BHP Pilbara Strategic Assessment

Jimblebar Significant Amendment

Validation Notice

31 January 2025

Document Version

Version	Description Of Amendment	Organisation	Date Validation Notice Finalised	Date Validation Notice Effective From
0	Original draft document	BHP Iron Ore Pty Ltd	N/A	
1	Updated draft document in response to comments	BHP Iron Ore Pty Ltd	N/A	
2	Final draft in response to comments	BHP Iron Ore Pty Ltd	20 August 2024	17 September 2024
3	Updated final to correct Ghost Bat monitoring commitments and habitat extents	BHP Iron Ore Pty Ltd	31 October 2024	17 September 2024
4	Update to total offset cost	BHP Iron Ore Pty Ltd	31 January 2025	17 September 2024

Glossary and Abbreviations

Term	Meaning
Activity or activities	The Activity is the proposed Jimblebar Significant Amendment as defined in Section 1.4
Activity Area	The area which the activity (or activities) will be undertaken within and excludes existing Newman hub operations as described in Section 1.4.
APOP	Pilbara Strategic Assessment Assurance Plan and Offsets Plan, Revision 2.3. Published April 2023. Supersedes BHP (2018a and 2018b) versions.
Approval	The approval of the taking of an action or class of actions granted by the Minister on 19 June 2017 in accordance with the Program given under section 146B of the EPBC Act.
Approval Holder	Any person or persons named in an Approval as an Approval Holder who may take action in accordance with the Program.
Assurance Plan	The plan that provides further detail on the process described in the Program, including management of Program Matters, stakeholder management, reporting and auditing requirements and governance arrangements, as approved by the Minister on 15 May 2023.
BC Act	*Biodiversity Conservation Act 2016* (WA)
BHP	BHP Iron Ore Pty Ltd
Commence, commenced or commencement	Any preparatory works required to undertake a Notifiable Action including clearing, the erection of any onsite temporary structure and the use of heavy duty equipment for the purpose of breaking the ground.
DAWE	Department of Agriculture, Water and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions (formerly DPaW)
DCCEEW	Department of Climate Change, Energy, the Environment and Water (formerly DAWE)
Department, the	The Australian Government Department responsible for the administration of the EPBC Act or successors.
Direct disturbance	The clearing of native vegetation and/or moving of earth as a result of activities undertaken within the Strategic Assessment Area in accordance with the Program.
DEMIRS	Department of Energy, Mines, Industry Regulation and Safety
DotE	Department of the Environment
DPaW	Department of Park and Wildlife (now DBCA)
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority

Term	Meaning
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth).
Full Conceptual Development Scenario	The conceptual direct disturbance footprint for the development of all current BHP mining tenures within the Strategic Assessment Area. Applied in the Impact Assessment Report.
Impact or impacts	As defined in section 527E of the EPBC Act.
Impact Assessment Report or IAR	BHP Billiton Iron Ore Strategic Assessment: Impact Assessment Report (BHP 2016).
Implementation Framework	Comprises this Assurance Plan and the Offsets Plan, which are designed to support the implementation of the Program.
Important population	A population that is necessary for a species' long-term survival and recover (N.B. variations of this definition may exist for the Program Matters -See Section 4.2.1).
Indicative Footprint	The area where the clearing of native vegetation and/or moving of earth as a result of activities is planned to occur.
KNAC	Karlka Nyiyaparli Aboriginal Corporation
Minister	Minister responsible for administering the EPBC Act (being, at the date of this Validation Notice, the Minister for the Environment).
MNES	Matters of National Environmental Significance
MS	Ministerial Statement
New Listings	Any new listed threatened species or existing species that have been included in a higher endangerment category identified in accordance with Section 4.1.2 of the Program.
New Matters	Other matters protected by a controlling provision of Part 3 of the EPBC Act (other than listed threatened species) that may be identified in accordance with Section 4.1.2 of the Program.
Notifiable Action	An activity that is considered likely to have a relevant impact on a Program Matter based on an assessment of the proposed Activity against the thresholds defined for Program Matters in the Assurance Plan and Offset Plan. In relation to the voluntary part of the Program, this includes an activity that is considered likely to have a relevant impact on a New Listing or a New Matter.
Notifiable Action completion	The point at which a Notifiable Action has been implemented in full, such as the time identified in a Validation Notice or at an earlier point as agreed between BHP and the Department.
Notifiable Action triggers	Criteria relating to the presence of a species, which if met, require a Validation Notice to be prepared.
NVCP	Native Vegetation Clearing Permit
Offsets Plan	The plan that provides further detail on the processes that will be implemented to identify and deliver offsets associated with a Notifiable Action, as approved by the Minister on 15 May 2023.
OSA	Overburden Storage Area

Term	Meaning
Other controlling provisions	Any controlling provision under the EPBC Act that is not already considered in accordance with the Program, this Assurance Plan and/or the Offsets Plan.
Practicable	Reasonably practicable having regard to, among other things, local conditions and circumstances (including costs) and to the current state of technical knowledge.
PEOF	Pilbara Environmental Offset Fund
Program	The BHP Billiton Iron Ore Pilbara Strategic Assessment Program endorsed by the Minister on 11 May 2017. Whilst the Agreement refers to a Plan, it was agreed with the Department that the term Program is a better reflection of the systems and processes to be delivered by BHP.
Program Matters	The listed threatened species Pilbara Leaf-Nosed Bat (*Rhinonicteris aurantius*), Northern Quoll (*Dasyurus hallucatus*), Greater Bilby (*Macrotis lagotis*) Ghost Bat (*Macroderma gigas*), Pilbara Olive Python (*Liasis olivaceus barroni*), Night Parrot (*Pezoporus occidentalis*) and Grey Falcon (*Falco hypoleucos*)
Protected Matters	Matters protected by a provision of Part 3 of the EPBC Act.
PMO	Program Matter Outcome
Strategic Assessment Area or SAA	The geographical extent of the assessment and boundaries within which the Program must be implemented, as depicted in Appendix 1.
Study Area	The geographical extent of a survey's boundaries.
TSSC	Threatened Species Scientific Community.
Validation Notice	This Validation Notice under Part C of the endorsed Program.
WA	Western Australia

Contents

1 Introduction

1.1 Background

BHP Iron Ore Pty Ltd (BHP) currently operates iron ore mines and associated rail and port infrastructure within the Pilbara region of Western Australia (WA). Current mining operations include:

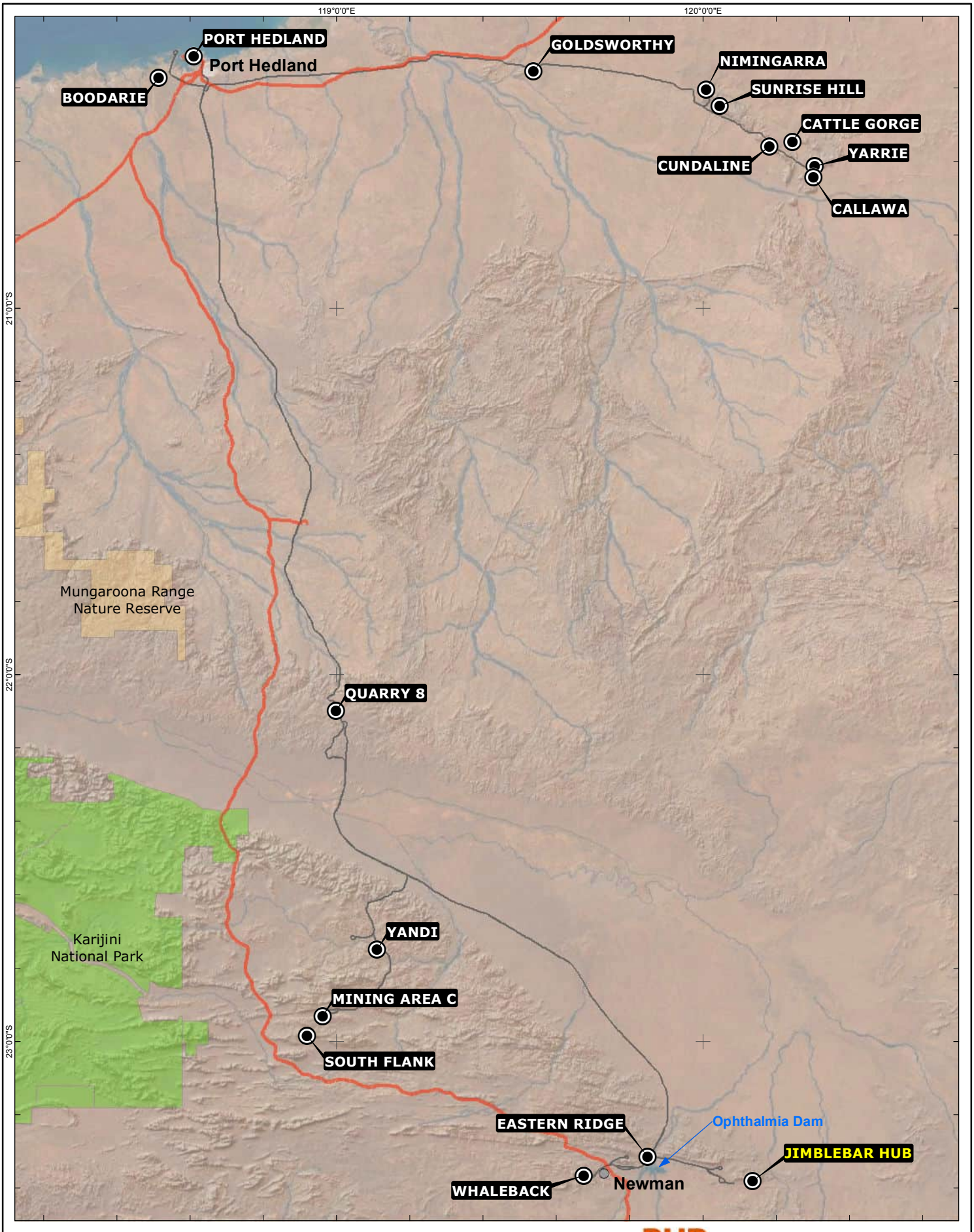
- Newman Joint Venture hub (NJV)- located approximately 2 km west of Newman township and consists of Mount Whaleback, and Orebodies 29, 30 and 35
- Mining Area C – Northern and Southern Flanks - located approximately 100 km northwest of Newman township
- Wheelarra Hill (Jimblebar) Mine, Orebody 18 and Orebody 31 (Jimblebar hub) - located approximately 35 km east of Newman township
- Eastern Ridge hub - located approximately 5 km east of Newman township and consists of Orebodies 23, 24, 25 and 32
- Yandi Mine - located approximately 100 km north northwest of Newman township.

Ore from the above mining operations is transported by rail to Port Hedland via the BHP Newman to Port Hedland Mainline (and associated spur lines). Ore is then shipped overseas via Port Hedland at the BHP facilities at Nelson Point and Finucane Island.

BHP proposes to expand existing operations at Jimblebar and amalgamate operations with Orebody 31 and Orebody 18. This Validation Notice has been prepared to document the validation process for the Jimblebar Significant Amendment (the Activity) as required under the *BHP Billiton Iron Ore Pilbara Strategic Assessment Program* (the Program) (BHP 2017).

1.2 Framework

The Program (BHP 2017) was endorsed by the Australian Government Minister for the Environment and Energy on 11 May 2017 and an Approval Decision (the Approval) for taking actions in accordance with the Program was issued on 19 June 2017. The Approval applies to the development of new iron ore mines and associated infrastructure and the expansion of existing iron ore mines and associated infrastructure within a defined Strategic Assessment Area (SAA) (Figure 1-1).



BHP mine
National Park
Nature Reserve
Highway
Rail

N

0 10 20 30 40
KILOMETRES
GCS GDA 1994

BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE
Regional location

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:1,500,000	PREPARED:	SPATIAL DATA	FIGURE:	1-1
DATE:	2/02/2024	REQUESTOR:	ENV. APPROVALS	NO:	A1021/144A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_144_E_JMB_VN_RegionalLocation_RevA.mxd

Key commitments of the endorsed Program and conditions of approval include the preparation and approval of an Assurance Plan (BHP 2018a) and Offsets Plan (BHP 2018b) and undertaking a validation process including preparation of a Validation Notice for each Notifiable Action undertaken in accordance with the Program.

This Validation Notice has been drafted in accordance with the Assurance Plan and Offsets Plan (APOP version 2.3), which sets out the current processes and requirements for compliance with the Program.

The APOP defines the environmental objectives, procedures and governance arrangements to ensure that all future activities within the scope of the Program are undertaken in accordance with the endorsed Program and achieve the Program's objectives. The APOP includes Program Matter Outcomes (PMO) which are measurable outcomes that BHP must meet to achieve the objectives developed for each Program Matter. Notifiable Action triggers are set out within the APOP to assess the requirement for a Validation Notice.

The APOP also ensures that appropriate offsets are applied to address residual impact(s) of Notifiable actions under the Program at an appropriate time.

In accordance with Part C of the Program, BHP has undertaken a validation process for the Activity, including new areas of proposed disturbance to ensure that the PMOs are met across the SAA.

This Activity is considered to require a Validation Notice, as the Activity:

- is within the scope of the Program; and
- meets one or more of the Notifiable Action triggers identified in the APOP.

1.3 Program, Assurance Plan and Offsets Plan Requirements

The endorsed Program and APOP specify the requirements and content of the Validation Notice. A summary of where the specified requirements and contents are addressed in this Validation Notice are provided in Table 1-1.

Table 1-1: Content of Validation Notice

	Strategic Assessment Program Offsets Plan Requirements	Sections which address these Requirements
1	Decision whether a Validation Notice is required for the Activity	1.7
2	BHP authorisation, date the Validation Notice will take effect	Foreword
3	Program Matters and triggers relevant to the Validation Notice	1.7, 4
4	Project description including Activity location and timeframes for the duration of activities	2
5	Stakeholder engagement and public consultation	3
6	Review of baseline and contemporary data with a description of the direct and indirect impacts	4
7	Estimates of disturbance and residual impacts	4
8	Application of the mitigation hierarchy	4
9	Outline the objective/s of the offset project/s, consistent with the scope of actions to offset impacts stated in the Program and APOP	7

	Strategic Assessment Program Offsets Plan Requirements	Sections which address these Requirements
10	Outline how the offset project/s will support the long-term persistence and viability of the relevant Program Matters	7
11	Commitment to measurable offset project milestones	7

1.4 Activity Overview

The proposed Activity is located approximately 30 km east of Newman in the eastern Pilbara region of Western Australia and includes:

- above and below water table mining of new iron ore pits at Jimblebar east
- additional overburden storage areas at Jimblebar East
- construction and operation of new beneficiation plant
- overland conveyor for ore transport
- pipelines for water and tailings
- groundwater abstraction for below water table mining
- in pit tailings deposition
- haul and access roads
- topsoil stockpiles
- creek diversion
- borrow and laydown areas
- communications infrastructure
- decommissioning, rehabilitation and closure

Further detail on the Activity is provided in Section 2.2.

Exclusions:

This Validation Notice does not include, reassess or change the previous activity or associated impacts identified in the original Jimblebar Optimisation Project Validation Notice (2020) or the Jimblebar Optimisation Project Revised Validation Notice (August 2023).

This Validation Notice also does not assess activities undertaken in accordance with:

- state Ministerial Statement (MS) 439 for Orebody 18, approved in 1997 prior to the introduction of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- MS1021 for Orebody 31 approved in 2015 prior to the EPBC Strategic Program

Both Orebody 18 and Orebody 31 are considered previously approved at the time of the Strategic Environmental Assessment.

1.5 Activity Area

The 'Activity Area' is the area where the Activity will be undertaken and encompasses a total of 24,684 ha, with additional clearing of up to 2,067 ha of native vegetation within an Indicative Footprint of 3,788 ha. The Indicative Footprint is based on the design at the time of preparation of this Validation Notice and is where the infrastructure and activities included within the scope of this Activity will occur within the Activity Area. It should be noted that the Activity design may be modified; however, it will remain wholly within the Activity Area and will not exceed the upper clearing limit of 2,067 ha.

The Activity Area for this Activity overlaps the activity area identified within the Jimblebar Optimisation Project Validation Notice (2020) and the Jimblebar Optimisation Project Revised Validation Notice (August 2023). Existing activities included in the previous Validation Notices do not form part of this Activity. Therefore, the additional clearing requirement identified in this Validation Notice represents a further deduction from the total clearing allocation approved under the Strategic Environmental Assessment (SEA).

1.6 Timeframes

This Validation Notice takes effect 20 business days from the date of authorisation (see Document Version table). If the Notifiable Action has not substantially commenced within a period of five years from that authorisation, BHP or a subsequent Approval Holder must not implement the Notifiable Action until either:

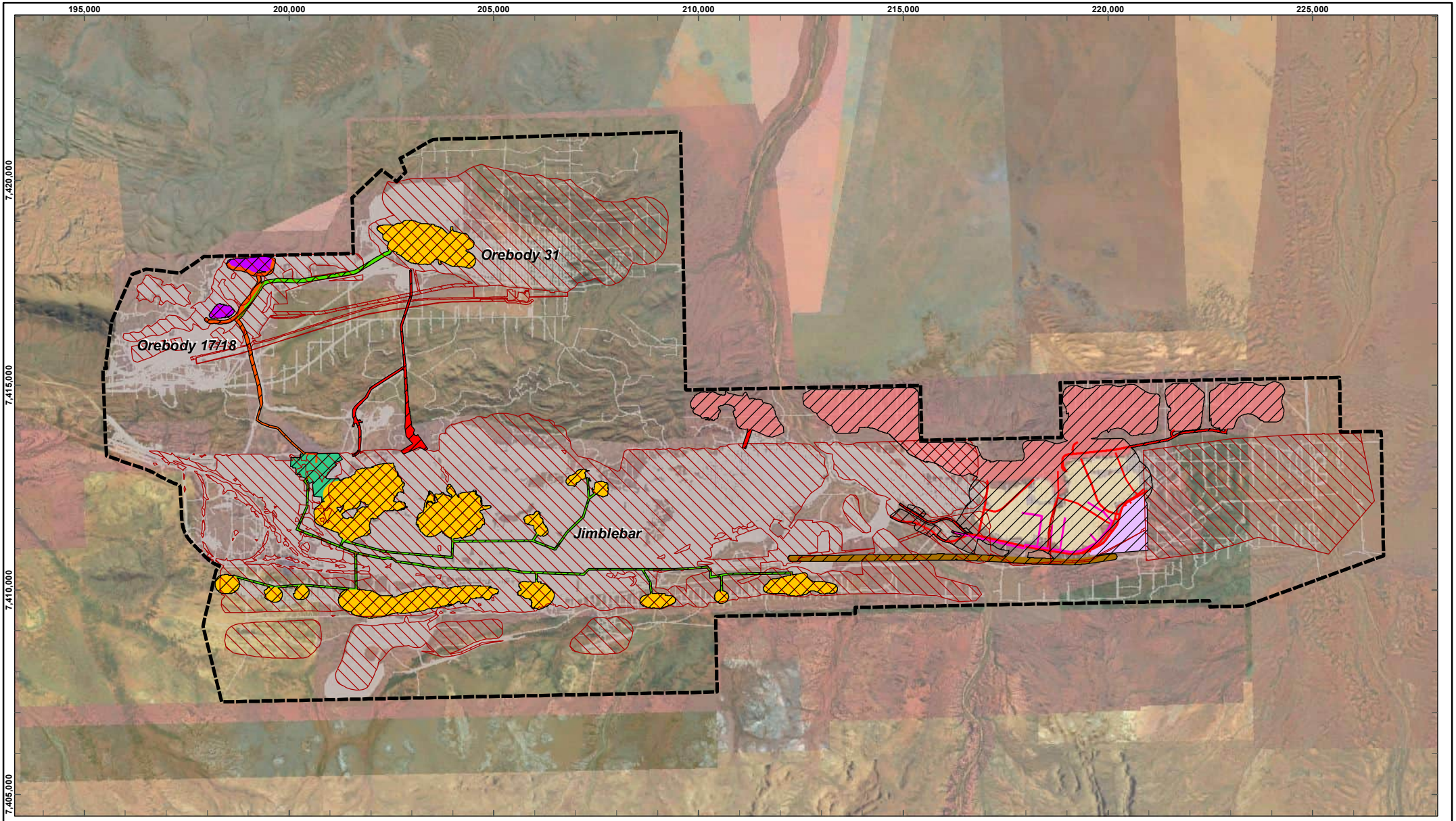
- the Department of Climate Change, Energy, the Environment and Water (DCCEEW) authorises commencement of the Notifiable Action by BHP or the Approval Holder; or
- BHP issues a new Validation Notice for the action in accordance with the Program. This process extends the commencement timeframe for another five years.

The Notifiable Action is forecast to be completed by 2046, as this is the predicted life span of the mine operation including construction, mine operation, decommissioning, rehabilitation and closure.

1.7 Decision for a Validation Notice

A Validation Notice is required for Notifiable Actions, in accordance with Notifiable Action triggers set out in the APOP (BHP 2023) and reproduced in Table 1-2. The Activity is a notifiable action as it fulfils the triggers of the APOP for two Program Matters, being Ghost Bat and Northern Quoll. This Validation Notice demonstrates how the implementation and operation of the Activity will meet each of the PMOs provided for Ghost Bat and Northern Quoll in the APOP by undertaking an impact assessment, applying the mitigation hierarchy and assessing residual impacts. This Section of the Validation Notice satisfies the requirements of Section 6.2 of the APOP. This decision for a Validation Notice will also be reported in the Annual Environmental Report.

As the Activity does not fulfil the Notifiable Action triggers for the remaining Program Matters, these species are not applicable to this Activity (Table 1-2). As such, only general species information, lack of habitats and records will be discussed to expand on information presented in the trigger assessment in Table 1-2. Sections 5.4, 5.5, 5.6, 5.7 and 5.8 outline the findings in relation to these species to support this decision.



