met. |
| Relevant policy and guidance | **EPA Policy and Guidance**<br>*Statement of Environmental Principles, Factors and Objectives* (EPA 2018b)<br>*Instructions on how to prepare an Environmental Review Document,* (EPA 2016b)<br>*Environmental Factor Guideline Inland Waters* (EPA 2018c)<br>**Other policy and guidance**<br>*Australian groundwater modelling guidelines* (Waterlines Report Series No. 82) (Barnett B et al. 2012)<br>*State Water Quality Management Strategy No. 6: Implementation Framework for Western Australia for the Australian and New Zealand Guidelines for Fresh and Marine Water Quality Monitoring and Report (Guidelines No. 4 & 7: National Water Quality Management Strategy)* (GoWA 2003)<br>*Western Australia water in mining guideline* (Water licensing delivery report series: Report No. 12) (Department of Water 2013)<br>*A Directory of Important Wetlands in Australia* (Environment Australia 2001) |

## 3.7 Air Quality

### Table 10 Air Quality

| Air Quality | |
|---|---|
| EPA objective | *To maintain air quality and minimise emissions so that environmental values are protected.*<br>For the purposes of EIA, the EPA defines the factor Air Quality as the chemical, physical, biological and aesthetic characteristics of air. |
| Relevant activities | • Clearing of native vegetation for mine and pipeline corridor<br>• Construction, mining and operational activities<br>• Power generation |
| Potential impacts and risks | • Dust generation<br>• Pollutant emissions from mining and power generation activities<br>• Ore processing<br>• Post –closure rehabilitation |
| Required work | **Yogi Mine Project**<br>85. An air quality assessment will be undertaken to determine the likely impacts from dust generated at the site as a result of the Proposal, specifically on flora and vegetation, nearby homesteads and the operational accommodation camp. This will include noting whether these impacts are unknown, unpredictable or irreversible, or combination or contrary to that thereof. |

| | |
|---|---|
| | 86. A Dust Management Framework will be developed to establish targets to protect flora and vegetation, surrounding land uses and on-site users.<br>87. Estimate of expected pollutants (i.e. criteria air pollutants) from the Proposal.<br>88. Greenhouse gas emissions key sources from the Proposal will be characterised and the expected greenhouse gas emissions estimated during construction activities, general mine operation and for the power station.<br>89. The residual health and aesthetic impacts on air quality will be predicted for direct, indirect and cumulative impacts, after considering avoidance and minimisation measures.<br>90. The ERD will demonstrate and document how the EPA's objective for this factor can be met. |
| Relevant policy and guidance | **EPA Policy and Guidance**<br>*Statement of Environmental Principles, Factors and Objectives* (EPA 2018b)<br>*Instructions on how to prepare an Environmental Review Document,* (EPA 2016b)<br>*Environmental Factor Guideline Air Quality* (EPA 2016l)<br>*A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities* (DEC 2011)<br>*Guidance for the Assessment of Environmental Factors: Separation Distances between Industrial and Sensitive Land Uses* (EPA 2005)<br>*Air Quality Modelling Guidance Notes* (DoE 2006)<br>**Other policy and guidance**<br>*National Greenhouse and Energy Reporting Act 2007* (NGER Act) |

## 3.8 Social Surroundings

### Table 11 Social Surroundings

| Social Surroundings | |
|---|---|
| EPA objective | *To protect social surroundings from significant harm.*<br>For the purposes of EIA, the EPA defines the factor as:<br>*….the social surrounding of man are his aesthetic, cultural, economic and social surroundings to the extent that those surroundings directly affect or are affected by his physical or biological surroundings*. |
| Relevant activities | • Clearing of native vegetation for mine and pipeline corridor<br>• Construction, mining and operational activities<br>• Construction of pipelines<br>• Physical presence of infrastructure |
| Potential impacts and risks | • Loss/disturbance to Aboriginal or European heritage sites<br>• Impacts to amenity values (including visual landscape, visual aesthetics values and recreational tourism) associated with the Pipeline corridor |