- Activity Area
- Indicative Footprint
- Previously Assessed Areas
- Indicative Cleared Area as at FY2022

Proposed pits and infrastructure

- Dewatering pipeline corridor
- Haul road
- Pipeline corridor (short term)
- *Potential In pit TSF (conceptual - long term)*
- *Potential pipeline corridor (conceptual – long term)*
- Beneficiation plant - construction disturbance footprint
- In-pit TSF (short term)
- Overland conveyor corridor
- Processing area
- Pit
- OSA

N

0 1 2 3 4

KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Activity Area and Indicative Footprint

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:125,000	PREPARED:	SPATIAL DATA	FIGURE:	1-2
DATE:	3/04/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/145B

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_145_E_JMB_VN_DE_IF_RevB.mxd

Table 1-2: Notifiable Action triggers for the Activity

Program Matter	Notifiable Action trigger	Activity Area Program Matter Data	Applicable Trigger?
Ghost Bat (*Macroderma gigas*)	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is: Presence of Ghost Bat critical habitat and or supporting habitat **AND** Presence or sign/s of Ghost Bat colony or residing individuals	Ghost Bat has been recorded 12 times within the Activity Area over a number of years including from scats, ultrasonic calls and foraging evidence. Ten of these records are associated with seven caves. These records indicate a residing colony is present within the Activity Area. A total of 12 caves are present in the Activity Area and have been categorised as potential Ghost Bat roosts which are all Category 3 and 4 roosts. None of these are considered critical habitat. Critical foraging habitat and supporting habitat are also present in the Activity Area.	Yes The trigger is met as both habitat and records are present within the Activity Area.
	Within the Activity Area there is: Presence of Ghost Bat critical habitat and or supporting habitat **AND** Presence or sign of Ghost Bat transient, infrequent or dispersing individual/s	The number of records of Ghost Bat within the Activity Area and presence of suitable caves demonstrates that Ghost Bat resides in the Activity Area and is not present as transient, infrequent or dispersing individuals.	No This trigger is not met because the records of Ghost Bat represent likely residing individuals, rather than transient, infrequent or dispersing individuals.
Northern Quoll (*Dasyurus hallucatus*)	Within the Activity Area or 500 m buffer: Presence of Northern Quoll critical habitat and or supporting habitat	One record of Northern Quoll was recorded in the Activity Area in 2021 from a scat in a waste dump undergoing rehabilitation. Despite targeted survey effort, no further	No This trigger is not met as there are no records of a residing colony or

Program Matter	Notifiable Action trigger	Activity Area Program Matter Data	Applicable Trigger?
	AND Presence or sign/s of Northern Quoll colony or residing individuals	records exist, therefore this record is considered to be associated with an isolated foraging individual only. There is no evidence of a Northern Quoll colony or residing individuals in the Activity Area. Supporting habitat is present in the Activity Area.	individuals of Northern Quoll in the Activity Area or 500 m buffer
	Within the Activity Area: Presence of Northern Quoll critical habitat and or supporting habitat; **AND** Presence or sign of Northern Quoll transient, infrequent or dispersing individual/s.	The single record of Northern Quoll in the Activity Area reflects presence or sign of the species as only transient, infrequent or dispersing individual. There is no evidence to demonstrate that the species resides in the Activity Area.	Yes This trigger is met as there is a single record of Northern Quoll which reflects a likely transient individual within the Activity Area.
Greater Bilby (*Macrotis lagotis*)	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is: Presence of Greater Bilby critical habitat and or supporting habitat **AND** Presence or sign/s of Greater Bilby residing individuals	A targeted Bilby survey (GHD 2020) over East Jimblebar did not record any evidence of Bilby presence. In addition, contemporary vertebrate fauna surveys at Warrawandu (Biologic 2023), East Jimblebar (GHD 2019), North Jimblebar (GHD 2019) and Shearer's West (Biota 2019) which targeted previously uncleared areas, have not recorded any evidence of Greater Bilby presence in the Activity Area or within the 500m buffer, therefore there is no evidence that the species resides in the Activity Area. Supporting habitat is present in the Activity Area including Sand Plain. Other habitats present including	No This trigger is not met as there is no evidence of Greater Bilby residing individuals within the Activity Area or 500m buffer

Program Matter	Notifiable Action trigger	Activity Area Program Matter Data	Applicable Trigger?
		Mulga Woodland, Minor and Major Drainage Line habitats are previously disturbed from grazing and are unlikely to provide supporting habitat for the species.	
	Within the Activity Area there is: Presence of Greater Bilby critical habitat and or supporting habitat **AND** Presence or sign of Greater Bilby transient, infrequent or dispersing individual/s	The lack of evidence of Greater Bilby in the Activity Area demonstrates that there are no transient, infrequent or dispersing individuals that utilise the Activity Area.	No This trigger is not met as there is no evidence of transient, infrequent or dispersing individuals in the Activity Area
Pilbara Olive Python *(Liasis olivaceus barroni)*	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is: Presence of Pilbara Olive Python critical habitat and or supporting habitat **AND** Presence or sign/s of a Pilbara Olive Python population or residing individuals	Contemporary vertebrate fauna surveys including at Warrawandu (Biologic 2023), East Jimblebar (GHD 2019), North Jimblebar (GHD 2019) and Shearer's West (Biota 2019) which targeted previously uncleared areas have not recorded evidence of Pilbara Olive Python in the Activity Area or 500m of the Activity Area. Critical habitat is present in the form of Gorge/Gully and Breakaway/Cliff habitat types. Supporting habitats are present including Major and Minor Drainage Lines.	No This trigger is not met as there are no records of Pilbara Olive Python within the Activity Area or within 500m
	Within the Activity Area there is:	The lack of evidence of Pilbara Olive Python demonstrates that there are no transient, infrequent or dispersing individuals.	No This trigger is not met as there are no records of transient, infrequent

Program Matter	Notifiable Action trigger	Activity Area Program Matter Data	Applicable Trigger?
	Presence of Pilbara Olive Python critical habitat and or supporting habitat **AND** Presence or sign of Pilbara Olive Python transient, infrequent or dispersing individual/s		or dispersing individuals in the Activity Area
Pilbara Leaf-Nosed Bat *(Rhinonicteris aurantia)*	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is: Presence of Pilbara Leaf-nosed Bat critical habitat and or supporting habitat **AND** Presence or sign/s of Pilbara Leaf-nosed Bat colony or residing individuals	A targeted Ghost Bat survey (GHD 2020) of the Activity Area monitored for Ghost Bat and was also capable of detecting Pilbara leaf-nosed Bat, if present. This survey did not record direct or indirect evidence of Pilbara Leaf-nosed Bat in the Activity Area or 500m buffer. In addition, contemporary vertebrate fauna surveys at Warrawandu (Biologic 2023), East Jimblebar (GHD 2019), North Jimblebar (GHD 2019) and Shearer's West (Biota 2019) which targeted previously uncleared areas have not recorded evidence of presence, or critical habitat for Pilbara Leaf-nosed Bat in the Activity Area or within 500m of the Activity Area. The ongoing Ghost Bat monitoring program across Eastern Pilbara uses recorders capable of also detecting Pilbara Leaf-nosed Bat. These surveys and monitoring combined have not recorded evidence of the species in the Activity Area or within 500m of the Activity Area. Supporting habitats have been mapped and include Drainage Area/Floodplain, Major Drainage Line, Minor Drainage Line, Hillcrest/Hillslope, Sand Plain.	No This trigger is not met as there are no records of Pilbara Leaf-nosed Bat in the Activity Area or 500 m

Program Matter	Notifiable Action trigger	Activity Area Program Matter Data	Applicable Trigger?
	Within the Activity Area there is: Presence of Pilbara Leaf-nosed Bat critical habitat and or supporting habitat **AND** Presence or sign of Pilbara Leaf-nosed Bat transient, infrequent or dispersing individual/s	The lack of records of the species in the Activity Area demonstrates that there are no transient, infrequent or dispersing individuals.	No This trigger is not met as there is no evidence of transient, infrequent or dispersing individuals in the Activity Area
Grey Falcon *(Falco hypoleucos)*	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is: Presence of Grey Falcon critical habitat and or supporting habitat **AND** Presence or sign/s of Grey Falcon residing individuals	Astron (2023) included targeted survey for Grey Falcon at Mesa Gap and did not record any evidence of the species. All vertebrate fauna surveys record all species observed directly or detected indirectly. Collectively the fauna surveys across the Activity Area have not recorded evidence of presence, or critical habitat for Grey Falcon in the Activity Area or within 500m of the Activity Area. Supporting habitats have been mapped and include Drainage Area/Floodplain, Mulga Woodland, Hillcrest/Hillslope, Minor Drainage Line, Sand Plain, Stony Plain.	No This trigger is not met as there are no records of Grey Falcon in the Activity Area or within 500 m
	Within the Activity Area there is: Presence of Grey Falcon critical habitat and or supporting habitat **AND**	The lack of records of the species in the Activity Area demonstrates that there are no transient, infrequent or dispersing individuals.	No This trigger is not met as there are no records of transient, infrequent

Program Matter	Notifiable Action trigger	Activity Area Program Matter Data	Applicable Trigger?
	Presence or sign/s of Grey Falcon transient, infrequent or dispersing individual/s		or dispersing individuals within the Activity Area
Night Parrot (*Pezoporus occidentalis*)	Within the Activity Area and or within a 500m buffer of the Activity boundary there is: Presence of Night Parrot critical habitat and or supporting habitat **AND** Presence or sign(s) of Night Parrot population(s) or residing individuals	Contemporary vertebrate fauna surveys across the Activity Area have included targeted methods to search for Night Parrot including the use of infrared motion cameras and songmeter acoustic call recorders. These include Warrawandu (Biologic 2023), East Jimblebar (GHD 2019), North Jimblebar (GHD 2019), Caramulla (Biota 2020) and Shearer's West (Biota 2019) which targeted previously uncleared areas. These surveys have not recorded evidence of presence, or critical habitat for Night Parrot in the Activity Area or within 500m of the Activity Area. Supporting habitats have been mapped and include Drainage Area/Floodplain, Sand Plain, Stony Plain.	No This trigger is not met as there are no records of Night Parrot within the Activity Area
	Within the Activity Area there is: Presence of Night Parrot critical habitat and or supporting habitat **AND** Presence or sign(s) of Night Parrot transient, infrequent or dispersing individual/s	The lack of records of the species in the Activity Area demonstrates that there are no transient, infrequent or dispersing individuals.	No This trigger is not met as there are no records of transient, infrequent or dispersing individuals in the Activity Area

2 Project Disturbance and Description

Section 2.1 summarises the proposed disturbance for the Activity. Section 2.2 describes the changes to the existing Activity including new project elements. Figure 1-2 illustrates the location of the proposed works comprising the Activity under assessment in this Validation Notice.

2.1 Proposed Disturbance

Disturbance of up to 2,067 ha will be required for this Validation Notice. Clearing for the Activity has been minimised by utilising existing infrastructure and planning new proposed infrastructure in areas already cleared subject to previous Validation Notices that support the Jimblebar mine including the Jimblebar Optimisation Project Validation Notice (2020) and the Revised Jimblebar Optimisation Project Validation Notice (2023).

The disturbance allocated to the SAA upper disturbance limit to date and including as consequence of this Validation Notice is detailed in Table 2-1.

Table 2-1: SAA Program Disturbance Allocation

Project Name	Decision Made	Date Decision Documented	Proposed Disturbance (ha)	Overall Cumulative Program Disturbance Remaining (ha)
MAC/South Flank	Validation Notice	May 2018	16,000	94,000
Jimblebar OSA1 Stage 1	Not a Notifiable Action	Aug 2018	95	93,905
Western Creek Diversion	Not a Notifiable Action	Feb 2020	15	93,890
MAC Surplus Water	Not a Notifiable Action	Apr 2020	0	93,890
Jimblebar Optimisation Project	Validation Notice	Jun 2020	2,000	91,890
OB31 Stage 1 clearing	Not a Notifiable Action	Dec 2022	5	91,885
Mooka Rail Siding	Validation Notice	April 2023	23	91,862
Revised Jimblebar Optimisation Project	Validation Notice	May 2023	1,042 (in addition to 2,000 ha as provided under the Previous Validation Notice)	90,820
Western Ridge	Validation Notice	Jul-23	4,266	86,554
Yeerabiddy Rail Works	Validation Notice	Aug-23	60	86,494

Project Name	Decision Made	Date Decision Documented	Proposed Disturbance (ha)	Overall Cumulative Program Disturbance Remaining (ha)
Thirteen Creek Drilling Program	Not a Notifiable Action	Aug-23	11	86,483
Rail decarbonisation electrification Project	Not a Notifiable Action	Aug-23	0	86,482.98
Orebody 32 Below Water Table	Not a Notifiable Action	Sep-23	224	86,259
Newman West (Mount Whaleback Mine)	Not a Notifiable Action	Nov-23	155	86,104
Newman Water Treatment Plant Tank Replacement and Upgrades	Not a Notifiable Action	Nov-23	7	86,097
Jimblebar Met Mast	Not a Notifiable Action	Nov-23	2	86,095
Jimblebar Significant Amendment	Validation Notice	Feb-24	2,067	84,028

2.2 Jimblebar Significant Amendment

The Activity will include the following (Figure 1-2):

- above and below water table mining of new iron ore pits at Jimblebar East
- additional overburden storage areas at Jimblebar East
- construction and operation of new beneficiation plant
- overland conveyor for ore transport
- pipelines for water and tailings deposition into empty pit voids
- additional groundwater abstraction of up to 23.8 GL/a for below water table mining
- in pit tailings deposition
- haul and access roads
- topsoil stockpiles
- creek diversion
- borrow and laydown areas
- communications infrastructure
- decommissioning, rehabilitation and closure

Mining will be undertaken as typical open pit operation. Note that decommissioning, rehabilitation, and closure are also components of this Activity.

2.2.1 Clearing

Clearing will be required for some components which are not able to be located entirely on existing cleared areas including mine pits, overburden storage areas and overland conveyor. The total clearing of 2,067 ha will enable installation of all components identified in Section 2.2.

2.2.2 Mine dewatering and surplus water management

The Activity will involve conventional open pit iron ore mining activities above and below water table of new pits at Jimblebar East, which will require mine dewatering to enable below water table mining. Up to 23.8 GL/a groundwater abstraction is required for this Activity, in addition to the existing 45.5 GL/a that is already approved under state Ministerial Statement (MS) 430 for Orebody 18 (approved in 1997), MS1021 for Orebody 31 (approved in 2015) and MS1126 and by Validation Notice for Jimblebar Optimisation Project in 2020.

Combined, this Activity plus existing approved activities will result in dewatering of to 69.3 GL/a. During operations, the water abstracted will be preferentially used to supplement the water requirements for the Activity. However, the dewatering volume is anticipated to be greater than the operational demand and surplus water will be produced. Surplus water not utilised for the Activity will be discharged to Ophthalmia Dam via a surplus water pipeline. The Activity will not result in any change to the existing discharge to creeks. Potential impacts from mine dewatering and surplus water management are addressed in Section 5 for each Program Matter, where relevant. The new pits are located within the Indicative Footprint.

2.2.3 Overland Conveyor

A new overland conveyor will be constructed and operated within the Indicative Footprint to transport ore from the proposed new Jimblebar East pits to existing approved infrastructure within the Activity Area. The overland conveyor is aligned in an east-west direction and will be elevated above ground level.

2.2.4 Beneficiation and tailings management

A new beneficiation plant will be constructed and operated, within an existing cleared area within the Indicative Footprint. The beneficiation plant will use surplus water from mine dewatering to process iron ore and improve product quality. The process generates tailings which require disposal. BHP has devised a tailings management strategy including deposition of tailings in mined out pit voids in existing approved areas. This will help achieve backfill of pit voids and avoid the requirement for construction of a new tailings storage area, thereby minimising the overall disturbance required for the Activity.

2.2.5 Closure and Decommissioning

A Mine Closure Plan has been developed which outlines proposed decommissioning, rehabilitation and closure strategy for the Activity. Recognising the importance of mine planning in facilitating the completion criteria for rehabilitation has been critical in planning and implementing successful rehabilitation practices. Embedding closure and rehabilitation planning in the Life of Asset and 5 Year Planning process for the business has resulted in rehabilitation being included as part of the mining process rather than being considered an add on or separate from mining. This allows identification of areas available for rehabilitation so that plans for executing final landform earthworks and rehabilitation within the subsequent five year timeframe are integrated with mine plans. To allow

appropriate landform design, planners now use waste characterisation information and with site input, model design options to identify the most appropriate rehabilitation plan for any given situation.

3 Stakeholder Engagement

BHP's commitment to community engagement is articulated in BHP's *Communications, Community and External Engagement Our Requirements* (BHP 2019), which states:

> '*Working openly with the communities in which we operate and with governments contributes to economic and social development and enhancement of BHP's reputation and social licence to operate...*'

To support this commitment, BHP has comprehensive company standards and dedicated resources to ensure its activities are underpinned by continuous community engagement and feedback.

3.1 Stakeholder Consultation

BHP is required to maintain a register of interested parties for the purpose of stakeholder consultation. Interested parties listed on this register have been identified through the formal Strategic Assessment public consultation period or have self-identified after the consultation period. Members of the community and groups are able to self-identify through local stakeholder engagement activities such as Community Consultative Groups in Port Hedland and Newman, and regular meetings with Traditional Owner groups, or through www.bhp.com/contact. The BHP community team will advise on any enquiries or requests to be included in stakeholder engagement activities relating to the Strategic Assessment.

Key regulatory authorities, including the DCCEEW, and target stakeholders were consulted during the development of the draft Validation Notice. Consultation outlined the SAA, proposed submission, including a description of proposed activities of the Notifiable Action, the potential impacts on the Program Matters and the proposed management approach. The stakeholders consulted and level of stakeholder engagement undertaken depended on the location, complexity, size and risk of the particular Activity, and the level of stakeholder interest.

Table 3-1 summarises the relevant consultation undertaken by BHP regarding the aspects of this Validation Notice.

3.2 Public Consultation

BHP made the draft Validation Notice publicly available on its website for a minimum period of 28 days. The public consultation period commenced on 19 February 2024 and concluded on 22 March 2024. Registered stakeholders were emailed notification that the public consult period has commenced. These stakeholders included the Department of Water and Environment Regulation (DWER) and Karlka Nyiyaparli Aboriginal Corporation (KNAC).

A summary of the engagement undertaken for the Validation Notice, including the public consultation period, is included in Table 3-1.

Table 3-1: Stakeholder Engagement

Stakeholder	Date	Topics/Issues Discussed	Response and Outcome
Nyiyaparli representatives through KNAC	May 2023	Social surroundings engagement including project overview, identification of existing values, potential impacts and proposed environmental management. On country discussion of water management, visit to Jimblebar East pit, proposed haul road and proposed short-term tailings pipeline corridor.	BHP and KNAC agreed to further engagement on country regarding dust management, rehabilitation and closure.
Nyiyaparli representatives through KNAC	August 2023	Social surroundings engagement including detailed overview of the Proposal, discussion of the beneficiation plant, overview of pipeline corridor, site visit to an existing overburden storage area rehabilitation area, discussion of seeding trials, processing plant dust controls, visit to *Acacia corusca* population and site visit to explore closure.	BHP to provide draft approval documentation for KNAC review. This included documents required under Part IV of the EP Act. BHP considered feedback from Nyiyaparli in relation to management measures.
DCCEEW	12 December 2023	Jimblebar Significant Amendment Validation, including proposed activity, predicted impacts, management and offsets.	BHP to provide slide pack of presentation to DCCEEW and to notify prior to publication of draft Validation Notice.
DWER – EPA Services	13 December 2023	Meeting with EPA Services to introduce the Proposal, discuss key environmental factors, predicted impacts and proposed management measures.	BHP to refer the Proposal for assessment under Part IV of the *Environmental Protection Act 1986.*
KNAC	21 February 2024	BHP provided draft Validation Notice to KNAC for review.	BHP will provide a written response to any KNAC comments received.
Public consultation	21 February 2024	Draft Validation Notice published on the BHP website for public comment.	BHP will prepare and publish responses to comments in the final Validation Notice.
DWER	21 February 2024	BHP provided the draft Validation Notice to EPA Services, DWER for comment.	No comments received to date.

Stakeholder	Date	Topics/Issues Discussed	Response and Outcome
DCCEEW	21 February 2024	BHP notified DCCEEW of the draft Validation Notice being published on the BHP regulatory information website.	Comments received and provided to DCCEEW on 5 July 2024.
PEOF, DWER	21 February 2024	BHP provided the draft Validation Notice to the PEOF Manager, DWER for information and comment.	No comments received.
DBCA	21 February 2024	BHP provided the draft Validation Notice to DBCA for comment.	No comments received.
Department of Energy, Mines, Industry Regulation and Safety (DEMIRS)	22 February 2024	BHP provided the draft Validation Notice to DEMIRS for comment.	No comments received.
KNAC	22 March 2024	KNAC provided written comments to BHP on the draft Validation Notice.	BHP prepared responses to comments and provided to KNAC on 1 July 2024.
PEOF (DWER DBCA DEMIRS EPA Services DCCEEW KNAC	5 July 2024	BHP provided the updated draft Validation Notice for comment.	Comments received from DCCEEW on 2 August 2024.
Public comment	8 July 2024	BHP published the updated draft Validation Notice on its website for 28 days.	No public comments received.

Stakeholder	Date	Topics/Issues Discussed	Response and Outcome
DCCEEW	18 August 2024	DCCEEW comments on updated Validation Notice.	BHP provided responses to comments from DCCEEW on 18 August 2024.

4 Validation Process

4.1 Guidance

The most recent Commonwealth guidance considered in the preparation of this Validation Notice include:

- DCCEEW (2023). Recovery Plan for the Greater Bilby (*Macrotis lagotis*)
- DotE (2016). EPBC Act referral guideline for the endangered northern quoll
- DotE (2015). Threat abatement plan for predation by feral cats
- DotE (2013) Matters of National Environmental Significance Significant Impact Guidelines 1.1 EPBC Act
- Department of the Environment, Water, Heritage and the Arts (DEWHA) (2010). Survey guidelines for Australia's threatened bats
- DEWHA (2008a). Threat abatement plan for predation by the European red fox
- DEWHA (2008b). Approved Conservation Advice for *Liasis olivaceus barroni* (Olive Python - Pilbara subspecies)
- Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2011a). Survey guidelines for Australia's threatened mammals
- DSEWPaC (2011b). Survey guidelines for Australia's threatened reptiles
- DSEWPaC (2011c). Threat abatement plan for the biological effects, including lethal toxic ingestion, caused by cane toads
- Threatened Species Scientific Committee (TSSC) (2020). Conservation Advice *Falco hypoleucos* Grey Falcon
- TSSC (2016a). Conservation Advice *Macrotis lagotis* greater bilby
- TSSC (2016b). Conservation Advice *Pezoporus occidentalis* night parrot
- TSSC (2016c). Conservation Advice *Macroderma gigas* ghost bat
- TSSC (2016d). Conservation Advice *Rhinonicteris aurantia* (Pilbara form) (Pilbara Leaf-nosed Bat)
- TSSC (2005e). Commonwealth Listing Advice on Northern Quoll (*Dasyurus hallucatus*).

The most recent Western Australian guidance considered included:

- EPA (2020). *Technical Guidance: Terrestrial vertebrate fauna surveys for environmental impact assessment.*

Other guidance considered included:

- Bat Call WA (2021a). *A review of ghost bat ecology, threats and survey requirements*. DWER.
- Bat Call WA (2021b). *A review of Pilbara leaf-nosed bat ecology, threats and survey requirements*. DWER.
- Southgate *et al.* (2018). *Verifying bilby presence and the systematic sampling of wild populations using sign-based protocols – with notes on aerial and ground-based techniques and asserting absence*. Australian Mammalogy.
- DBCA (2017). *Guidelines for surveys to detect the presence of bilbies and assess the importance of habitat in Western Australia*. DBCA.

4.1.1 Important Population

For the purpose of this Validation Notice, and in accordance with the EPBC Act '*Significant Impact Guidelines 1.1 Matters of National Environmental Significance*' (DoE 2013), an important population for all Program Matters, with exception of Northern Quoll, is defined as:

'a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- *key source populations either for breeding or dispersal*
- *populations that are necessary for maintaining genetic diversity and/or*
- *populations that are near the limit of the species range.'*

An important population for the long-term survival of the Northern Quoll is specifically defined in the EPBC Act Referral guideline for the endangered Northern Quoll (DotE 2016) as including:

- *'high density quoll populations, which occur in refuge-rich habitat critical to the survival of the species, including where cane toads are present*
- *occurring in habitat that is free of cane toads and unlikely to support cane toads upon arrival i.e. granite habitats in WA, populations surrounded by desert and without permanent water*
- *subject to ongoing conservation or research actions i.e. populations being monitored by government agencies or universities or subject to reintroductions or translocation.'*

4.1.2 Critical Habitat

Critical habitat is defined by DoE (2013) as '*Habitat critical to the survival of a species or ecological community*' and refers to areas that are necessary:

- *for activities such as foraging, breeding, roosting, or dispersal*
- *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)*
- *to maintain genetic diversity and long term evolutionary development*
- *for the reintroduction of populations or recovery of the species or ecological community.*

Critical habitat and supporting habitats for the seven Program Matters are defined in Table 12.1 of the APOP (BHP 2023) and are based on relevant published conservation guidance.

4.2 Surveys and Studies

The contemporary and historical surveys which form the baseline data for the Activity Area are considered adequate for validating impacts to Program Matters in line with the requirements of Section 7.1 (Contemporary Information and Data) of the Program.

4.2.1 Contemporary Surveys

The entire Activity Area has been subject to targeted fauna surveys. In some areas, survey coverage does not extend 500m beyond the Activity Area. This is a result of surveys being commissioned and completed prior to the updates to the APOP which was approved in April 2023, which was amended to require surveys to include a 500m buffer of the Activity Area.

Surveys undertaken within the last five years encompassing parts of or all of the Activity Area which inform this Validation Notice are presented in Table 4-1 with survey boundaries illustrated on Figure 4-1. Appendix 2 provides these survey reports.

Surveys were undertaken in a manner consistent with the requirements of the Commonwealth and Western Australia guidance for surveys in place at the time that surveys were conducted, as listed in Section 4.2 and fulfil the requirement of Section 7.1 of the Program for contemporary targeted on-ground surveys.

Table 4-1: Terrestrial Fauna – recent studies and surveys

Title	Date	Survey type	Summary
Shearer's West Targeted Vertebrate and Short range endemic invertebrate fauna assessment (Biologic 2019)	January 2019	Targeted terrestrial vertebrate fauna survey (and SRE invertebrate fauna survey) including targeted trapping, targeted searches, ultrasonic recordings for threatened bat species, acoustic recording for Night Parrot, motion cameras and opportunistic recordings.	No conservation significant fauna species identified.
Jimblebar East and Caramulla Fauna Survey (GHD 2019)	April – May 2019	Level 2 single season vertebrate fauna survey over Jimblebar East and Caramulla including systematic trapping, active searches, motion sensor cameras, bat and bird acoustic recordings, nocturnal searching, walking transects and opportunistic recordings.	Seven fauna habitat types identified. Four conservation significant fauna recorded including Ghost Bat, Peregrine Falcon, Western Pebble- mound Mouse and Brush-tailed Mulgara.
North Jimblebar Fauna Survey (GHD 2019)	April to May 2019	Level 2 single season vertebrate fauna survey covering North Jimblebar including trapping, active searching, motion sensor cameras, bat and bird acoustic recorders, nocturnal searching, opportunistic records and walking transects.	Eight fauna habitat types identified. Three conservation significant fauna recorded including Ghost Bat, Peregrine Falcon and Western Pebble-mound Mouse.
Caramulla Miscellaneous Licence Level 1 and Targeted Vertebrate Fauna Survey (Biota 2020)	March 2020	Single season Phase Level 1 targeted vertebrate fauna survey including targeted searches, nocturnal searches, trapping, bat echolocation call recordings, acoustic recordings.	Four fauna habitat types identified and no conversation significant fauna recorded.
Jimblebar Targeted Ghost Bat Survey (GHD 2021)	May 2020	Targeted Ghost Bat survey over the Jimblebar area including habitat and roost assessments, time lapse video cameras and bat call surveys for both Ghost Bat and Pilbara Leaf-nosed Bats.	Foraging habitats identified and five diurnal roosts, eight potential diurnal roosts and three nocturnal roosts identified.

Title	Date	Survey type	Summary
Jimblebar Greenhouse Gas Abatement Study Basic Vertebrate Fauna Survey (Biologic 2020)	May 2020	Basic vertebrate fauna survey for Jimblebar Greenhouse Gas Abatement study, including habitat assessments, targeted searches, ultrasonic bat recorders, camera transects, plot searches, bird acoustic recorders, opportunistic sightings.	Six fauna habitats identified and no conservation significant fauna recorded.
East Jimblebar and Caramulla Targeted Greater Bilby Survey (GHD 2021)	September 2020	Targeted Greater Bilby survey at Jimblebar East and Caramulla including habitat assessment, targeted plot searches and opportunistic recordings.	Seven fauna habitats identified and no evidence of Greater Bilby recorded.
North Jimblebar Targeted Northern Quoll Assessment (Biologic 2022)	February and June 2022	Targeted Northern Quoll survey over northern and central Jimblebar including habitat assessments, targeted searches and camera traps.	Suitable habitat identified. No evidence of Northern Quoll presence recorded.
Mesa Gap Corridors Basic Fauna Survey (Astron 2023)	March 2023	Reconnaissance vegetation and flora survey and basic fauna survey in the Mesa gap area at Jimblebar including habitat assessments, motion sensor cameras, acoustic bat surveys, cave assessments, avifauna surveys, targeted and opportunistic recordings.	Eight fauna habitat types identified and no conservation significant fauna recorded.
Warrawandu Targeted Fauna Survey (Biologic 2023)	December 2023	Targeted significant fauna survey including habitat assessment, targeted searches and sampling, and opportunistic records.	Eight fauna habitats recorded. Ultrasonic calls of Pilbara Leaf-nosed Bat recorded more than 500m outside of the Activity Area relevant to this Validation Notice.

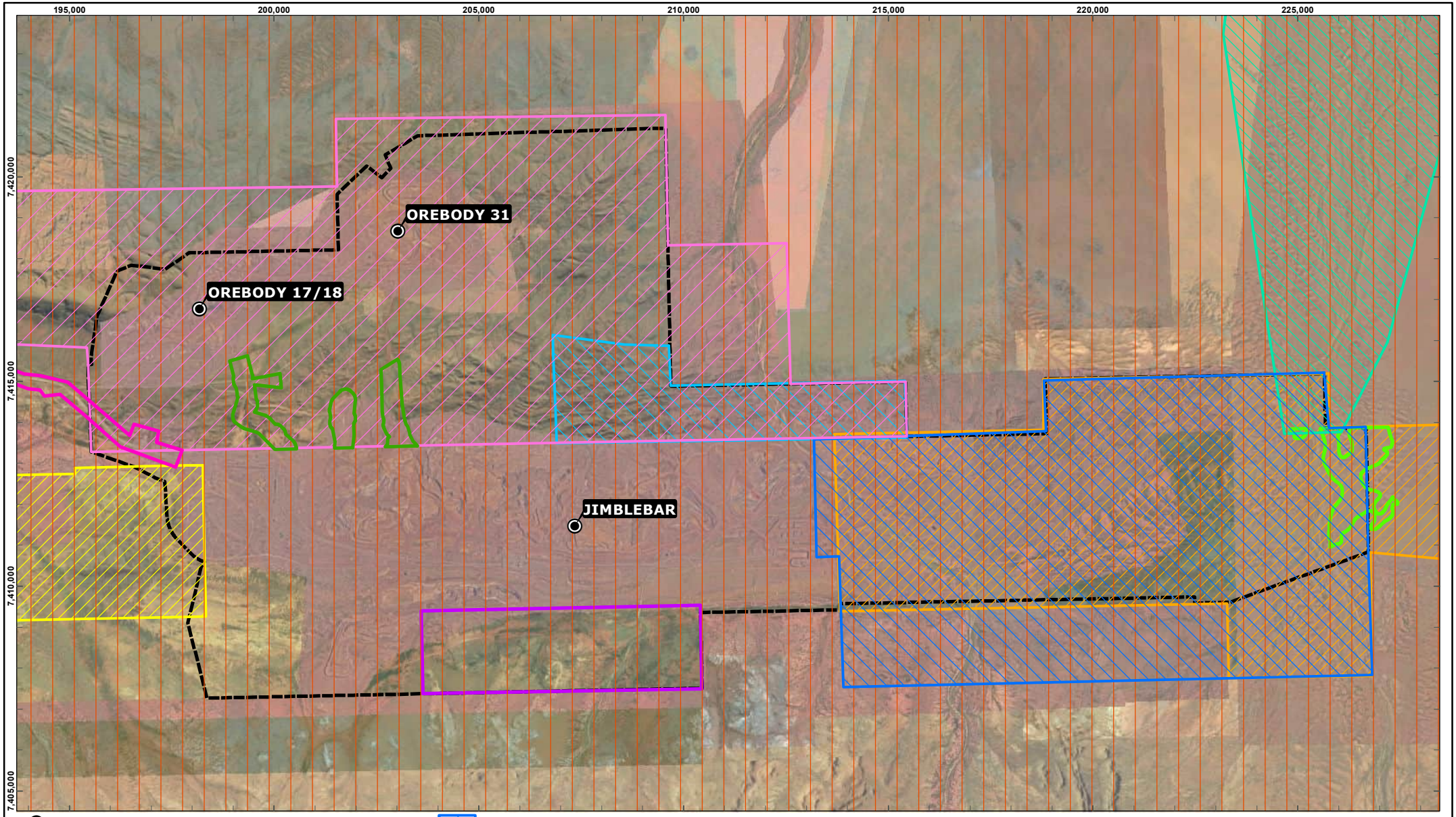
Note that the Caramulla NVCP Training Package searching for Mulgara and Bilby Burrows is identified in Figure 4-1. This relates to a site visit to provide training on accurate identification of Bilby burrows and is therefore not included in the table above.

4.2.2 Other Surveys

A total of 33 fauna surveys and assessments which intersect the Activity Area have been completed between 1994 and 2018. The combined survey coverage of these is depicted in Figure 4-2. The most relevant and recent targeted fauna survey is described in Table 4-2 below.

Table 4-2 Other fauna surveys

Title	Date	Survey type	Summary
Western Ridge and Jimblebar Ghost Bat Monitoring Program: 2021-2022 (Biologic 2023a)	Sept 2021 x 2 Feb 2022 June 2022 Sept 2022	Ghost bat monitoring program to understand the population dynamics, cave usage and significance, and Ghost Bat movements in the Eastern Pilbara region (with a particular focus on Western Ridge and Jimblebar). This monitoring period represents the first of a continuous monitoring program established for the area. Forty-two (42) caves were monitored with each visited at least once during the survey period, with a total of 148 cave visitations undertaken. Note this monitoring program is also capable of detecting a broad spectrum of bat calls including from Pilbara Leaf-nosed Bat, if present.	Monitoring detected evidence of Ghost Bat at seven caves at Jimblebar in 2021 and at seven caves in 2022. No PLNB calls were recorded on SM4 bat detectors established within the Activity Area.



- BHP mine
- Activity Area
- BHP WAIO Warrawandu Targeted Fauna Survey Report (Biologic 2023)
- Caramulla Miscellaneous Licence Level 1 and Targeted Vertebrate Fauna Survey (Biota 2020)
- Caramulla NVCP Training Package Searching for Mulgara and Bilby Burrows (GHD 2019)
- East Jimblebar Vertebrate Fauna Survey (GHD 2019)
- East Jimblebar and Caramulla Targeted Bilby Survey (GHD 2020)
- Jimblebar Greenhouse Gas Abatement Study Level 1 Vertebrate Fauna Survey (Biologic 2020)
- Jimblebar targeted ghost bat survey (GHD 2020)
- North Jimblebar Vertebrate Fauna Survey (GHD 2019)
- North Jimblebar: Targeted Northern Quoll Assessment (Biologic 2022)
- Shearer's West Targeted Vertebrate and Short-range Endemic Invertebrate Fauna Assessment (Biota 2019)
- Mesa Gap Targeted Flora, Vegetation and Fauna Survey (Astron 2019)

N

0 1 2 3 4 5

KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

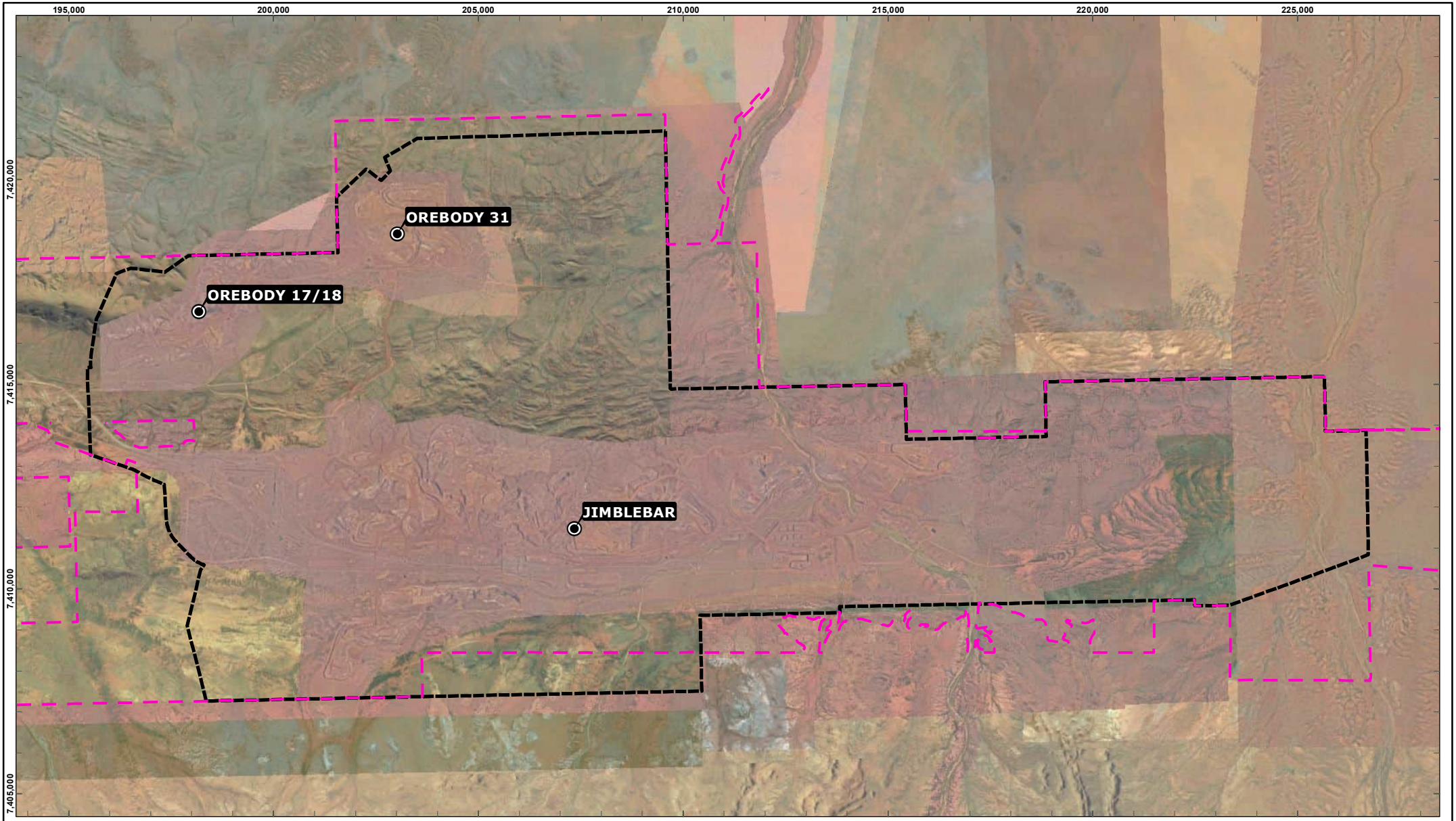
JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Contemporary Vertebrate Fauna Surveys undertaken in the Activity Area

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:125,000	PREPARED:	SPATIAL DATA	FIGURE:	4-1
DATE:	20/02/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/146A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_146_E_JMB_VN_VertFaunaSurveys_RevA.mxd



BHP mine
Historical Survey Coverage
Activity Area

N

0 1 2 3 4 5
KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Historic Vertebrate Fauna Surveys undertaken in the Activity Area

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:125,000	PREPARED:	SPATIAL DATA	FIGURE:	4-2
DATE:	19/02/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/147A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_147_E_JMB_VN_VertFaunaSurveysHistoric_RevA.mxd

5 Existing environmental values

5.1 Fauna habitats

Detailed fauna habitat mapping of the Activity Area has been completed as part of the numerous surveys undertaken for the Activity. Previous habitat mapping was reviewed and consolidated across BHP tenements, with habitat descriptions aligned between surveys undertaken across the Pilbara (Biologic 2014a). This consolidated mapping has been regularly revised and updated as new survey data became available.

Based on this consolidated mapping, and subsequent surveys, 11 fauna habitat types have been mapped within the Activity Area (Table 5-1 and Figure 5-1). A portion of the Approved Proposal area (for MS1126) is unmapped. This unmapped area is associated with the existing Jimblebar mine, which began operating in 1989 prior to BHP ownership and the introduction of survey requirements and prior to the introduction of the EPBC Act in 1999.