| Social Surroundings | |
|---|---|
| | • Impacts to pastoral lease operations and any tourism activities in the Development Envelope<br>• Activities may occur in areas of Native Title |
| Required work | **Yogi Mine Project**<br>91. The heritage and cultural values of the Development Envelope will be characterised.<br>92. Aboriginal heritage surveys will be conducted to identify Aboriginal archaeological and ethnographic sites of significance and concerns associated with the Proposal. The surveys will be limited to area not previously surveyed.<br>93. Appropriate consultation will be conducted to identify the potential impacts on the social surroundings of people affected by the Proposal (related to the physical area involved in the Proposal)<br>94. The potential impacts to economic surroundings of people referred to in scope 93 above will be identified and discussed. The discussion will include consideration of the mitigation hierarchy. This will include noting whether these impacts are unknown, unpredictable or irreversible, or combination or contrary to that thereof.<br>95. The current and any other reasonably foreseeable land and recreational uses, and amenity values (including for visual, noise, odour and dusts) of the Development Envelope will be characterised.<br>96. The outcome of the consultation and heritage surveys will be provided.<br>97. A detailed description and figure (s) of the proposed disturbance and impacts to heritage sites, value and/or cultural associations relating to the Proposal will be provided.<br>98. An environmental management plan will be provided that describes the proposed management, and monitoring methods to be implemented to mitigate potential impacts to social surrounds.<br>99. The residual impacts on social surrounds will be predicted for direct, indirect and cumulative impacts, after considering avoidance and minimisation measures.<br>100. A mine closure plan will be prepared, consistent with the DMIRS and EPA Guidelines.<br>101. The ERD will demonstrate and document how the EPA's objective for this factor can be met. |
| | **Pipeline corridor**<br>102. A desktop review of available reports, government databases and spatial data will be undertaken to identify and characterise the heritage and cultural values of the Pipeline Development Envelope. |

| Social Surroundings | |
|---|---|
| | 103. Impacts on any heritage sites, values/ and or cultural associations, associated with implementation of the Proposal will be assessed, including those resulting from changes to the environment which may impact on cultural and heritage significance values. This will include noting whether these impacts are unknown, unpredictable or irreversible, or combination or contrary to that thereof.<br>104. An environmental management plan will be provided that describes the proposed management, and monitoring methods to be implemented to mitigate potential impacts to social surrounds.<br>105. The residual impacts on social surrounds will be predicted for direct, indirect and cumulative impacts, after considering avoidance and minimisation measures.<br>106. The ERD will demonstrate and document how the EPA's objective for this factor can be met. |
| Relevant policy and guidance | **EPA Policy and Guidance**<br>*Statement of Environmental Principles, Factors and Objectives* (EPA 2018b)<br>*Instructions on how to prepare an Environmental Review Document,* (EPA 2016b)<br>*Environmental Factor Guideline Social Surroundings* (EPA 2016m)<br>Guidance for the Assessment of Environmental Factors, Assessment of Aboriginal Heritage No. 41 (EPA 2004a)<br>*Guidance Statement 41 – Assessment of Aboriginal Heritage* (EPA 2004b)<br>**Other policy and guidance**<br>*Aboriginal Heritage – Due Diligence Guidelines* (Version 3.0) (Department of Aboriginal Affairs and Department of the Premier and Cabinet 2013) |

# 4. Other environmental factors or matters

No other environmental factors have been considered.

As described in Section 1.7, the ERD will include a separate section which summarises the potential impacts on MNES to complete the requirements under the EPBC Act as an accredited assessment. The MNES identified for this Proposal are Listed Threatened Species and Communities.

The MNES section will describe, to the extent practicable, any feasible alternatives to the proposed action and possible mitigation measures. Proposed offsets to address significant residual impacts on MNES will also to be discussed.

# 5. Stakeholder consultation

The Proponent will undertake consultation with stakeholders who are affected by, or interested in the Proposal. This includes the Decision Making Authorities (refer to Section 6), other state government agencies and local government authorities, the local community and environmental non-government organisations.

The Proponent will document the following in the ERD:

- Identified stakeholders
- The stakeholder consultation undertaken and the outcome, including decision making authorities specific regulatory approvals and any adjustment to the Proposal as a result of consultation
- Any future plans for consultation.

# 6. Decision Making Authorities

At this stage, the Proponent has identified the authorities listed in Table 12 as decision making authorities for the Proposal. Additional decision making authorities may be identified during the assessment process.