Table 5-1 Fauna habitats present in the Activity Area and Indicative Footprint

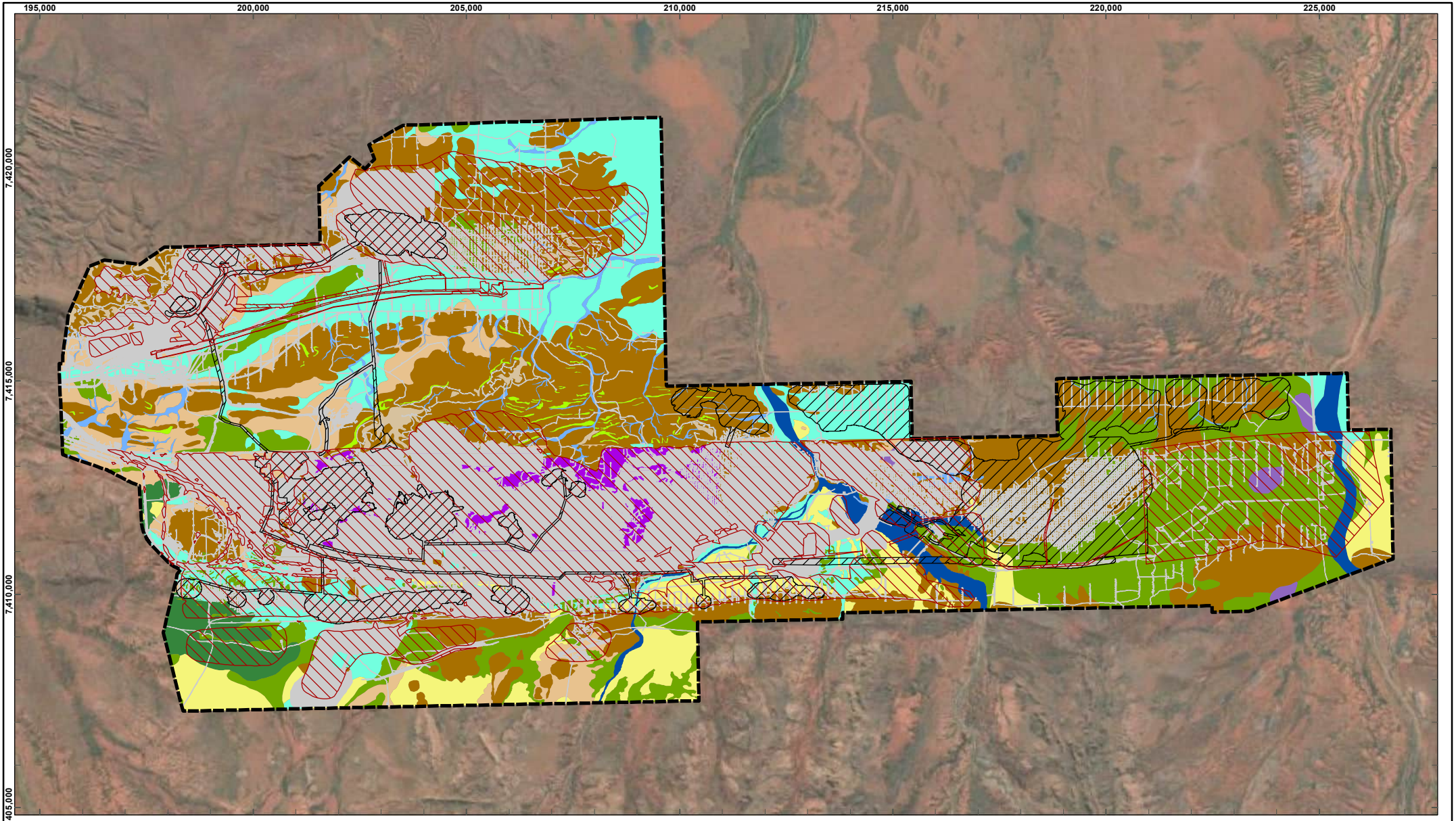
Habitat Type	Description	Extent within Activity Area (ha)	Extent within the Indicative Footprint to be cleared (ha)
Breakaway/ Cliff	Breakaways/ Cliffs are rugged, incised rocky hills and ranges, generally occurring within the Hillcrest/ Hillslope habitat type. They tend to contain large rock fragments and more rock outcropping than other habitats. Vegetation can be dense and complex in areas of soil deposition or sparse and simple where erosion has occurred.	114.7	Up to 2.5
Claypan	Claypans are often isolated features associated with tussock grasses. Cracking clay soils, usually containing weak crabhole (gilgai) micro-relief, and are generally saline at depth. Surface mantles are absent or common to abundant as pebbles and cobbles of ironstone, basalt and other rocks.	90.5	0
Drainage Area/ Floodplain	The Drainage Area/ Floodplain habitat type is low in relief, generally located adjacent drainage lines, and has been shaped by the presence of water and surface water movement. This habitat is characterised by a low woodland over broad-leafed *Acacia* shrubland on sandy loam soils, sometimes with exposed rocky areas. These can have high vegetation density, complexity and diversity, and because they tend to occur on depositional areas, often have deeper and richer soils than other fauna habitat types. Grasses tend to be dominated by tussock grasses rather than spinifex.	3,014.0	269.1
Gorge/ Gully	The Gorge/ Gully habitat type occurs across small isolated areas within the Hillcrest/ Hillslope habitat type, and is characterised by greater topographic features including deep gorges, rocky outcropping, scree slopes and a greater abundance of caves and overhangs. Vegetation of this habitat type is variable from sparsely vegetated to more densely vegetated (particularly where associated with minor drainage lines).	185.3	Up to 7.6
Hardpan Plain	Hardpan Plain habitat type is associated with lower lying plain often sparsely vegetated or with scattered Mulga, occurring on heavy clay substrates often with a stony or gravelly surface. Characterised by large open areas often void of vegetation.	406.6	0.8

Habitat Type	Description	Extent within Activity Area (ha)	Extent within the Indicative Footprint to be cleared (ha)
Hillcrest/ Hillslope	The Hillcrest/ Hillslope habitat type tends to be more open and structurally simple due to their position in the landscape compared to other habitats, and are dominated by varying species of spinifex. The vegetation is variable and may contain *Eucalyptus* trees, *Acacia* and *Grevillea* scrublands over hummock grasslands. A common feature of these habitats is a rocky substrate, often with exposed bedrock, and skeletal red soils. The occurrence of this habitat type lacks trees that would provide perching opportunities for foraging.	6,760.1	1,067.1
Major Drainage Line	Major Drainage Lines comprise mature River Red Gum and Coolibah trees over dry river pools. The riverbeds of this habitat type are generally open, sandy or gravelly. In non-grazed areas, the vegetation adjacent to the main channel or channels is denser, taller and more diverse than adjacent terrain.	486.5	15.9
Minor Drainage Line	Located within the minor gullies and depressions, generally through the Hillcrest/ Hillslope or Drainage Area/ Floodplain habitat types. Consists primarily of *Acacia* low shrubland with occasional scattered *Corymbia* trees. The understorey generally lacks density and often consists solely of sparse tussock grassland, often including the weed Buffel Grass (**Cenchrus ciliaris*) where it has been introduced. The substrate can be sandy in places but generally consists of a skeletal loam gravel or stone.	328.1	24.7
Mulga Woodland	The Mulga Woodland habitat type includes woodlands and other ecosystems in which Mulga (*Acacia aneura* and close relatives) is dominant, either as the principal *Acacia* species or mixed with others. It consists of broad groves on stony or sandy soils, with little undergrowth. Within the eastern portion of the proposed Development Envelope, this habitat type occurs in bands or groves adjacent to drainage lines and lower relief drainage areas and floodplains.	3,322.1	492.9
Sand Plain	Sand Plain habitat type is characterised by relatively deep sandy soils supporting dense spinifex grasslands, sparse shrubs and scattered *Corymbia* and *Acacia* trees. This habitat transitions into patches of Mulga in places. This habitat often occurs as terraces along drainage lines and extensive plains.	1,402.9	24.4
Stony Plain	The Stony Plain habitat type is characterised by erosional surfaces of gently undulating plains, ridges and associated footslopes. Mainly support hard spinifex (and occasionally soft spinifex) with mixed *Acacia*, *Hakea* and *Senna* species open shrubland with a mantle of gravel and pebbles.	1,201.2	16.9
Degraded/Cleared		800.8	145.1

Habitat Type	Description	Extent within Activity Area (ha)	Extent within the Indicative Footprint to be cleared (ha)
Unmapped		346.0	0
Sub-total		**18,459**	**2,067**
Cleared areas		6,225	1,256
Previously assessed			465
Total		**24,684**	**3,788**

Cleared areas were cleared under MS439 as amended by MS1012, MS1021 and MS1126 and the Jimblebar Optimisation Project Validation Notice (June 2020) and the Revised Jimblebar Optimisation Project Validation Notice (May 2023), as described in Section 1.4 and Table 2-1.

Previously assessed areas (456 ha) were assessed for the Jimblebar Optimisation Project; however, are yet to be cleared.



- Previously Assessed Areas
- Proposed Development Envelope
- Indicative Footprint
- Indicative Cleared Area as at FY2022
- Breakaway/ Cliff
- Claypan
- Drainage Area/ Floodplain
- Gorge/ Gully
- Hardpan Plain
- Hillcrest/ Hillslope
- Major Drainage Line
- Minor Drainage Line
- Mulga Woodland
- Sand Plain
- Stony Plain
- Unmapped

N

0 2 4 6

KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Vertebrate Fauna Habitat

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:120,000	PREPARED:	SPATIAL DATA	FIGURE:	5-1
DATE:	7/08/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/173B

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_173_E_JMB_VN_FaunaHabitat_RevB.mxd

5.2 Northern Quoll

The following sections provide background information to demonstrate that Notifiable Action triggers for Northern Quoll are met. Impacts to the Northern Quoll are discussed to illustrate that the Program Matter Objective for this species will be met.

5.2.1 General Species Information

The Northern Quoll is listed under the EPBC Act as 'Endangered'. It is the smallest and most arboreal of the four Australian quoll species (van Dyck and Strahan 2008) and has undergone a dramatic range contraction since European settlement, including a 75% reduction in distribution during the 20th century. In the Pilbara, Northern Quoll distribution is bounded in the north, east and south by the Great Sandy Desert, Gibson Desert and Little Sandy Desert (DotE 2023c). The potential invasion of the Pilbara by the Cane Toad is regarded as the most significant future threat to the persistence of the Northern Quoll in the Pilbara (Cramer *et al.* 2016a).

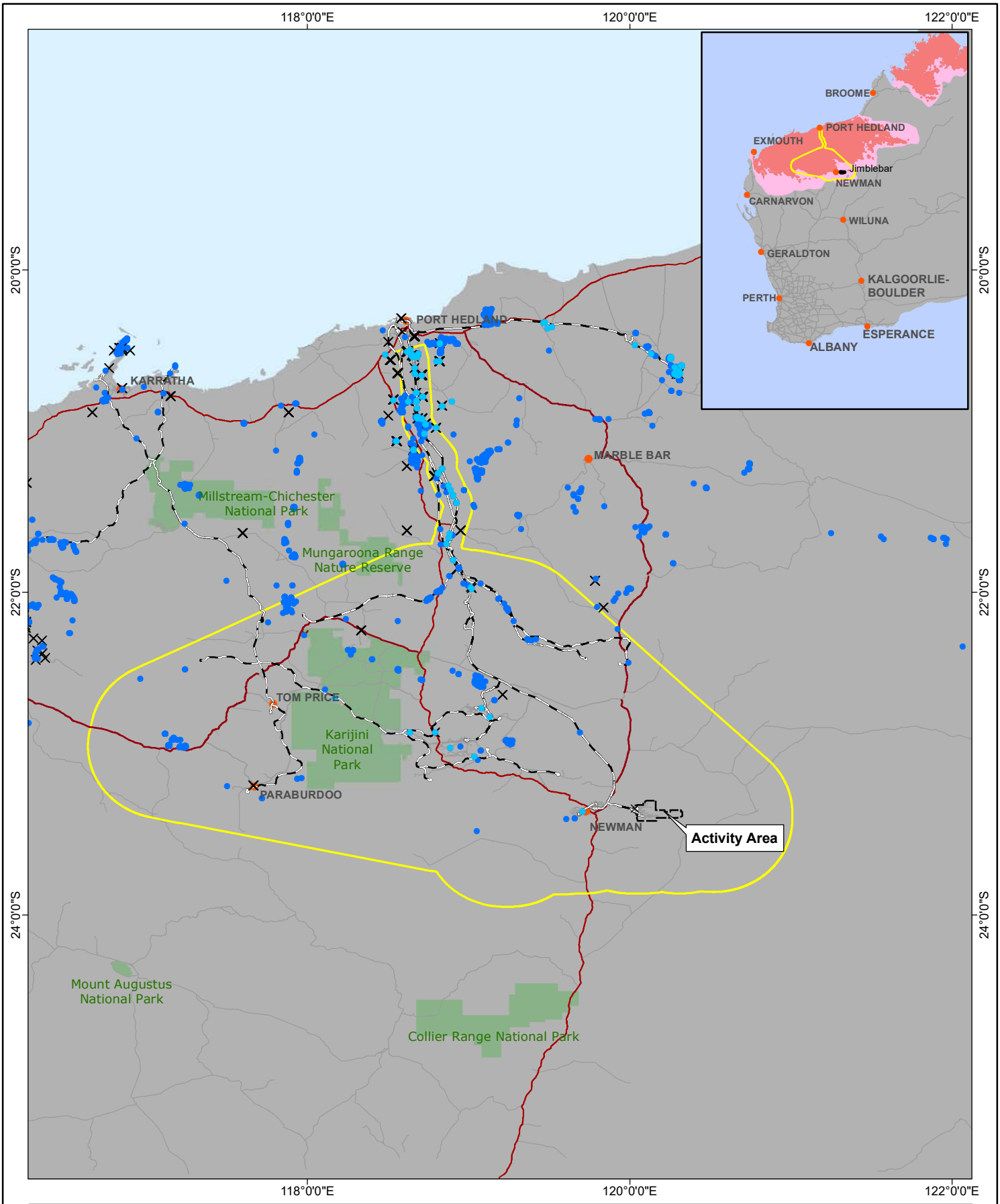
The Northern Quoll is a short lived mammal which mostly favours rocky habitats (e.g. escarpments, mesas, gorges, breakaways and boulder fields), major drainage lines and treed creek lines as denning or shelter habitat, and foraging occurs in the vegetated areas surrounding their dens (DotE 2023c). Higher densities of Northern Quoll are usually found in rocky habitats as they offer protection from predators and are generally more productive in terms of availability of resources (Braithwaite and Griffiths 1994, Oakwood 2002).

The ecology of Northern Quolls is complex as they use habitats in a variety of ways for denning and foraging, and an individual can use multiple den sites. Northern Quolls will den during the day and leave den sites to forage during the night. They are generally considered to be solitary, with females having mutually exclusive denning areas, but can have overlapping foraging areas. Populations fluctuate annually, which is likely to be related to the abundance, dispersion and renewability of food (Oakwood 2002). Both sexes use a number of dens within their home range (Oakwood 2008).

5.2.2 Regional Habitat and Baseline Modelling Data

The Impact Assessment Report (Eco Logical 2015) presented the modelled habitat preference for the Northern Quoll using 518 species records from publicly available and BHP data. The model indicated that preferred habitat (H4) was strongly associated with rugged hills, ranges and outcrops in the north and northeast of the Pilbara bioregion, as opposed to areas in the central and southern areas of the Pilbara bioregion. It was acknowledged, however, that the model may have potentially under predicted in the higher elevation ranges in the southern part of the Strategic Assessment Area (Eco Logical 2014a).

The cumulative impact assessment model predicts a potential impact of 504 ha to preferred habitat for the Northern Quoll as a result of the Full Conceptual Development Scenario (Table 5-2). No preferred habitat exists in the Activity Area and only a minimal extent of the second most preferred habitat (H3) is present. Figure 5-3 shows the Northern Quoll modelled habitat and regional records within the Activity Area for this Validation Notice.



BHP

Spatial Data - Studies Planning & Access
BHP IRON ORE
PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Northern Quoll regional records and distribution

Scale @ A4:	1:3,500,000	Prepared:	SPATIAL DATA	Project No:	A1021/148
Date:	12/08/2024	Checked:		Figure:	5-2
Revision:	REV B	Reviewed:	ENV.APPROVALS		

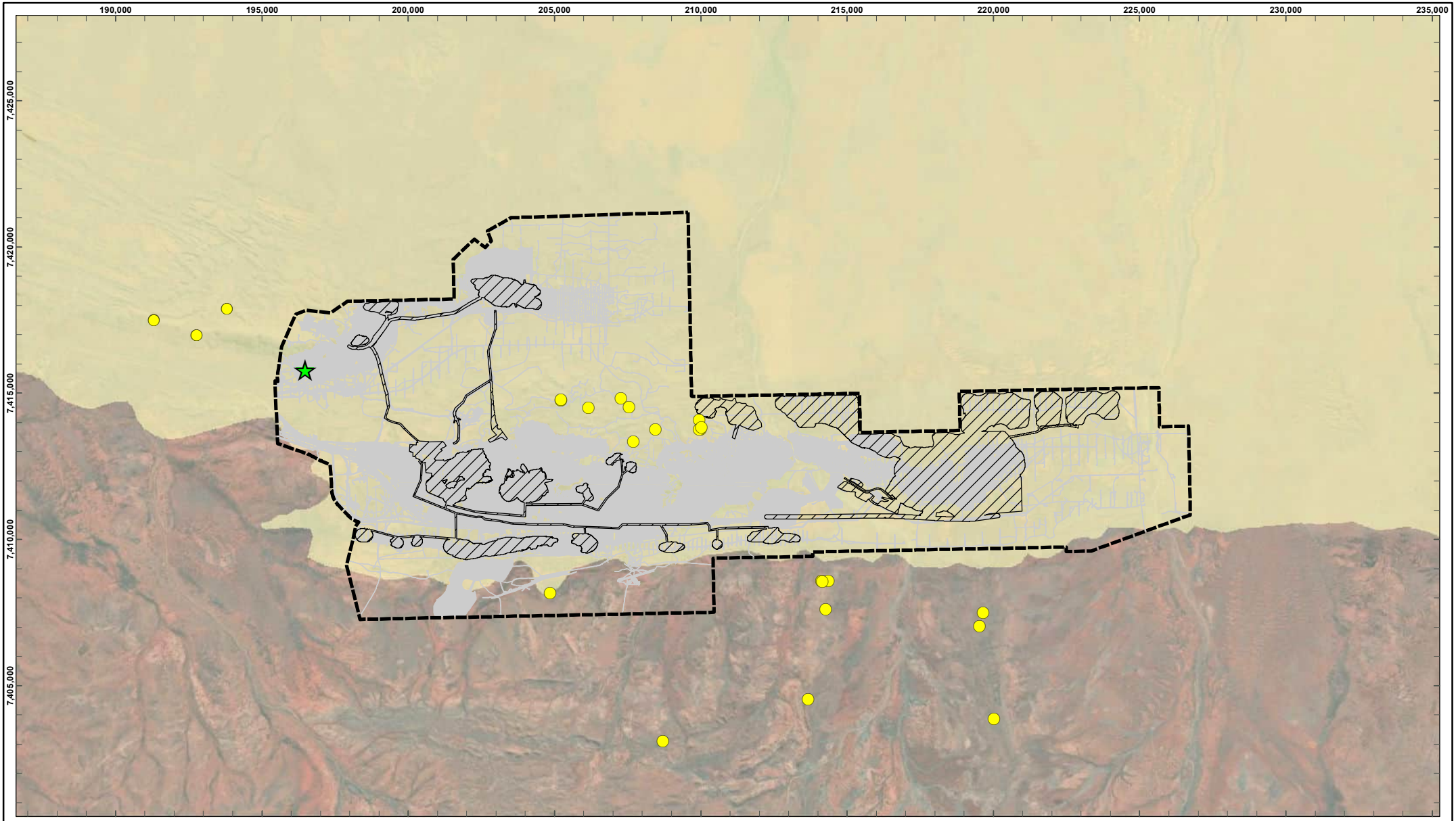
- Northern Quoll records 2005 to 2017
- Northern Quoll records after 2017
- Northern Quoll records missing date
- Town
- Major Road
- Minor/Regional Road
- Rail Centreline
- Activity Area
- Strategic Assessment Area
- Species or species habitat likely to occur
- Species or species habitat may occur

N

0 25 50 75
Kilometres

Coordinate System: GCS GDA 1994
Datum: GDA 1994

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_148_E_JMB_VN_NQRecordsandDistribution_RevB.mxd



Northern Quoll (*Dasyurus hallucatus*) (EN)
Cave
Activity Area
Indicative Footprint
Indicative Cleared Area as at FY2022

Northern Quoll potential habitat modelling
H1 (Lowest potential)
H2
H3
H4 (Highest potential)

N
0 1 2 3 4 5
KILOMETRES
GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Northern Quoll modelled habitat and regional records

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:175,000	PREPARED:	SPATIAL DATA	FIGURE:	5-3
DATE:	3/04/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/149A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_149_E_JMB_VN_NQModelledHabitatandRecords_RevA.mxd

Table 5-2: Northern Quoll modelled habitats within the SAA

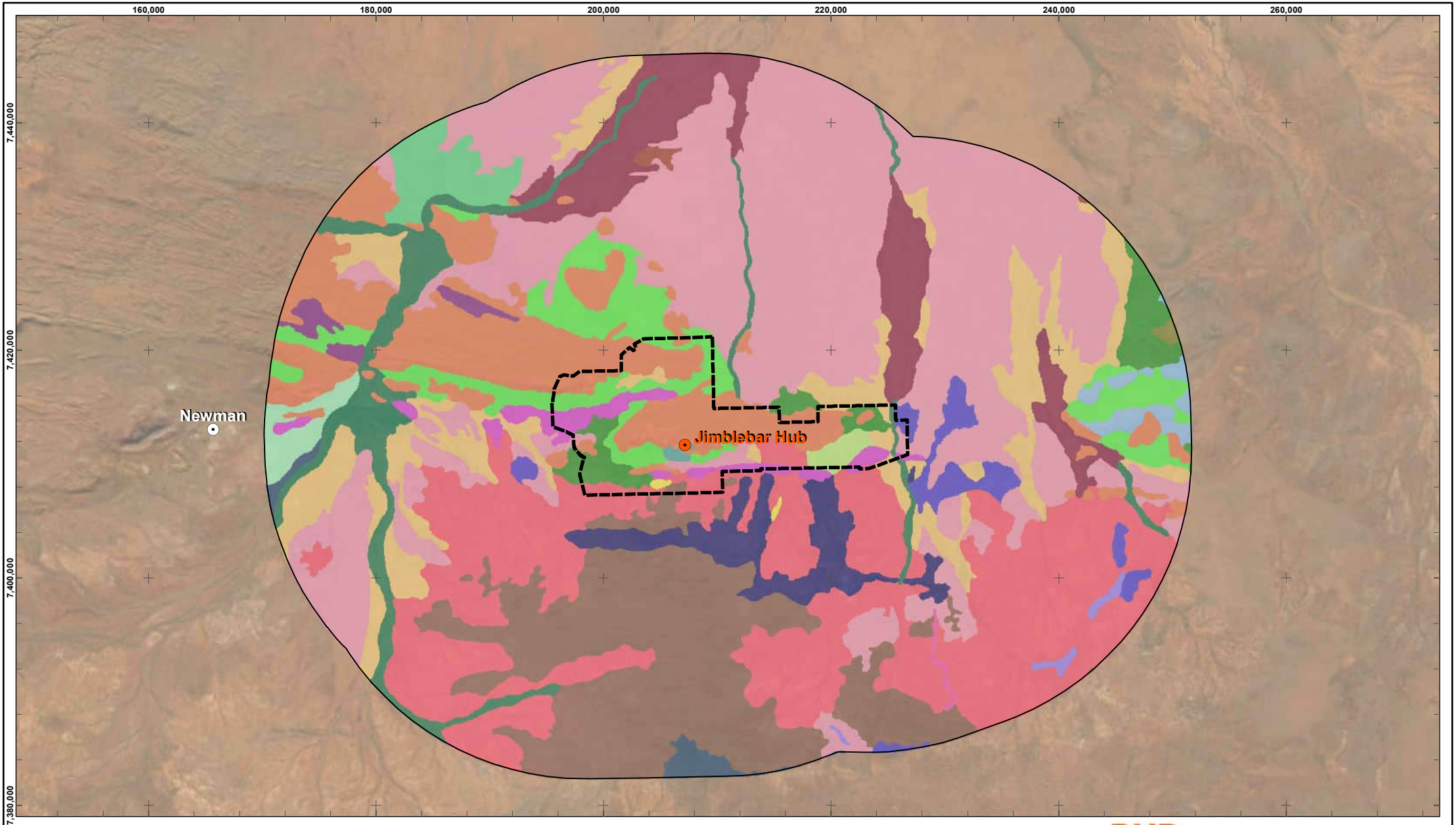
Habitat Description	Modelled Habitat Area Pilbara bioregion (ha)	Modelled Habitat in Strategic Assessment Area (ha)	Modelled Habitat within the Full Development Scenario (ha)	Modelled within Activity Area^ (ha)	Modelled within the Indicative Footprint (ha)
H4	1,552,321	64,228	504	0	0
H3	4,497,928	221,103	3,104	3	1
H2	3,822,101	678,966	3,104	32	3
H1	7,920,267	4,993,780	273	7,382	4,287

The land systems of the Pilbara region documented by van Vreeswyk *et al* (2004) that are found within 25 km of the Activity Area are detailed in Table 5-3 and Figure 5-4. A number of these land systems provide a significant quantity (> 100,000 ha) of preferred Northern Quoll foraging and breeding habitat adjacent to the Activity Area.

Table 5-3: Pilbara land systems within 25 km of the Activity Area

Land System	Description	Habitats	Area (ha)
Adrian	Stony plains with acacia shrublands and halophytic shrublands	Stony Plain	535.54
Balfour	Alluvial plains with tussock grasslands	Stony Plain	316.86
Boolgeeda	Stony lower slopes and plains below hill systems supporting hard and soft spinifex grasslands or mulga shrublands.	Stony Plain Mulga Woodland	18,449.2
Cadgie	Wash plains and sandy banks on hardpan, with mulga shrublands and wanderrie grasses or spinifex	Drainage Area/Floodplain, Major Drainage Line, Mulga Woodland	5,362.63
Charley	Dolerite hills and ridges and restricted plains supporting mulga and *cassia* shrublands or spinifex grasslands.	Hillcrest/Hillslope Gorge/Gully Breakaway/Cliff Drainage Area/Floodplain Major/Minor Drainage Lines	441.92
Disturbed land	Area of mining disturbance	N/A	294.16
Divide	Sandplains and occasional dunes supporting shrubby hard spinifex grasslands.	Sandplains/Sand Dunes	120,562.84
Elimunna	Stony plains on basalt supporting sparse acacia and cassia shrublands and patchy tussock grasslands.	Stony Plain	2,951.59
Fan	Wash plains on hardpan with mulga shrublands	Hardpan Plain	5,856.84
Fortescue	River plains with grassy woodlands and tussock grasslands	Drainage Area/Floodplain, Mulga Woodland	19,971.19

Land System	Description	Habitats	Area (ha)
Jamindie	Stony hardpan plains and rises supporting groved mulga shrublands, occasionally with spinifex understorey.	Drainage Area/Floodplain Stony Plain Mulga Woodland	6,931.13
Laterite	Mesas, breakaways and stony plains with acacia or eucalpyt woodlands and halophytic shrublands	Breakaway/Cliff, Stony Plain, Mulga Woodland	210.77
McKay	Hills, ridges, plateaux remnants and breakaways of meta sedimentary and sedimentary rocks supporting hard spinifex grasslands.	Hillslope/Hillcrest, Breakaway/Cliff	4,769.26
Newman	Rugged jaspilite plateaux, ridges and mountains supporting hard spinifex grasslands.	Hillslope/Hillcrest, Breakaway/Cliff	39,236.64
Prairie	Gently undulating stony plains and granite hills supporting *acacia-eremophila-cassia* shrublands and minor soft spinifex grasslands.	Stony Plain	49,220.4
River	Active flood plains, major rivers and banks supporting grassy eucalypt woodlands, tussock grasslands and soft spinifex grasslands.	Major/Minor Drainage Lines Drainage Area/Floodplain	15,082.64
Robertson	Hills and ranges with spinifex grasslands	Hillcrest/Hillslope	2,656.84
Rocklea	Basalt hills, plateaux, lower slopes and minor stony plains supporting hard spinifex (and occasionally soft spinifex) grasslands.	Hills/Ridges/Breakaways	2,085.13
Spearhole	Gently undulating gravelly hardpan plains and dissected slopes supporting groved mulga shrublands and hard spinifex.	Drainage Area/Floodplain Stony Plain Mulga Woodlands	2,130.04
Slyvania	Gritty surfaced plains and low rises on granite supporting *acacia-eremophila-cassia* shrublands.	Stony Plain	7,7920.4
Table	Low calcrete plateaux, mesas and lower plains supporting mulga and cassia shrublands and minor spinifex grasslands.	Hills/Ridges/Breakaways Major/Minor Drainage Lines Drainage Area/Floodplain Mulga Woodlands	784.72
Talga	Hills and ranges with spinifex grasslands	Hillcrest/Hillslope	10,193.56
Washplain	Hardpan plains supporting groved mulga shrublands.	Stony Plain Mulga Woodland	30,175.03
Zebra	Wash plains and sandy banks on hardpan, with mulga shrublands and wanderrie grasses or spinifex	Mulga Woodland, Sand Plain, Hillcrest/Hillslope	1,222.27



- 25km radius of the Activity Area
- Development Envelope
- BHP operations
- Adrian
- Balfour
- Boolgeeda
- Cadgie
- Charley
- Disturbed Land
- Divide
- Elimunna
- Fan
- Fortescue
- Jamindie
- Laterite
- McKay
- Newman
- Prairie
- River
- Robertson
- Rocklea
- Spearhole
- Sylvania
- Table
- Talga
- Washplain
- Zebra

N

0 5 10 15 20 25

KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Regional Land Systems

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:450,000	PREPARED:	M. ENGLISH	FIGURE:	5.4
DATE:	9/01/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/026B
		REVIEWED:	A. EDGAR		

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_026_E_Jimblebar_VN_RangelandLandSys_RevB.mxd

5.2.3 Local Habitat

Survey areas and methods used to detect the Northern Quoll in the Activity Area are shown in Figure 5-5 with mapped habitat and records shown in Figure 5-6. The Activity Area falls within the current distribution of the Northern Quoll, whereby the species or species habitat may occur.

While some habitats present in the Activity Area meet the definition of critical habitat, given the absence of a population in the Activity Area or within 500m of the Activity Area, there is no 'home range' for this species relevant to the Activity Area. Therefore, these habitats are not considered further.

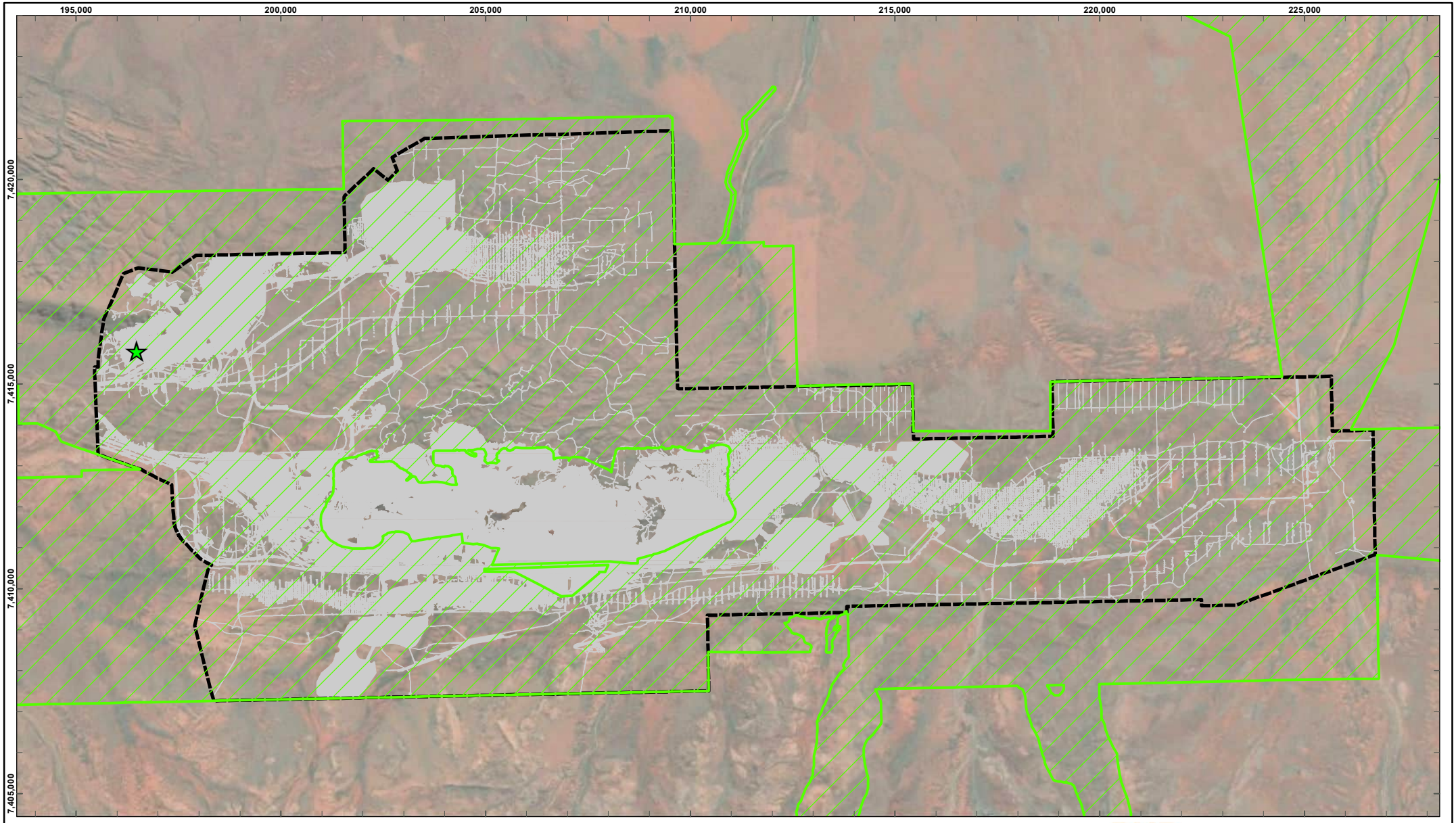
Supporting habitat present in the Activity Area includes Hillcrest/Hillslope, Sand Plain and Stony Plain. Up to 9,364.2 ha of these habitats are present in the Activity Area (Table 5-4). A total of 1,108.4 ha of supporting habitat is present within the Indicative Footprint and will be impacted.

Table 5-4 Northern Quoll habitat

Habitat Description	Within Activity Area (ha)	Within Indicative Footprint of Proposal (ha)
Supporting habitat		
Hillcrest/Hillslope	6,760.1	1,067.1
Sand Plain	1,402.9	24.4
Stony Plain	1,201.2	16.9
Total	**9,364.2**	**1,108.4**

5.2.4 Northern Quoll Records

One record of a Northern Quoll scat was recorded in the Activity Area in 2021 on a waste dump undergoing rehabilitation. No further evidence of Northern Quoll presence has been recorded in the Activity Area or within areas surveyed within 500m of the Activity Area despite targeted survey effort. Given the lack of further evidence, it is unlikely that a population of the species occurs in the Activity Area.



Northern Quoll - Sample Method

- Opportunistic
- Survey Coverage
- Activity Area
- Indicative Cleared Area as at FY2022

N

0 1 2 3 4 5

KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

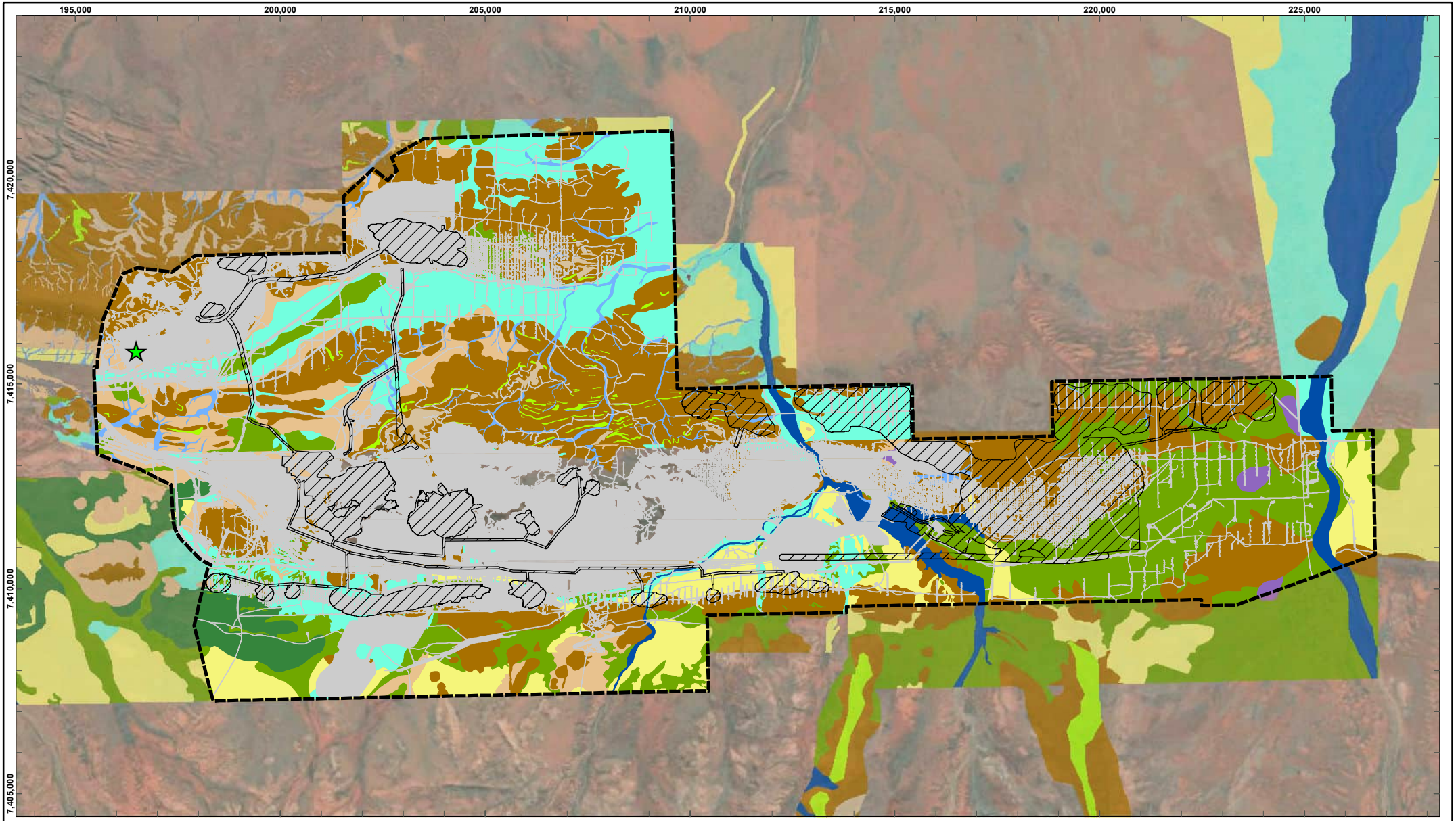
JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Northern Quoll
survey areas and methods

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:125,000	PREPARED:	SPATIAL DATA	FIGURE:	5-5
DATE:	19/02/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/150A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_150_E_JMB_VN_NQSurveys_RevA.mxd



Northern Quoll (*Dasyurus hallucatus*) (EN)

Indicative Footprint

Activity Area

Indicative Cleared Area as at FY2022

Habitat Area

- Breakaway/ Cliff
- Calcrete Plain
- Claypan
- Cleared/ Disturbed
- Drainage Area/ Floodplain
- Gorge/ Gully
- Hardpan Plain
- Hillcrest/ Hillslope
- Major Drainage Line
- Minor Drainage Line
- Mulga Woodland
- Sand Plain
- Stony Plain
- Undulating Low Hills

N

0 1 2 3 4 5

KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Northern Quoll
mapped habitat and records

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:125,000	PREPARED:	SPATIAL DATA	FIGURE:	5-6
DATE:	3/04/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/151A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_151_E_JMB_VN_NQHabitatandRecords_RevA.mxd

5.2.5 Impact Assessment

The potential direct and indirect impacts to the Northern Quoll from the Activity are considered below. Impacts to the Northern Quoll are discussed and the mitigation hierarchy applied to illustrate that the Program Matter Objective for this species will be met.

Habitat Loss

The key potential impact to the Northern Quoll arising from the Activity is loss of habitat. Up to 1,108.4 ha of supporting habitat, including Hillcrest/Hillslope, Sand Plain and Stony Plain will be disturbed and this is considered a residual impact; however, given the lack of evidence of a residing population or colony, fragmentation as a result of the Activity is not predicted to impact any individuals.

Hydrological changes

Groundwater dewatering for the Activity will lower the groundwater table at Jimblebar East, in proximity to the proposed new below water table pits. Riparian vegetation occurs along Jimblebar Creek and Caramulla Creek; however, depth to groundwater in these areas is greater than 50 mbgl, and therefore too deep for roost systems of Eucalyptus species to access. There are also no groundwater dependent pools present in the Activity Area or within the modelled drawdown area. As a result, dewatering is not predicted to impact the condition of critical foraging habitat for the Northern Quoll.

Geochemical analysis of tailings demonstrates that tailings are not acid forming and liquids generated from tailings are near neutral pH, low salinity and low metal and nutrient concentrations. The selected short term tailings storage options (De Grey and Swan pits) have been assessed for connectivity to the regional aquifers. The De Grey pit is not hydraulically connected to the regional aquifer due to presence of a hydraulic barrier, while the Swan pit is indirectly hydraulically connected to the regional aquifer via the connection to Orebody 31. Any seepage from Swan pit would be captured by groundwater abstraction at Orebody 31 from ongoing dewatering activity. As a result, in pit tailings is not expected to impact groundwater quality. In addition, as described above, there is no groundwater dependent vegetation or pools present in the Activity Area and therefore, fauna habitats are not predicted to be impacted by in pit tailings deposition.

Alterations to landforms and construction of infrastructure can lead to altered surface water drainage patterns which in turn may cause flooding and erosion in some areas and, rain-shadow effects in other areas. With the implementation of surface water management measures, changes to surface water drainage will be minimized and are not predicted to result in residual impacts to habitats as a result of the Activity.

Habitat modification

Hot work activities on site and the introduction and increased vehicle movements could increase the risk of fire and spread of weeds, respectively. Fire and weed encroachment have the potential to degrade Northern Quoll supporting habitat within the Activity Area and within 500m of the Activity Area (DCCEEW 2023a). In addition, fire activity can remove ground cover and make native fauna more vulnerable to predation. With standard BHP fire management and weed control practices, the potential for increased risk of fire and habitat degradation due to weeds, are considered low and are not predicted to result in residual impact to the species.

Vegetation clearing and vehicle movements may result in an increase in airborne particulate matter. Dust can indirectly affect fauna by altering the structure and composition of native vegetation and causing habitat degradation. Degradation of habitat value due to dust emissions is considered unlikely with the implementation of dust monitoring and management, throughout construction and operation of the Activity.

Alterations to landforms and construction of infrastructure can lead to altered surface water drainage patterns which in turn may cause flooding and erosion in some areas and, rain-shadow effects in other areas. With the

implementation of surface water management measures, changes to surface water drainage will be minimized and are not predicted to result in residual impacts to habitats as a result of the Activity.

Vehicle and infrastructure interactions

Interaction of fauna with vehicle and machinery movements have the potential to result in fauna strike, causing injury or mortality to fauna individuals. Northern Quoll are a ground dwelling species and therefore may be at risk of vehicle strike. The risk of interaction with vehicles is greatest where roads occur in proximity to suitable habitat for the species. Much of the proposed Indicative Footprint is located in existing operational and disturbed areas and therefore the portions of the Activity in these areas are not predicted to alter the potential for interaction. In addition, given the scarcity of records of Northern Quoll in the Activity Area and within 500m of the Activity Area, the Activity is not predicted to result in a residual impact to Northern Quoll from vehicle or machinery interaction.

The Activity will include the construction and operation of new infrastructure including a beneficiation plant and overland conveyor. The beneficiation plant will be located in an existing cleared area and therefore construction of this infrastructure is not predicted to result in residual impact to Northern Quoll or its habitat. The conveyor location will require clearing. The conveyor will be elevated above the ground level on a fixed structure and is therefore unlikely to result in interaction of moving parts with any individual Northern Quoll that may be present. On this basis, infrastructure and vehicle interactions are not predicted to result in a residual impact to Northern Quoll.

Feral Predators and Cane Toads

Feral predators may compete with the Northern Quoll for food or may prey on it. With implementation of standard BHP waste management and feral cat management practices, and given there is only the one confirmed scat of Northern Quoll in the Activity Area, the potential impact of feral cats as a result of the Activity on Northern Quoll is considered low. BHP is also currently investigating options to implement ongoing feral cat monitoring to enhance detection and control measures. This information will be updated in the final Validation Notice if available at the time of publication.

The Northern Quoll is vulnerable to lethal toxic ingestion of cane toad toxin, and this is considered the main threat to Northern Quoll populations outside of the Pilbara (Oakwood 2004; Hill and Ward 2010). The future predicted spread of the cane toad into the Pilbara bioregion may have comparable negative impacts to the Northern Quoll as observed in other areas of northern Australia. Some models predict that the cane toad's distribution will spread to include the Pilbara via the narrow coastal strip but this spread will be dependent on the presence of artificial water bodies (Tingley *et al*. 2013). This Activity is not predicted to increase impact of Cane Toad on the Northern Quoll. In addition, as there is only one record of the species in the Activity Area, the potential impact of Cane Toads on the Northern Quoll as a result of the Activity is considered low.

Infrastructure and Vehicle interactions

The presence of infrastructure has the potential to alter movement patterns of fauna that may be present. Much of the Indicative Footprint has been placed on existing cleared areas where habitat values no longer exist.

Interaction of fauna with vehicle and machinery movements have the potential to result in fauna strike, causing injury or mortality to fauna individuals. Northern Quoll are vulnerable to vehicle strike due to being a ground dwelling species and the risk of interaction with vehicles is greatest where roads occur in proximity to suitable habitat for the species.

Haul roads and access roads will be required to support the Activity. As there is only one confirmed record of the species in the Activity Area, the risk of mortality due to vehicle collision as a result of the Activity is considered very low and therefore the Activity is not predicted to result in residual impact to the species from vehicle interactions.

5.2.6 Mitigation Hierarchy

Avoid

Given there is only one record of Northern Quoll in the Activity Area, no specific avoidance measures have been applied in relation to this species. The establishment of buffers for Ghost Bat caves will also protect and retain suitable habitat for Northern Quoll, given the habitats within the buffers may also suitable for Northern Quoll foraging. In addition, the Activity has been designed to be located on existing cleared areas, as much as possible, to avoid clearing.

Mitigate

Potential impacts to Northern Quoll habitat from fire are to be minimised through standard BHP hot work management procedures, assigning designated smoking areas and managing fuel loads through weed control programs.