Table 12 Decision Making Authorities

| Decision Making Authorities | Relevant legislation |
|---|---|
| Department of the Environment and Energy | *Environment Protection and Biodiversity Conservation Act 1999* |
| Minister for Aboriginal Affairs | *Aboriginal Heritage Act 1972* |
| Minister for Environment | *Environmental Protection Act 1986*<br>*Biodiversity Conservation Act 2016* |
| Minister for Lands | *Land Administration Act 1997* |
| Minister for Mines and Petroleum | *Mining Act 1978* |
| Director General, Department of Water and Environmental Regulation | *Environmental Protection Act 1986*<br>*Rights in Water and Irrigation Act 1914* |
| Executive Director: Department of Mines, Industry, Regulation and Safety | *Mining Act 1978* |
| Shire of Yalgoo | *Local Government Act 1995* |

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# Appendices

# Appendix A Peer review

**Table 1 Yogi Magnetite Peer Review**

| Section / Factor | Comment | Response | Proposed action / Change | Peer review comment |
|---|---|---|---|---|
| 1.7 | Make sure the two MNES topics have sub-headings in the body of the doc. and appear in the Table of Contents (ToC) so that Commonwealth and EPA Services (EPAS) staff can readily see these topics have been addressed. | Consistent with contemporary ESDs reviewed, as the MNES are Listed Threatened and Migratory Species the assessment requirements have been described in the Flora and Fauna and Terrestrial Fauna section (Tables 4 and 8).<br><br>Section 1.7 has been amended to state that a standalone MNES section will be included to review the impacts to MNES. | Section 1.7 revised to specifically state that a standalone MNES section will be included | Understand this is similar to other ESDs but it makes it a lot easier for Commonwealth and State assessors to see that the MNES issues have been clearly identified if they have their own sub-sections and headings in ToC.<br><br>This is, however, a suggestion only. |
| Table 3 Mine site dewatering | Will this water be re-used? If so, it is an important point since it reduces water supply abstraction requirements and should be mentioned here and/or in the text. | Water sourced from de-watering will be preferentially used for processing. | | Noted, and recommend this is stated in the document if not already the case. |
| 3 | Also include a heading or sub-heading entitled 'Matters of National Environmental Significance' so that EPAS and Commonwealth staff can readily see that those matters have been addressed. Make sure this heading gets into the ToC. | Consistent with contemporary ESDs reviewed, as the MNES are Listed Threatened and Migratory Species the assessment requirements have been described in the Flora and Fauna and | Section 1.7 revised to specifically state that a standalone MNES section will be included. | As for 1.7 above. |



**GHD Pty Ltd** ABN 39 008 488 373
Level 10 999 Hay Street Perth WA 6000 Australia
**T** + 61 8 6222 8222 **F** + 61 8 6222 8555 **E** permail@ghd.com **W** www.ghd.com

| Section / Factor | Comment | Response | Proposed action / Change | Peer review comment |
|---|---|---|---|---|
| | | Terrestrial Fauna section (Tables 4 and 8).<br><br>Section 1.7 has been amended to state that a standalone MNES section will be included to review the impacts to MNES. | | |
| 3 | Suggest make each of these factors a subheading that then appears in the ToC, so that EPAS staff can readily see each factor has been addressed and can find them quickly in the doc. | Agreed. | Document revised to include subheadings for each Preliminary Key Environmental Factor. | Noted |
| 3 | Unless there is a good reason, suggest put these factors in the same order as they appear in the EPA Public Record to make it as simple as possible for assessors to check they have all been addressed. I'd suggest your job is to make assessors jobs easy. | Agreed. | Order of Preliminary Key Environmental Factor revised for consistency with order *Statement of Environmental Principles, Factors and Objectives EPA 2018).* | Noted |
| 3 | Briefly say why you have included Landforms | Agreed. | Document revised to state:<br><br>"In addition to the above, Landforms have also been considered as the Proposal will involve mining a Banded Iron Formation (BIF) range. While the location of the mine is not subject to extensive existing mining projects, based on anticipated community interest in BIF | Noted |

| Section / Factor | Comment | Response | Proposed action / Change | Peer review comment |
|---|---|---|---|---|
| | | | ranges a decision has been made by the Proponent to include an assessment of impacts to landforms for completeness." | |
| Table 2 | Various typographical errors and omissions – requires careful proof reading | Noted | Document edited. | Noted |
| Table 3 | Various typographical errors and omissions – requires careful proof reading<br><br>Under 'ore processing waste' – what are "water processing waste" and "dry processing water" respectively? | Noted. | Document revised to state:<br><br>"Disposal of up to 40 million cubic metres ($m^3$) of wet processing waste.<br><br>Disposal of up to 80 $m^3$ of dry processing waste (life of mine)." | Noted |
| Table 4 | Various typographical errors and omissions – requires careful proof reading | Noted | Document edited. | Noted |
| Table 4 | Suggest list factors in order they are listed in the EPA Public Record, unless there is some good reason to do otherwise | Noted | Document revised to include subheadings for each Preliminary Key Environmental Factor. | Noted |
| Table 4 | The text here looks like it may have been cut and pasted from an ESD written by EPA. While that is a good starting point to make sure you have covered all the topics the EPA would have included, you have an opportunity here to demonstrate commitment to actually doing the | Agreed. | Document revised to specify work/studies "will be" not "should". | Noted – this is a significant improvement in terms of the level of commitment |