BHP will store waste securely to prevent feral animal attraction and will implement standard BHP feral cat management practices.

In the event the presence of Cane Toads is detected on site, additional management measures will be applied following the guidance of DBCA.

5.2.7 Residual Impact

Residual impacts to Northern Quoll include the direct disturbance to 1,108.4 ha of supporting habitat, which has the potential to support foraging. Given there is one record of Northern Quoll in the Activity Area, BHP will provide offsets for notifiable actions in accordance with the requirements of the Program.

5.2.8 Review of Program Matter Outcomes

Following the impact assessment (Section 5.2.5) and application of the mitigation hierarchy (Section 5.2.6) a review of the Activity against the PMOs was undertaken. Table 5-5 presents a review and identifies which PMOs are relevant for the Activity and considers further management.

Table 5-5 Review of Program Matter Outcomes (Northern Quoll)

Program Matter Outcome	Notifiable Action trigger	Assessment
Minimise loss of critical and supporting habitats of the Northern Quoll as a result of Program Activities within the SAA	Within the Activity Area there is: Presence of Northern Quoll critical habitat and or supporting habitat **AND** Presence or sign of Northern Quoll transient, infrequent or dispersing individual/s	The loss of up to 1,108.4 ha of supporting habitat represents a residual impact and requires offsetting (see Section 7). The Activity has minimised the loss of critical and supporting habitats by utilising existing disturbed areas as far as practicable.

5.2.9 Monitoring

Given the limited evidence of Northern Quoll in the Activity Area, the single record most likely represents a dispersing individual rather than regular or continual use of the area by a population. Therefore, monitoring is not considered to be required.

5.2.10 Summary

The Activity will not impact any critical habitat for the Northern Quoll and impact to supporting habitat has been minimised by designing the disturbance to occur on existing disturbed areas as far as practicable. On this basis, BHP considers that the Activity will meet the PMO to minimise loss of critical and supporting habitats. The loss of supporting habitat will be offset (Section 7).

5.3 Ghost Bat

The following sections provide information to demonstrate that the Ghost Bat Notifiable Action triggers are met. Impacts to the Ghost Bat are discussed and the mitigation hierarchy applied to illustrate that the Program Matter Objective for this species will be met.

5.3.1 General Species Information

The Ghost Bat is listed under the EPBC Act as ‘Vulnerable’. It is the largest microbat in Australia and the second largest in the world (TSSC 2016a). In the Pilbara region, the species occurs in all four sub-regions, and was recorded in 21 of the 24 areas surveyed by DPaW during the Pilbara Biological Survey (2002-2007; see McKenzie and Bullen 2009). The Pilbara Ghost Bat population is currently estimated to be approximately 1,850 (350 across the Hamersley Range and 1,500 across the eastern Pilbara) (Bat Call WA 2021a). The largest colonies of Ghost Bats in the Pilbara occur outside the SAA where they mostly roost in abandoned mines. Colonies within the SAA are much smaller, and available data suggests that they likely depend on a number of roosts within their range.

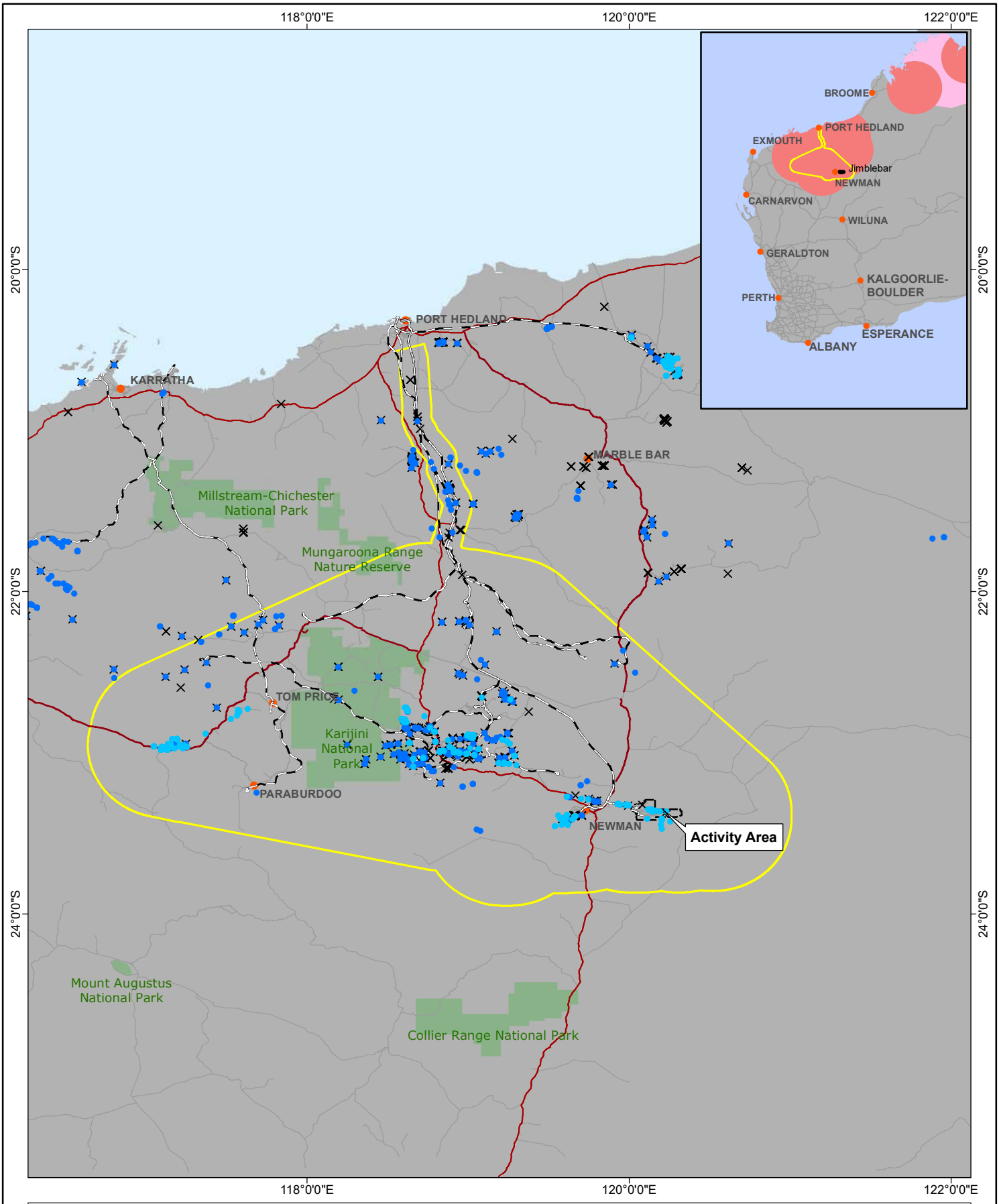
In the Pilbara region, the species roosts in deep, complex caves beneath bluffs of low rounded hills, often composed of Marra Mamba Iron Formation or banded iron formation, granite rock piles and abandoned mines (Armstrong and Anstee 2000). Ghost Bats may move between caves both seasonally and in response to weather changes (van Dyck and Strahan 2008). Highly suitable foraging habitats for the Ghost Bat in the Pilbara include Drainage

Area/Floodplain, Gorge/Gully, Major Drainage Line and Mulga Woodland, followed by Stony Plain as a less suitable habitat (Biologic 2020b; unpublished data).

Recent Ghost Bat tracking studies (Augusteyn et al. 2018, Biologic 2019 and Bullen 2021) show that Ghost Bats, both male and female, forage over large areas up to 12 km from their diurnal roost (Augusteyn et al. 2018; Bullen 2021), and occasionally up to 17 km from a roost during foraging bouts (Bullen et al. 2023).

5.3.2 Regional Habitat

During the Strategic Environmental Assessment, the Ghost Bat was listed as a 'Vulnerable' species under the EPBC Act on 5 May 2016 and was therefore included as a Program Matter for the Impact Assessment Report. As this species was a late inclusion in the Impact Assessment Report, a regional model was not developed; however, BHP conducted an impact assessment based on species records in order to determine cumulative impacts of the Program on the Ghost Bat.



BHP

Spatial Data - Studies Planning & Access
BHP IRON ORE
PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Ghost Bat regional records and distribution

Scale @ A4:	1:3,500,000	Prepared: SPATIAL DATA	Project No: A1021/152
Date:	9/08/2024	Checked:	Figure: 5.7
Revision:	REV B	Reviewed: ENV.APPROVALS	

- Ghost Bat records after 2017
- Ghost Bat records 2005 to 2017
- Ghost Bat records Missing Date
- Town
- Major Road
- Minor/Regional Road
- Rail Centreline
- Activity Area
- Strategic Assessment Area
- Species or species habitat likely to occur
- Species or species habitat may occur

N

0 25 50 75
Kilometres

Coordinate System: GCS GDA 1994
Datum: GDA 1994

Document Path: Y:\Jobs\A1001_A1500\A1021\Project\A1021_152_E_JMB_VN_GBRecordsandDistribution_RevB.mxd

5.3.3 Local Habitat

Surveys areas and methods are show in Figure 5-8 and Ghost Bat habitat and records are shown in Figure 5-9. Critical and supporting habitat are present in the Activity Area and these are discussed below and presented in Table 5-6 and Table 5-8. The Activity Area falls within the current distribution of Ghost Bat whereby the species or species habitat is likely to occur.

Critical habitat

There are no Category 1 or Category 2 roosts (Appendix 3) present in the Activity Area. Two Category 2 roosts are located outside of and more than 500m from the Activity Area.

Critical habitats present in the Activity Area includes 185.3 ha of Gorge/Gully and 114.7 ha of Breakaway/Cliff habitats. Note that the Activity Area includes areas already approved for disturbance under existing Validation Notices that overlap the Activity Area that is relevant to this Validation Notice. Up to 7.6 ha of Gorge/Gully and 2.5 ha of Breakaway/Cliff are in the Indicative Footprint and will be impacted.

Critical foraging habitat within 12 km of the Category 2 roosts is present in the Activity Area including Major Drainage, Minor Drainage, Mulga Woodland and Drainage Area/Floodplain.

Supporting habitat

A total of twelve (12) caves have been recorded in the Activity Area, including three Category 3 caves and nine Category 4 roosts. None of the Category 3 caves are adjacent to Category 2 roosts and are therefore all considered supporting roosts. Indirect evidence including scats and ultrasonic recordings have been made at seven of these caves. The remaining caves have no evidence of use.

While Sand Plain and Stony Plain habitats within 12 km of Category 2 roosts meet the definition of critical foraging habitat, the extents of these habitat types mapped in the Activity Area lack trees that would provide suitable perching opportunities to support nocturnal foraging. These habitat types are therefore considered supporting habitat.

Table 5-6 Caves with potential and recorded Ghost Bat use in the Activity Area

Cave ID	Roost classification (Biologic 2023b)	Cave Characteristics (plus	Distance from existing disturbance	Distance from Indicative Footprint	Evidence of use by Ghost Bats
CJIM-04	Category 4	A shallow (approximately 12m) semi exposed overhang with one chamber approximately 3m high.	87m	176m	None
CJIM-05	Category 4	A semi exposed cave, moderately deep (approximately 15m) with two chambers.	140m	1.88 km	2 records – old scats in 2019 (GHD 2019a) – fresh scats in 2022 (Biologic 2023a)
CJIM-06	Category 4	A semi exposed, moderately shallow (approximately 10m) cave with one chamber approximately 1.5m high.	51m	358m	1 record – few old unconfirmed degraded scats in 2019 (GHD 2019a)
CJIM-07	Category 4	A shallow (approximately 6m) semi exposed cave with one chamber approximately 2m high.	70m	424m	1 record – old unconfirmed degraded scats in 2019 (GHD 2019a)
CJIM-08	Category 4	A small cavity with a restricted entrance (1m wide – 0.7m high). Relatively shallow (approximately 5m) and low (approximately 0.9m) with one chamber.	36m	470m	None
CJIM-09	Category 3	A moderately deep (approximately 20m) cave with a restricted entrance (1.2m wide / 1m high). One chamber approximately 3m high.	141m	567m	3 records – fresh scats in 2020 (GHD 2021b) – ultrasonic recordings of individual(s) in May 2020 (GHD 2021b) – fresh scats in 2021 (Biologic 2023a)
CJIM-14	Category 3	A semi exposed, moderately shallow (approximately 6m) old mine adit with one chamber approximately 1.5m high.	261m	1.34 km	None

Cave ID	Roost classification (Biologic 2023b)	Cave Characteristics (plus	Distance from existing disturbance	Distance from Indicative Footprint	Evidence of use by Ghost Bats
CJIM-15	Category 4	A moderately deep (approximately 20m) cave with a restricted entrance (1.2 m wide and 1.5 m high). One chamber approximately 1.5 m high.	76m	2.25 km	1 record – few fresh scats in 2022 (Biologic 2023a)
CJIM-17	Category 4	A shallow (approximately 5m) semi exposed cave with one chamber approximately 3m high.	79m	2.26 km	None
CJIM-18	Category 4	A semi exposed, moderately shallow (approximately 10m) cave with one chamber approximately 2m high.	189m	1.58 km	None
CJIM-20	Category 4	An exposed, shallow (approximately 5m) cave with one chamber approximately 2.5m high. Entrance is approximately 7m wide.	512m	1.58 km	1 record – fresh scats in 2022 (Biologic 2023a)
CJIM-21	Category 3	A semi exposed, moderately shallow (approximately 15m) cave with one chamber approximately 5m high.	265m	1.82 km	1 record – foraging evidence (few scattered feathers) in 2020 (GHD 2021b)

Table 5-7 Caves with potential and recorded Ghost Bat use outside of the Activity Area

Cave ID	Roost classification (Biologic 2023b)	Distance from Activity Area	Evidence of Ghost Bat use
CJIM-01	Category 4	Greater than 500 m from Activity Area	None
CJIM-02	Category 3	Greater than 2 km from Activity Area	None
CJIM-03	Category 2	Greater than 500 m from Activity Area	4 records – scat in 2019 (GHD 2019b) – large number of scats in 2020 (GHD 2021b) – large number of scats in 2021 (Biologic 2023a) – 1 individual (direct observation) in 2021 (Biologic 2023a)
CJIM-11	Category 3	Greater than 4 km from Activity Area	1 record – old scat in 2020 (GHD 2021b)
CJIM-12	Category 3	Greater than 2.5 km from Activity Area	1 record – old scat in 2020 (GHD 2021b)
CJIM-13	Category 3	Greater than 5.5 km from Activity Area	None
CJIM-16	Category 3	Greater than 1.5 km from Activity Area	2 records – old scat in 2020 (GHD 2021b) – fresh scats in 2022 (Biologic 2023a)
CJIM-19	Category 4	Greater than 500 m from Activity Area	None
CNIN-01	Category 3	4.46 km west of Activity Area	5 records – multiple (four) ultrasonic recordings of individual(s) September to December 2021 (Biologic 2023a) – scats in June 2022 (Biologic 2023a)
CNIN-02	Category 3	Greater than 2 km from Activity Area	None

Cave ID	Roost classification (Biologic 2023b)	Distance from Activity Area	Evidence of Ghost Bat use
CNIN-03	Category 2	2.93 km west of the Activity Area	16 records – scat recorded in 2013 (Biologic 2014b) – large number of scats recorded in September 2021 (Biologic 2023a) – fresh scat recorded in June 2022 (Biologic 2023a) – multiple (12) ultrasonic recordings September 2021 to August 2022 (Biologic 2023a) – large number of scats recorded in September 2022 (Biologic 2023a)
CNIN-04	Category 4	Greater than 4.5 km from Activity Area	None
CNIN-05	Category 4	Greater than 2.5 km from Activity Area	None
CNIN-06	Category 4	Greater than 2 km from Activity Area	None
CNIN-07	Category 3	Greater than 7 km from Activity Area	None
CNIN-09	Category 3	9.59 km west of the Activity Area	10 records – multiple (five) ultrasonic recordings of individual(s) October 2021 to February 2022 (Biologic 2023a) – direct observation of individuals in February 2022 (Biologic 2023a) – multiple (two) ultrasonic recordings of individual(s) May to June 2022 (Biologic 2023a) – direct observation of individuals in May 2022 (Biologic 2023a) – ultrasonic recordings of individual(s) in August 2022 (Biologic 2023a)
CNIN-10	Category 3	Greater than 7 km from Activity Area	None
CNIN-11	Category 3	Greater than 7 km from Activity Area	None
CNIN-12	Category 3	Greater than 7 km from Activity Area	None

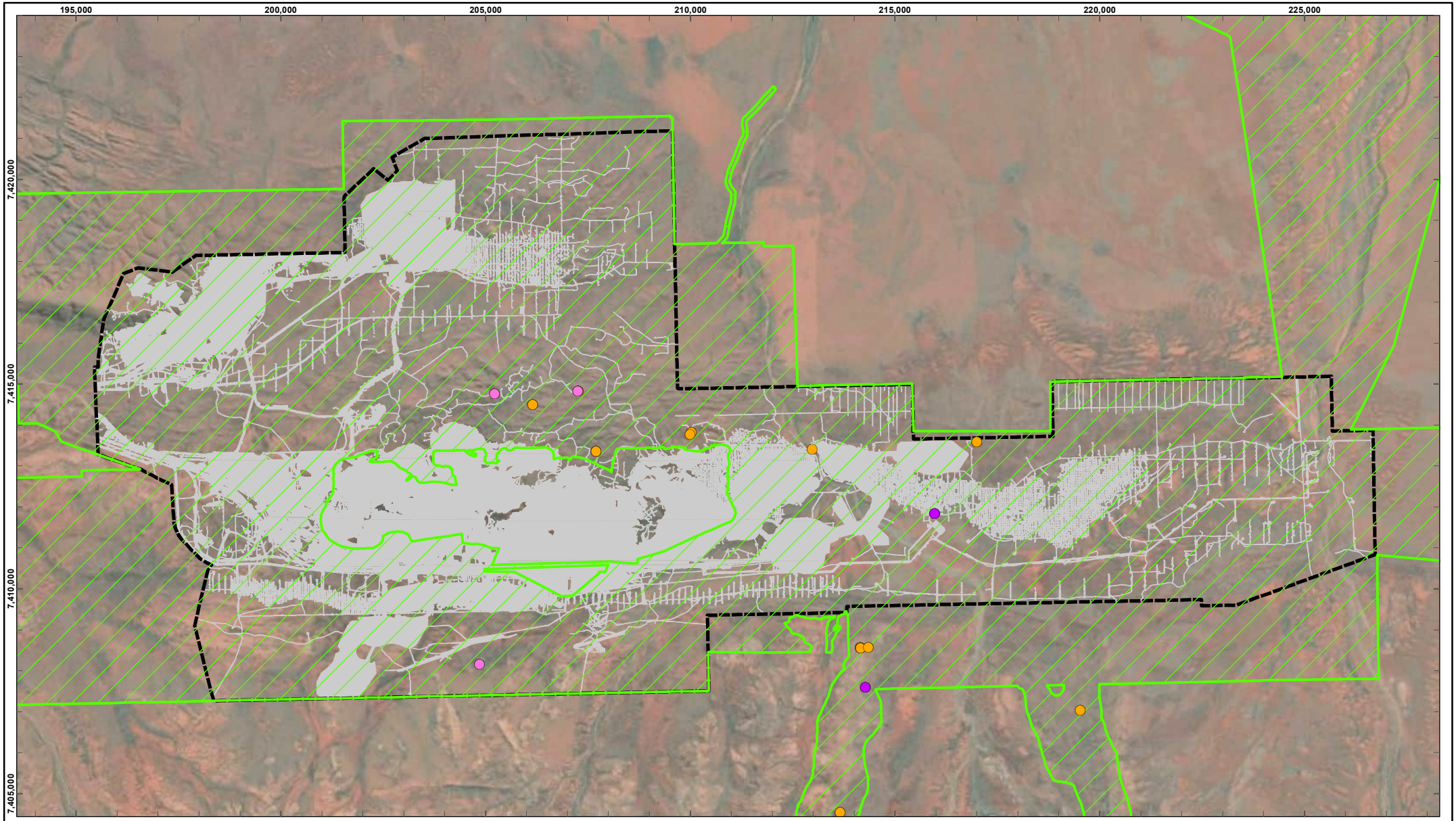
Cave ID	Roost classification (Biologic 2023b)	Distance from Activity Area	Evidence of Ghost Bat use
CNIN-13	Category 3	Greater than 7 km from Activity Area	1 record – scat in 2022 (Biologic 2023a)
CNIN-14	Category 4	Greater than 4.5 km from Activity Area	None
CNIN-16	Category 4	Greater than 7 km from Activity Area	1 record – potential feeding evidence in 2020 (GHD 2021c)
CNIN-17	Category 4	Greater than 2.5 km from Activity Area	None

Note that not all of these caves are shown on Figure 5-9. CNIN-07, 9, 10, 11, 12, 13 and 16 are all located further than 7 km west of the Activity Area and not depicted in this figure.

Table 5-8 Ghost Bat habitat

Habitat description	Within Activity Area (ha)	Within Indicative Footprint (ha)
Supporting habitat		
Sand Plain	1,402.9	24.4
Stony Plain	1,201.2	16.9
Total supporting habitat	**2,604.1**	**41.3**
Critical habitat		
Gorge/Gully	185.3	7.6
Breakaway/Cliff	114.7	2.5
Critical foraging habitat within 12 km of Category 2 roosts		
Major Drainage Line	486.5	15.9
Minor Drainage Line	328.1	24.7
Mulga Woodland	3,322.1	492.9
Drainage Area/Floodplain	3,014.0	268.5
Total critical habitat	**7,450.7**	**812.1**

Note that Sand Plain and Stony Plain habitat types within the Activity Area lack suitable perching trees and generally provide limited foraging value and are therefore considered supporting habitat.



Ghost Bat - SampleMethod

- Opportunistic
- Scat Sheet
- Targeted Search
- Activity Area
- Survey Coverage
- Indicative Cleared Area as at FY2022

N

0 1 2 3 4 5

KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

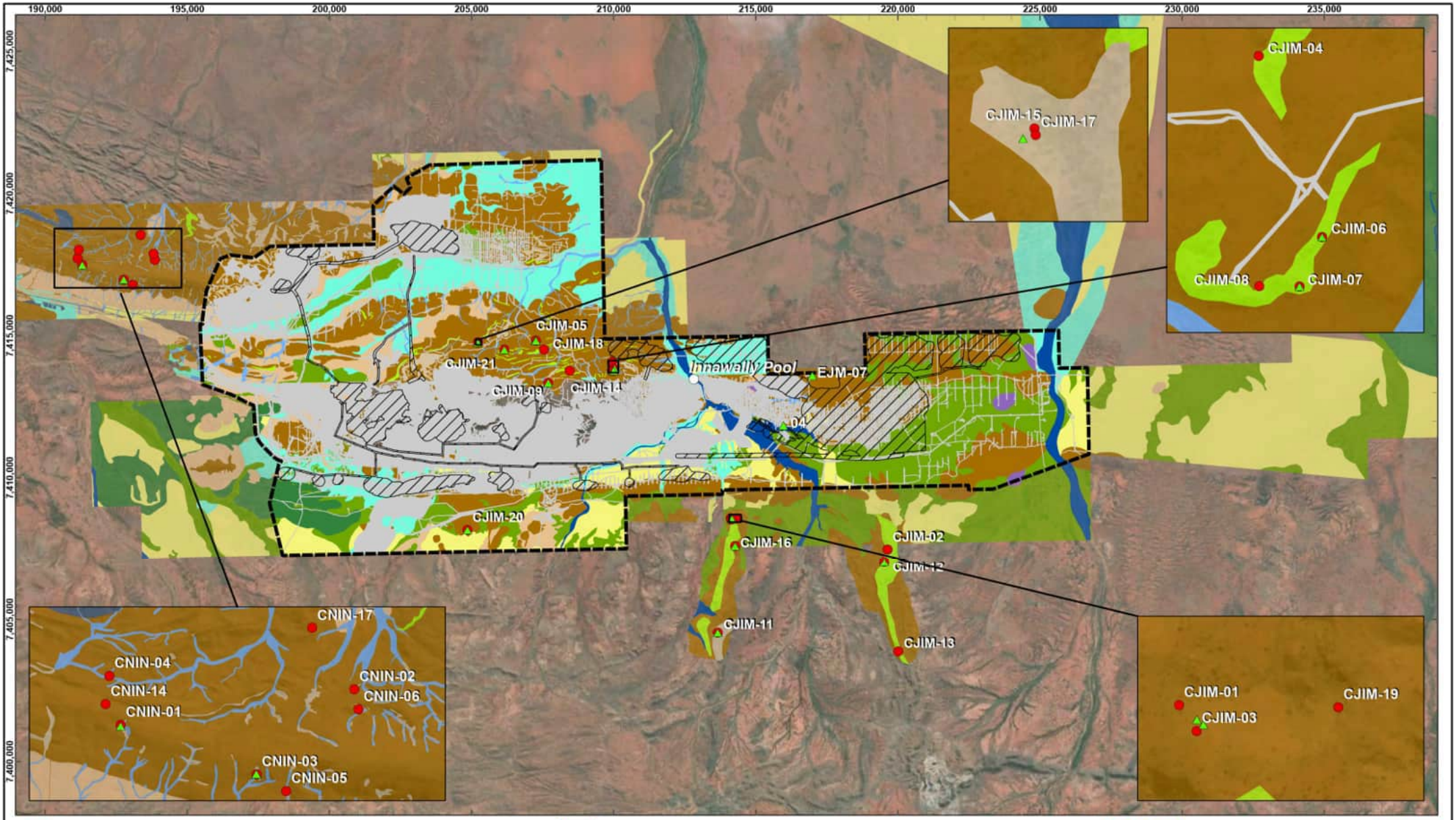
Ghost Bat

survey areas and methods

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:125,000	PREPARED:	SPATIAL DATA	FIGURE:	5-8
DATE:	19/02/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/153A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_153_E_JMB_VN_GBSurveys_RevA.mxd



- Ghost Bat caves
- Ghost Bat (*Macroderma gigas*) records
- Proposed Development Envelope
- Indicative Footprint
- Indicative Cleared Area as at FY2022

Habitat Area

- Breakaway/ Cliff
- Calcrete Plain
- Claypan
- Cleared/ Disturbed
- Drainage Area/ Floodplain
- Gorge/ Gully
- Hardpan Plain
- Hillcrest/ Hillslope
- Major Drainage Line
- Minor Drainage Line
- Mulga Woodland
- Sand Plain
- Stony Plain
- Undulating Low Hills

N

0 2 4 6

KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Ghost Bat mapped habitat and records

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:180,000	PREPARED:	SPATIAL DATA	FIGURE:	5-9
DATE:	30/10/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/154F

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_154_F_JMB_VN_GBHabitatandRecords_RevE.aprx

5.3.4 Ghost Bat Records

Twelve records of Ghost Bat presence have been recorded in the Activity Area including scats, ultrasonic recordings and evidence of foraging (feathers). Ten of these records are from seven caves and the remaining two are from a foraging individual in drainage line habitat (Table 5-6 and Table 5-9).

Table 5-9 Ghost Bat records in the Activity Area

Record	Year	Description
Site ID-04	Aug-Sept 2005	Opportunistic observation of a Ghost Bat foraging (Ecologia 2006b)
EJM-07	May 2019	Observation of Ghost Bat foraging residue (GHD 2021)

Evidence of Ghost Bat from outside of the Activity Area has been recorded from scats, ultrasonic recordings and direct observations with the nearest records approximately 1 km from the Activity Area (Table 5-7).

The number of records and presence of critical roosts outside of the Activity Area and supporting roosts in the Activity Area, with evidence of use suggests that the species is resident in the Jimblebar area.

5.3.5 Impact Assessment

The potential direct and indirect impacts to Ghost Bats from the Activity are outlined below. The loss of critical foraging habitat within 12 km of Category 2 roosts, including Minor Drainage, Major Drainage, Mulga Woodland and Drainage Area/Floodplain is a residual impact that requires offsetting (Section 7).

Habitat loss

The Activity will avoid direct impact to all Ghost Bat roosts present within the Activity Area, based on the Indicative Footprint.

Clearing will result in the loss of up to 7.6 ha of Gorge/Gully and up to 2.5 ha of Breakaway/Cliff habitat, which are considered critical habitat for Ghost Bat. In addition, the Activity will result in the loss of approximately 802 ha of critical foraging habitat within 12 km of the two Category 2 roosts outside of the Activity Area. This includes Major Drainage Line, Minor Drainage Line, Mulga Woodland habitats and Drainage Area/Floodplain habitats. This clearing is within an existing operational mine area and is therefore not expected to fragment an existing population. This clearing is considered a residual impact; however, given the average foraging distance of Ghost Bats (12 km), this impact is not expected to reduce the availability of habitat to the extent that the population will decline.

Noise and Vibration

Noise and vibration in proximity to Ghost Bat roosts have the potential to disturb Ghost Bats that may be present, causing flushing from roosts and temporary or permanent abandonment. All 12 caves recorded in the activity Area are either Category 3 or Category 4 roosts, representing supporting habitat for Ghost Bat. Indirect evidence of use has been recorded at seven of the 12 caves. All of the seven caves are located greater than 300m from the Indicative Footprint. Given the separation distance from roost to proposed disturbance, it is not predicted that the activity will result in residual impact to Ghost Bat individuals or habitat as a result of noise or vibration.

Hydrological changes

Groundwater dewatering for the Activity will lower the groundwater table at Jimblebar East, in proximity to the proposed new below water table pits. Riparian vegetation occurs along Jimblebar Creek and Caramulla Creek; however, depth to groundwater in these areas is greater than 50 mbgl, and therefore too deep for roost systems of

Eucalyptus species to access. There are also no groundwater dependent pools present in the Activity Area or within the modelled drawdown area. As a result, dewatering is not predicted to result in residual impacts to the condition of critical foraging habitat for the Ghost Bat. Similarly, given depth to groundwater, drawdown is not predicted to result in any change to cave microclimate.

Geochemical analysis of tailings demonstrates that tailings are not acid forming and liquids generated from tailings are near neutral pH, low salinity and low metal and nutrient concentrations. The selected short term tailings storage options (De Grey and Swan pits) have been assessed for connectivity to the regional aquifers. The De Grey pit is not hydraulically connected to the regional aquifer due to presence of a hydraulic barrier, while the Swan pit is indirectly hydraulically connected to the regional aquifer via the connection to Orebody 31. Any seepage from Swan pit would be captured by groundwater abstraction at Orebody 31 from ongoing dewatering activity. As a result, in pit tailings is not expected to impact groundwater quality. In addition, as described above, there is no groundwater dependent vegetation or pools present in the Activity Area and therefore, fauna habitats are not predicted to be impacted by in pit tailings deposition.

Alterations to landforms and construction of infrastructure can lead to altered surface water drainage patterns which in turn may cause flooding and erosion in some areas and, rain-shadow effects in other areas. With the implementation of surface water management measures, changes to surface water drainage will be minimized and are not predicted to result in residual impacts to habitats.

Habitat modification

Hot work activities on site and the introduction and increased vehicle movements could increase the risk of fire and spread of weeds, respectively. Fire and weed encroachment have the potential to degrade Ghost Bat critical and or supporting habitat within the Activity Area and within 500m of the Activity Area (DCCEEW 2023a). With standard BHP fire management and weed control practices, the potential for increased risk of fire and habitat degradation due to weeds as a result of the Activity, are considered low and are not predicted to result in residual impacts to the species.

Vegetation clearing and vehicle movements may result in an increase in airborne particulate matter. Dust can indirectly affect fauna by altering the structure and composition of native vegetation and causing habitat degradation. Degradation of habitat value due to dust emissions as a result of the Activity is considered unlikely.

Alterations to landforms and construction of infrastructure can lead to altered surface water drainage patterns which in turn may cause flooding and erosion in some areas and, rain-shadow effects in other areas. With the implementation of surface water management measures, changes to surface water drainage will be minimized and are not predicted to result in residual impacts as a result of the Activity to habitats.

Light

Artificial light has the potential to indirectly impact Ghost Bats by altering nocturnal foraging behaviours and/or potentially restricting the use of roosts. The potential indirect impacts to Ghost Bats associated with artificial light associated with active mine pits are considered to be minor given the implementation of buffers which will exclude disturbance in proximity to caves. Where practicable, light installations will be directed into active operational areas and away from caves, in order to minimise potential impact of light spill on caves and is not predicted to result in residual impact to the species.

Feral Predators

The Activity may attract feral cats to the area, with the establishment of water sources, storage of food and waste disposal on site. With standard BHP feral cat management practices, the impact of feral cats on Ghost Bat prey as a result of the Activity is considered low. BHP is also currently conducting research into feral cat predation on Ghost Bats at roosts, with several roosts at Jimblebar monitored as part of this program.

The future predicted spread of the Cane Toad into the Pilbara bioregion, and potentially Jimblebar may have negative impacts to the Ghost Bat population. Genetic studies have shown that Ghost Bats are unable to tolerate bufotoxins (Shine *et al*. 2016). The decline in Ghost Bat numbers in parts of Queensland has been attributed to the consumption of Cane Toads (Bullen pers. comm. 2015). Cane Toads may be introduced to areas via vehicles or equipment (DPaW 2015). It is considered unlikely that Cane Toads will be introduced to Jimblebar as travel to and from high-risk areas such as the Kimberley are not foreseen.

The Activity is not predicted to result in residual impacts to the species as a result of feral predators.

Vehicle and infrastructure interactions

Interaction of fauna with vehicle and machinery movements have the potential to result in fauna strike, causing injury or mortality to fauna individuals. Ghost Bat are understood to fly low to the ground and may therefore be vulnerable to vehicle strike. The risk of interaction with vehicles is greatest where roads occur in proximity to suitable habitat for the species. The exclusion zones applied to Ghost Bat caves will prevent vehicle movements from occurring in proximity to caves and are expected to minimize the potential for vehicle interaction. On this basis, infrastructure and vehicle interactions are not predicted to result in a residual impact to Ghost Bat.

Ghost Bats are known to become entangled in barbed wire due to their low elevation flying pattern (Armstrong and Anstee 2000). The use of barbed wire fencing within the Indicative Footprint will be avoided as far as practicable, except where required by legislation. In these instances, reflectors will be installed on barbed wire fencing to deter bat interaction. On this basis, Activity is not predicted to result in residual impact to Ghost Bat as a result of barbed wire fencing.

The Activity will include the construction and operation of new infrastructure including a beneficiation plant and overland conveyor. The beneficiation plant will be located in an existing cleared area and therefore construction of this infrastructure is not predicted to result in residual impact to Ghost Bat or its habitat. The conveyor location will require some clearing however is located more than 1 km from the nearest cave at any point. On this basis, infrastructure and vehicle interactions are not predicted to result in a residual impact to Ghost Bat.

Human Disturbance

The Ghost Bat is understood to be easily disturbed and entering caves or minor disturbances on the perimeter of caves, including approaching vehicles or people, can cause the flushing or abandonment of caves by Ghost Bats and in extreme cases, the loss of pups (Churchill 2008, Armstrong 2010, Bullen and Crease 2014, Woinarski *et al*., 2014 and TSSC 2016a). Monitoring of caves may require access by humans to lay scat sheets or retrieve monitoring equipment and has the potential to flush Ghost Bats from caves. With the proposed monitoring to remain outside of the breeding period for Ghost Bat, and caves to be only visited at intervals of three to four months, the Activity is not predicted to result in residual impacts to Ghost Bats as a result human disturbance.

5.3.6 Mitigation Hierarchy

Avoid

The Activity will avoid direct impacts to all Ghost Bat roosts within the Activity Area. Exclusion buffers have been applied to ensure the retention and protection of roosts, as identified in Table 5-10 below. Clearing and mining activities will be excluded from these buffers. In the event that the Indicative Footprint is modified due to design changes, no more than 7.6 ha of Gorge/Gully and up to 2.5 ha of Breakaway/Cliff habitat types will be cleared. In addition, BHP will implement a Terrestrial Fauna Environmental Management Plan (TFEMP) to ensure no disturbance to roosts, allow for monitoring of roosts within exclusion zones, to restrict access to roosts during the breeding season and to minimise risk of injury to Ghost Bat from installed infrastructure.

In addition, the Activity has been designed to be located on existing cleared areas, as much as possible, to avoid clearing.

Table 5-10 Ghost Bat avoidance measures

Cave ID	Roost classification	Evidence of use by Ghost Bats	Proposed avoidance and mitigation	Avoid or impact
CJIM-04	Category 4	None	No direct avoidance measures	Outside of Indicative Footprint and unlikely to have direct impacts
CJIM-05	Category 4	Yes	50 m mining exclusion buffer applied	Direct impacts avoided
CJIM-06	Category 4	Yes (unconfirmed)	50 m mining exclusion buffer applied	Direct impacts avoided
CJIM-07	Category 4	Yes (unconfirmed)	50 m mining exclusion buffer applied	Direct impacts avoided
CJIM-08	Category 4	None	No direct avoidance measures	Outside of Indicative Footprint and unlikely to have direct impacts
CJIM-09	Category 3	Yes	100 m mining exclusion buffer applied	Direct impacts avoided
CJIM-14	Category 3	None	100 m mining exclusion buffer applied	Direct impacts avoided
CJIM-15	Category 4	Yes	50 m mining exclusion buffer applied	Direct impacts avoided
CJIM-17	Category 4	None	No direct avoidance measures; however, this cave is within the buffer applied to CJIM-15.	Outside of Indicative Footprint and unlikely to have direct impacts
CJIM-18	Category 4	None	No direct avoidance measures	Outside of Indicative Footprint and unlikely to have direct impacts
CJIM-20	Category 4	Yes	50 m mining exclusion buffer applied	Direct impacts avoided
CJIM-21	Category 3	Yes	100 m mining exclusion buffer applied	Direct impacts avoided

Note that exclusion zones are measured from the cave entrance.

Mitigate

Potential impacts to Ghost Bat habitat from fire are to be minimised through standard BHP hot work management procedures, assigning designated smoking areas and managing fuel loads through weed control programs.

Potential indirect impacts from dust will be minimized through application of dust management measures and ongoing dust monitoring across Jimblebar operations.

Artificial light will be directed into mining areas and away from cave entrances, where practicable.

BHP will store waste securely to prevent feral animal attraction and monitoring of Ghost Bat caves will occur outside of the breeding season.

BHP will implement standard BHP feral cat management practices. In the event the presence of Cane Toads is detected on site, additional management measures will be applied following the guidance of DBCA.

BHP will minimise the risk of injury or mortality of Ghost Bat by avoiding the use of barbed wire fencing. If barbed wire is required to be installed by legislation. BHP will install reflectors to deter bat interaction. BHP will inspect fencing after installation to ensure reflectors are installed.

BHP will monitor Ghost Bats as identified in Section 5.3.9 outside of the breeding season, so as to minimise potential disturbance to Ghost Bats that may be utilising caves.

5.3.7 Residual Impact

Residual impacts include the loss of up to 10.1 ha of critical habitat and 820.2 ha of critical foraging habitat.

5.3.8 Review of Program Matter Outcomes

Following the impact assessment (Section 5.3.5) and application of the mitigation hierarchy (Section 5.3.6) a review of the Activity against the PMOs was undertaken. Table 5-11 identifies which PMOs are relevant for the Activity and considers further management.

Table 5-11: Review of Program Matter Outcomes (Ghost Bat)

Program Matter Outcome	Applicable Notifiable Action trigger	Assessment
Minimise loss of critical and supporting habitats of the Ghost Bat as a result of Program Activities within the SAA **AND** No loss (or maintain) Ghost Bat colony(s) as a result of program activities.	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is: Presence of Ghost Bat critical habitat and or supporting habitat **AND** Presence or sign/s of Ghost Bat colony or residing individuals	After the application of mitigation measures, the Activity will result in residual impact of up to 10.1 ha of critical habitat and 802 ha of critical foraging habitat. This residual impact will be offset (Section 6). The Activity will not directly impact any known Ghost Bat roosts. Monitoring of Ghost Bat roosts within exclusion zones will continue throughout operation and this is described further below. This Activity is not predicted to result in any loss of Ghost Bat colony(s) as a result of the Activity.
Minimise loss of critical and supporting habitats of the Ghost Bat as a result of Program Activities within the SAA	Within the Activity Area there is: Presence of Ghost Bat critical habitat and or supporting habitat **AND** Presence or sign of Ghost Bat transient, infrequent or dispersing individual/s	Not applicable, given the Ghost Bat records do not reflect transient, infrequent or dispersing individuals, but rather represent a colony.

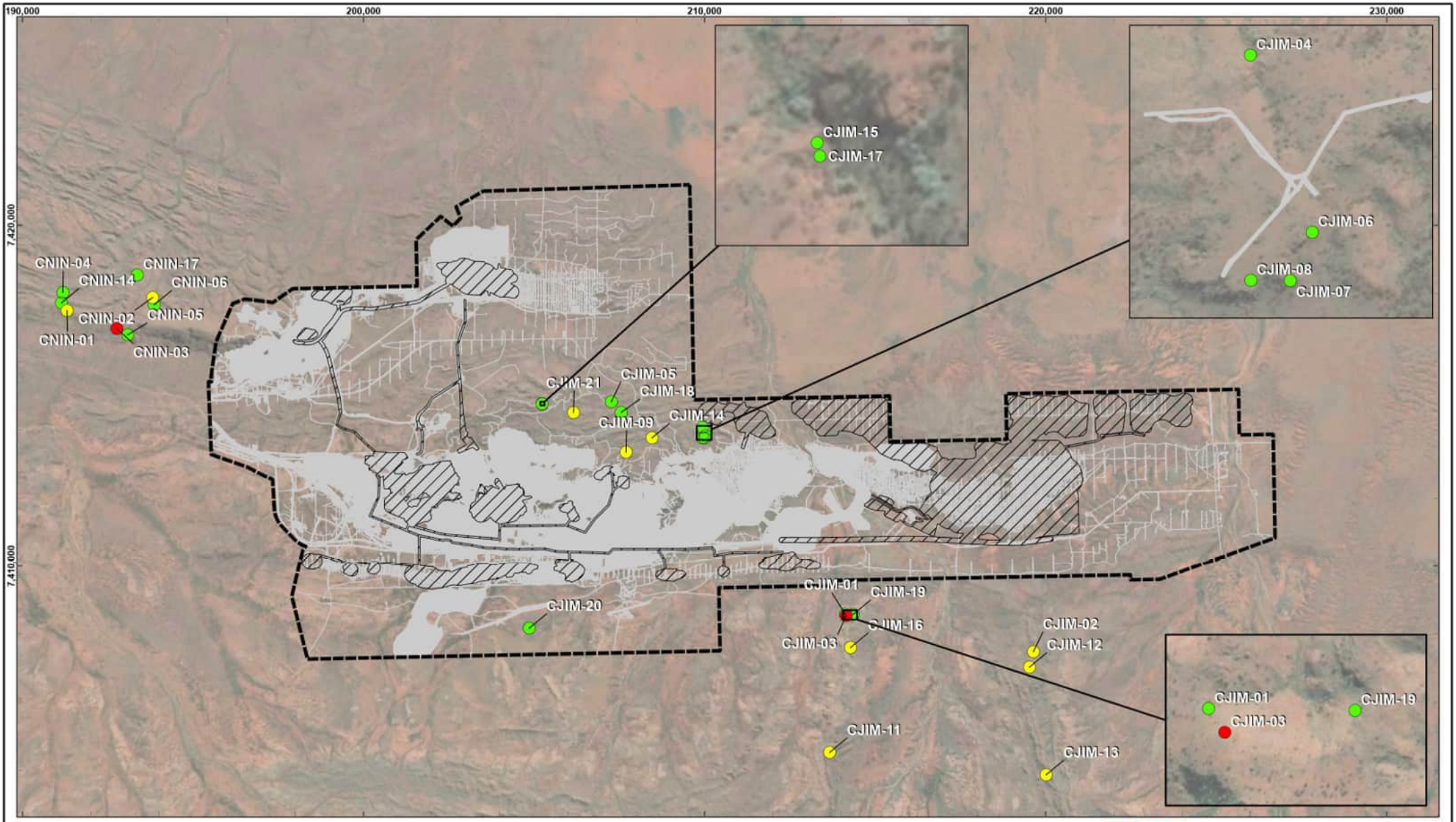
5.3.9 Monitoring

BHP has implemented Ghost Bat monitoring at Jimblebar, Ninga, Cathedral Gorge, Homestead and Western Ridge, as part of a broader Eastern hub monitoring program. Monitoring of Ghost Bat will continue at roosts retained in exclusion zones including Category 3 roosts CJIM-09 and CJIM-14 and Category 4 roosts, CJIM-05, CJIM-06, CJIM-07, CJIM-15 and CJIM-20. Category 3 roosts will be monitored at least annually and Category 4 roosts will be monitored at least biennially. Monitoring methods may include scat collection and analysis, use of motion sensor cameras, ultrasonic recordings and/or microclimate recordings (Table 5-12).