| Section / Factor | Comment | Response | Proposed action / Change | Peer review comment |
|---|---|---|---|---|
| | things that are required. Therefore suggest you consider changing to active language throughout – i.e. 'should' becomes 'will'. See examples in text of Table 4. | | | |
| Table 4 - Subterranean fauna | Risks – include clearing as a risk for loss of food supplies<br>Subterranean fauna rely on energy and nutrient inputs from above ground. Therefore clearing the vegetation removes important sources of these inputs and should be considered when thinking about impacts on sub-fauna. | Agreed | Risk added of clearing also added. | Noted |
| Table 4 - Terrestrial Environmental Quality | Include reference to EPA + DMIRS Mine Rehabilitation Guideline in full. Also include in Reference List.<br>Pipelines will have a significant footprint and their operation will create numerous opportunities for spills, ongoing disturbance and clean-up requirements. Suggest include these points.<br>Suggest include risk of toxicity from hydrocarbon and other spills, erosion risks. Any others? | Agreed. | Reference includes in full. | Noted |
| Table 4 - Hydrology | Item 63a – include subterranean fauna and GDEs<br>Will offsets only apply to MNES under the Federal requirements? Suggest also need to consider offsets for WA | Noted. | GDEs and subterranean fauna also included.<br>Document revised to include the potential for offsets in the event of | Noted, but check the WA Offset guidance – may need to flag the possibility of offsets required for issues other than MNES. |

| Section / Factor | Comment | Response | Proposed action / Change | Peer review comment |
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| | issues that may not be Commonwealth MNES.<br><br>Consider this point for all relevant factors. | | significant residual impacts being identified to MNES for Flora and Vegetation, Terrestrial Fauna, Subterranean Fauna and Inland Waters. | This point may apply to every factor.<br><br>*Noted, ESD updated to specify both WA and EPBC offset guidance to be considered in the event of a significant residual impact.* |
| Table 4 – Social surrounds | Fix cut and paste reference to Air Quality in first row. Also suggest specifically acknowledge noise as a potential issue (although may not actually be).<br><br>Think about traffic impacts – people worry about truck traffic even if it is outside the auspices of the proposal.<br><br>Consider noise during construction of pipeline but also maintenance and possible ongoing operational noise from compression or pump stations on pipelines.<br><br>What about heritage/ historic sites other than Aboriginal heritage sites? | Agreed.<br><br>Transportation of magnetite via a slurry pipeline to Geraldton minimises the potential for traffic movement.<br><br>Construction of pipeline will be above ground (i.e. not trenching) and is not expected to generate substantial noise emissions.<br><br>Other heritage sites will also be described. | Document revised to amend error. | Noted. Might there be the potential for pipeline noise during operations – e.g. from pump stations for example? May also depend on whether sensitive receptors are nearby.<br><br>*Noted. Item 105 involves the preparation of a Management Plan to describe proposed management of the pipeline.* |
| 4. | "No other environmental factors have been considered" – what about MNES? | Consistent with contemporary ESDs reviewed, as the MNES are Listed Threatened and Migratory Species the assessment requirements have been described in the Flora and Fauna and | Section 1.7 revised to specifically state that a standalone MNES section will be included. | See comment in text – may be worthwhile repeating your point above at this point in the document. |

| Section / Factor | Comment | Response | Proposed action / Change | Peer review comment |
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| | | Terrestrial Fauna section (Tables 4 and 8).<br><br>Section 1.7 has been amended to state that a standalone MNES section will be included to review the impacts to MNES. | | *Noted. Reference to a MNES section has been included.* |

GHD

Level 10
999 Hay Street
T: 61 8 6222 8222  F: 61 8 6222 8555  E: permail@ghd.com



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Document Status

| Revision | Author | Reviewer | | Approved for Issue | | |
|---|---|---|---|---|---|---|
| | | Name | Signature | Name | Signature | Date |
| 0 | M Brook | D Farrar | | D Farrar | | 03/08/2018 |
| 1 | M Brook | D Farrar | | D Farrar | | 24/08/2018 |
| 2 | M Brook | D Farrar | | D Farrar | | 21/11/2018 |
| 3 | S Nind | D Farrar | | D Farrar | | 28/02/2019 |
| 4 | S Nind | M Brook | | M Brook | | 2/04/2019 |
| 5 | S Nind | M Brook |  | M Brook |  | 8/04/2019 |

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