Table 5-12: Ghost Bat Monitoring methods

Method	Monitoring parameters
Motion camera footage	Presence (sighting of individuals) Number of individuals
Bat call detection (ultrasonic recordings)	Number of calls
Sheet method[1]	Presence of scats Scat deposition rate/usage Habitat characteristics Local meteorological data
Scat genetic analysis	Number of individuals (based on genotypes) Cave use (multiple or one cave)
Scat hormone analysis	Presence of lactating females
Cave microclimate recording	Temperature Humidity

[1] Entrance into caves will only be permitted for those deemed safe to do so following geotechnical assessment of the cave.



BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Existing Ghost Bat monitoring locations

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:150,000	PREPARED:	GEOMATICS	FIGURE:	5-10
DATE:	30/10/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/155C

Document Path: Y:\Jobs\A1001_A1500\A1021\Project\A1021_155_E_JIMB_VN_GBMonitoringLocations_Rev8.aprx

Table 5-13 Ghost Bat monitoring commitments

Program Matter Objective	To support the long-term persistence and viability of the Ghost Bat within the SAA.		
Notifiable Action triggers	Within the Activity Area and or within a 500m buffer of the Activity boundary, there is: Presence of Ghost Bat critical habitat and or supporting habitat **AND** Presence or sign/s of Ghost Bat colony or residing individuals		
Program Matter Outcome	Minimise loss of critical and supporting habitats of the Ghost Bat as a result of Program Activities within the SAA **AND** No loss (or maintain) Ghost Bat colony(s) as a result of program activities		
Monitoring Target	**Monitoring and Frequency**	**Corrective and contingency actions**	**Reporting**
Ensure no Ghost Bats are present in Category 4 roosts (CJIM-04, CJIM-08, CJIM-17 and CJIM-18) prior to disturbance, if disturbance is required.	Prior to disturbance: • Inspect the Category 4 roosts (CJIM-04, CJIM-08, CJIM-17 and CJIM-18) prior to disturbance • If present, displace Ghost Bats from a roost during the inspection via physical presence in the cave or use of deterrents (i.e. noise or light) Complete roost pre-disturbance checklist to ensure required actions have been undertaken.	Response actions to monitoring targets not being met may include, but are not limited to: • investigate potential cause of monitoring targets not being met • revise pre-disturbance checklist if required • provide the checklist to all personnel required to be involved in pre-disturbance checks	SEA AER
Inspect barbed wire fencing to ensure it is fitted with reflectors to deter bat interaction.	After installation of barbed wire fencing, inspect to ensure reflectors are installed.	If reflectors have not been installed: • Install reflectors as soon as practicable • Reinspect to ensure reflectors have been installed	
Monitor caves (Category 3 roosts CJIM-09 and CJIM-14, and Category 4 roosts CJIM-05, CJIM-06, CJIM-07, CJIM-15 and	Monitoring of caves within Ghost Bat cave buffers (Category 3 roosts CJIM-09 and CJIM-14, and Category 4 roosts CJIM-05, CJIM-06, CJIM-07, CJIM-15 and CJIM-20)	Review trend in Ghost Bat monitoring results and frequency of monitoring, to inform ongoing adaptive management.	

CJIM-20) and associated buffers to: • to demonstrate evidence of Ghost Bat use at one or more of the monitored caves over a two year period.	• Category 3 roosts (Figure 5-10) to be monitored at least annually • Category 4 roosts (Figure 5-10) to be monitored at least biennially This monitoring is in addition to the following monitoring committed to in the Jimblebar Optimisation Project Revised Validation Notice: • Category 2 roosts (CJIM-03 and CNIN-03) at least 6 monthly • Category 3 roosts (CNIN-01, CNIN-13 and CJIM-09) at least yearly • Category 4 roosts (CJIM-05, CJIM-06, CJIM-08, CJIM-15, CJIM-17 and CJIM-20, at least two yearly (biennially) (all pending safe access, heritage and tenure restrictions). Monitoring techniques may include but are not limited to scat monitoring (deposition rate, genetic analyses hormone analyses), ultrasonic recording, cave microclimate monitoring and photo monitoring of caves.		
Monitor caves outside of the breeding season	Review timing of proposed monitoring events prior to implementation to ensure it falls outside of the breeding season. Annual review of Ghost Bat monitoring report to confirm monitoring was undertaken outside of breeding season	If monitoring is delayed or postponed, review new timing to ensure it remains outside of the breeding season.	

5.3.10 Summary

BHP considers the Activity will meet the PMO to minimise loss of critical and supporting habitats of the Ghost Bat and no loss (or maintain) Ghost Bat colony as a result of program activities, given that buffers have been applied to most roosts in the Activity Area. In addition, offsets will be provided for the loss of critical and supporting habitats (Section 6). As a result, the PMO will be achieved.

5.4 Greater Bilby

The following sections provide background information to demonstrate that Notifiable Action triggers for Greater Bilby are not met. Impacts to the Greater Bilby are discussed to illustrate that the Program Matter Objective for this species will be met.

5.4.1 General Species Information

The Greater Bilby is listed under the EPBC Act as 'Vulnerable'. Within the Pilbara bioregion, the Greater Bilby exists along the Fortescue River and northeast to Shay Gap (DCCEEW 2023b). The extent of occurrence for the Greater Bilby is thought to have remained relatively stable over the last 20 years. This mammal was common throughout most of its range until the early 1900s when there was a sudden and widespread collapse (Abbott 2001; Johnson 2008). This collapse and range contraction has been attributed to predation from cats and foxes, habitat destruction from introduced herbivores and changed fire regimes. Feral cats have been linked to the reduced success of reintroduced populations (DCCEEW 2023b).

The Greater Bilby is a highly mobile species with home ranges varying between 1 km^2 to 3 km^2 (DCCEEW 2023b). The movement patterns of the Greater Bilby are thought to be influenced by resource availability (Strahan 1995). The species may also persist in areas of low productivity (Southgate and Carthew 2006, Southgate *et al*. 2007 and Southgate *et al*. 2018).

The presence of the Greater Bilby is strongly associated with substrate type as it is generally restricted to areas that contain suitable burrowing habitat, such as sandy loam plains, alluvial creeks, dunes and sand ridges (TSSC 2016b). Within the Pilbara region the species is sparsely distributed, and often associated with level or undulating plains including watercourses and dune systems, composed of cracking clay, soil or sand that allows burrowing, with vegetation consisting of hummock grassland (spinifex), with low shrubland, usually *Acacia* dominated (Dziminski and Carpenter 2017). The Greater Bilby has also been recorded from mulga woodlands and stony plain habitats in the Abydos Plains region further north in the Pilbara. Food sources for the Greater Bilby include, but are not limited to, grass, sedge seeds, ants, fungi, termites, beetles, insect larva and spiders (Dziminski and Carpenter 2017, Southgate *et al*. 2018).

5.4.2 Local Habitat

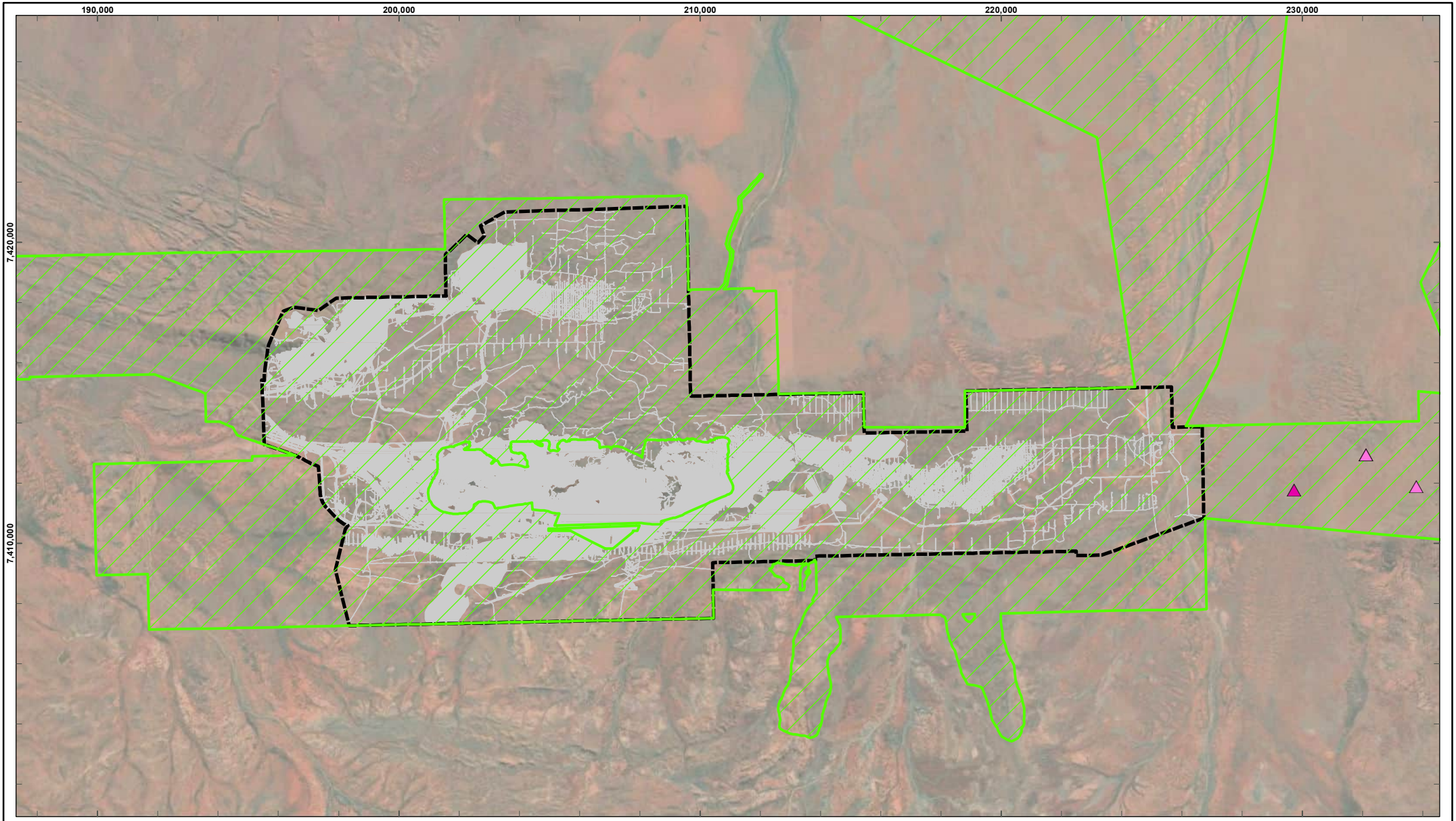
The Activity Area falls within the current distribution of the Greater Bilby, whereby the species or species habitat may occur. The areas surveyed for Greater Bilby are shown in Figure 5-11. Approximately 8,940.2 ha of supporting habitat is present in the Activity Area including Sand Plain, Drainage Area/Floodplain, Stony Plain and Mulga Woodland.

Table 5-14 Greater Bilby habitat

Habitat Description	Within Activity Area (ha)	Within Indicative Footprint (ha)
Supporting Habitat		
Sand Plain	1,402.9	24.4
Stony Plain	1,201.2	16.9
Mulga Woodland	3,322.1	492.9
Drainage Area/Flood Plain	3,014.0	269.1
Total	**8,940.2**	**803.3**

5.4.3 Greater Bilby Records

There is no evidence of any individuals or populations of Greater Bilby within the Activity Area or in surveyed areas within 500m of the Activity Area. Surveys to date, including a targeted Greater Bilby survey (GHD 2021), have not recorded any Greater Bilby signs, tracks, scats, diggings or burrows within the Activity Area. Given the lack of records, and lack of suitable habitat to support the species, it is considered unlikely that the Greater Bilby occurs within the Activity Area. The nearest record of Greater Bilby is an inactive burrow located more than 3 km east of the Activity Area.



Greater Bilby - Sample Method

- Bilby Plot
- Opportunistic
- Survey Coverage
- Activity Area
- Indicative Cleared Area as at FY2022

N

0 1 2 3 4 5

KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

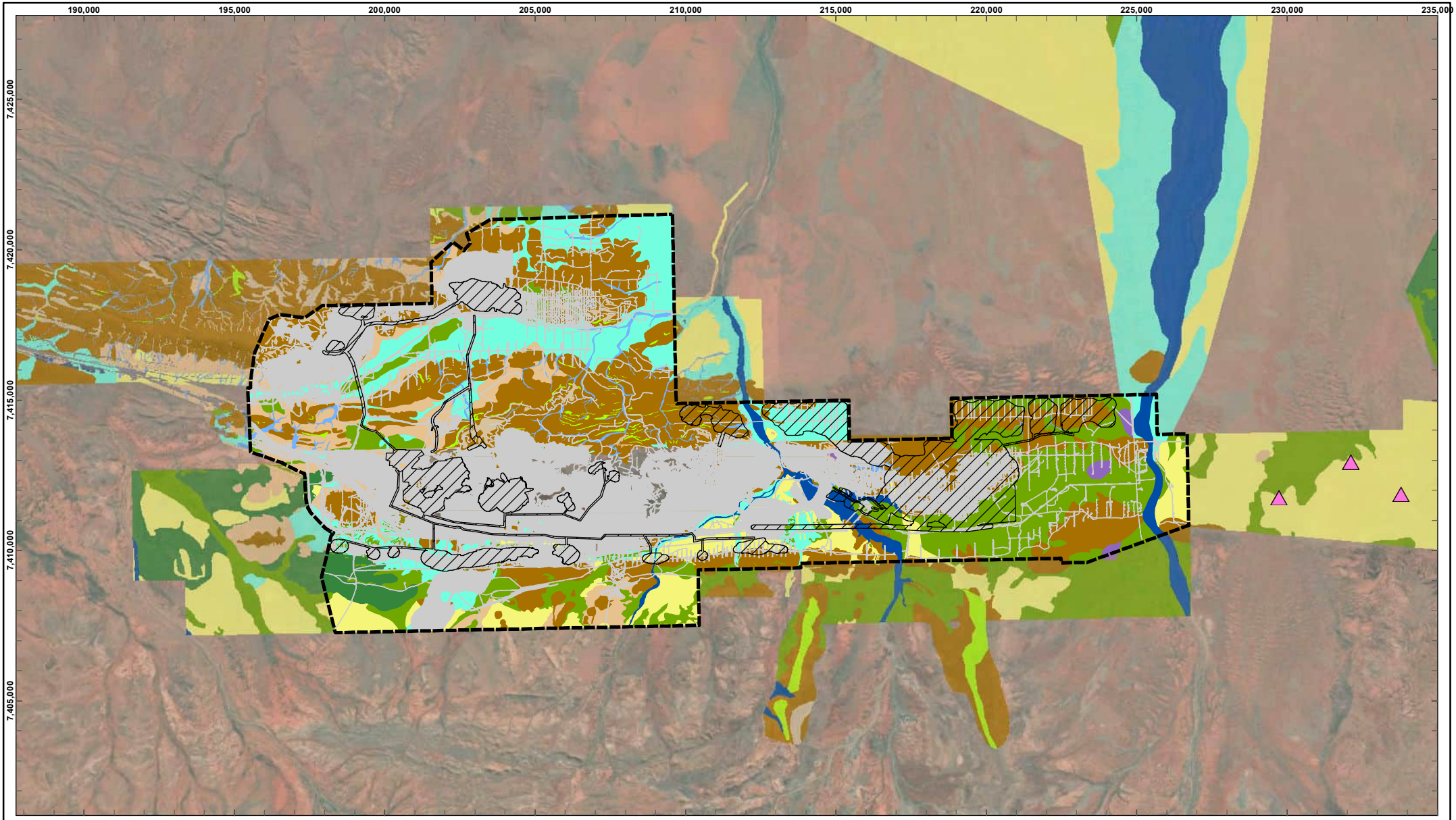
Greater Bilby
survey areas and methods

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:170,000	PREPARED:	SPATIAL DATA	FIGURE NO:	5-11
DATE:	19/02/2024	REQUESTOR:	ENV. APPROVALS		

1021/157A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_157_E_JMB_VN_BilbySurveys_RevA.mxd



Greater Bilby
Activity Area
Indicative Footprint
Indicative Cleared Area as at FY2022

Habitat Area

- Breakaway/ Cliff
- Calcrete Plain
- Claypan
- Cleared/ Disturbed
- Drainage Area/ Floodplain
- Gorge/ Gully
- Hardpan Plain
- Hillcrest/ Hillslope
- Major Drainage Line
- Minor Drainage Line
- Mulga Woodland
- Sand Plain
- Stony Plain
- Undulating Low Hills

N

0 1 2 3 4 5
KILOMETRES
GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Greater Bilby
mapped habitat and records

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:170,000	PREPARED:	SPATIAL DATA	FIGURE:	5-12
DATE:	3/04/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/158A

Document Path: Y:\Jobs\A1001_A1500\A10213\Project\A1021_158_E_JMB_VN_BilbyHabitatandRecords_RevA.mxd

5.4.4 Impact Assessment

The potential direct and indirect impacts to the Greater Bilby from the Activity are considered below.

Habitat loss

Land clearing of the semi-arid zone and overgrazing of arid zone rangelands have been identified as possible threats to Greater Bilby. The Activity will result in the loss of approximately 803.3 ha of supporting habitat including Sand Plain, Drainage Area/Floodplain, Mulga Woodland and Stony Plain. Given the lack of records of Greater Bilby in the Activity Area and within 500m of the Activity Area, habitat loss associated with the Activity is not considered to be a residual impact.

Habitat loss has the potential to result in fragmentation, however, given there are no records of Greater Bilby present in the Activity Area or within 500m, the Activity is not predicted to result in a residual impact to the species.

Surface Water Changes

The Activity will include the implementation of ephemeral creek diversions to maintain surface water flows downstream. The Activity does not include installation of infrastructure that could impact sheetflow, and therefore it is not predicted to result in any impact to sheetflow dependent Mulga.

Habitat modification

Fire and weed encroachment have the potential to degrade Greater Bilby foraging habitat which in turn may cause population declines (Bradley *et al.* 2015). Hot work activities on site and the introduction and increased vehicle movements may increase the risk of fire and spread of weeds, respectively, which may degrade supporting habitats for Greater Bilby within the Activity Area. However, given the lack of records of Greater Bilby within the Activity Area and with implementation of BHP standard weed management and hot work management measures, the Activity is not predicted to result in residual impact to the Greater Bilby from fire or weeds.

Alterations to landforms and construction of infrastructure can lead to altered surface water drainage patterns which in turn may cause flooding and erosion in some areas and, rain-shadow effects in other areas. Implementation of surface water management measures will minimize any changes from the Activity to surface water drainage and supporting habitats present.

Vegetation clearing and vehicle movements may result in an increase in airborne particulate matter. Dust can indirectly affect fauna by altering the structure and composition of native vegetation and causing habitat degradation. Degradation of habitat value due to dust emissions from the Activity is considered unlikely due to the implementation of dust monitoring and management measures within the Activity Area. Therefore, the Activity is not predicted to result in residual impact to Greater Bilby from dust.

Feral Predators

The Activity may attract and / or increase feral cat numbers within the area, due to the establishment of water sources, storage of food and waste disposal on site. Standard BHP feral cat management practices will minimise this potential impact, and given there are no records from within the Activity Area or 500m of the Activity Area, the activity is not predicted to result in a residual impact to Greater Bilby from feral predators.

Vehicle and machinery interaction

Interactions of Greater Bilby with vehicle and machinery movements have the potential to result in injury or mortality to individuals. Haul roads and access roads will be required to support the Activity. The risk of interaction with vehicles is greatest where roads occur in proximity to suitable habitat for the species. Given the lack of records in the Activity

Area and within 500m of the Activity Area, it is unlikely that vehicle and machinery movements associated with the Activity will result in any impact to Greater Bilby.

5.4.5 Summary

The Greater Bilby Notifiable Action triggers are not applicable as there are no records of Greater Bilby within the Activity Area or within 500m of the Activity Area boundary. The Activity is not predicted to result in residual impact to Greater Bilby through either direct or indirect impacts to Greater Bilby supporting habitat. No critical habitat will be impacted.

5.5 Pilbara Olive Python

The following sections provide background information to demonstrate that Notifiable Action triggers for Pilbara Olive Python are not met. Impacts to the Pilbara Olive Python are discussed to illustrate that the Program Matter Objective for this species will be met.

5.5.1 General Species Information

The Pilbara Olive Python is listed under the EPBC Act as 'Vulnerable'. It is restricted to ranges within the Pilbara bioregion, although an isolated population is thought to occur south on Mount Augustus in the Gascoyne region (Bush and Maryan 2011), and additional records exist in the northeastern Carnarvon region. Within the Pilbara bioregion, the species has been recorded from the Hamersley Range, Dampier Archipelago, Pannawonica, Millstream, Tom Price, Burrup Peninsula, and 70 km east of Port Hedland (Pearson 2003). The species is also known from riparian areas along the Fortescue River (Doughty *et al.* 2011).

The Pilbara Olive Python commonly inhabits rocky areas in proximity to water such as gorges, rivers, pools and surrounding hills, but can be found in a range of habitats. In the Hamersley region, this species is most often encountered in the vicinity of permanent water features in rocky ranges or among riverine vegetation (Biologic 2020a).

Pilbara Olive Pythons are known to occupy a distinct home range ranging from 85 ha to 450 ha and to move around frequently within their home range (Pearson 2003).

5.5.2 Local Habitat

The Activity Area falls within the current distribution of the Pilbara Olive Python whereby the species or species habitat may occur.

The areas surveyed for Pilbara Olive Python are shown in Figure 5-13. Mapped habitat and records (nil) are shown in Figure 5-14. Approximately 300 ha of critical habitat and 814.6 ha of supporting habitat is present in the Activity Area.

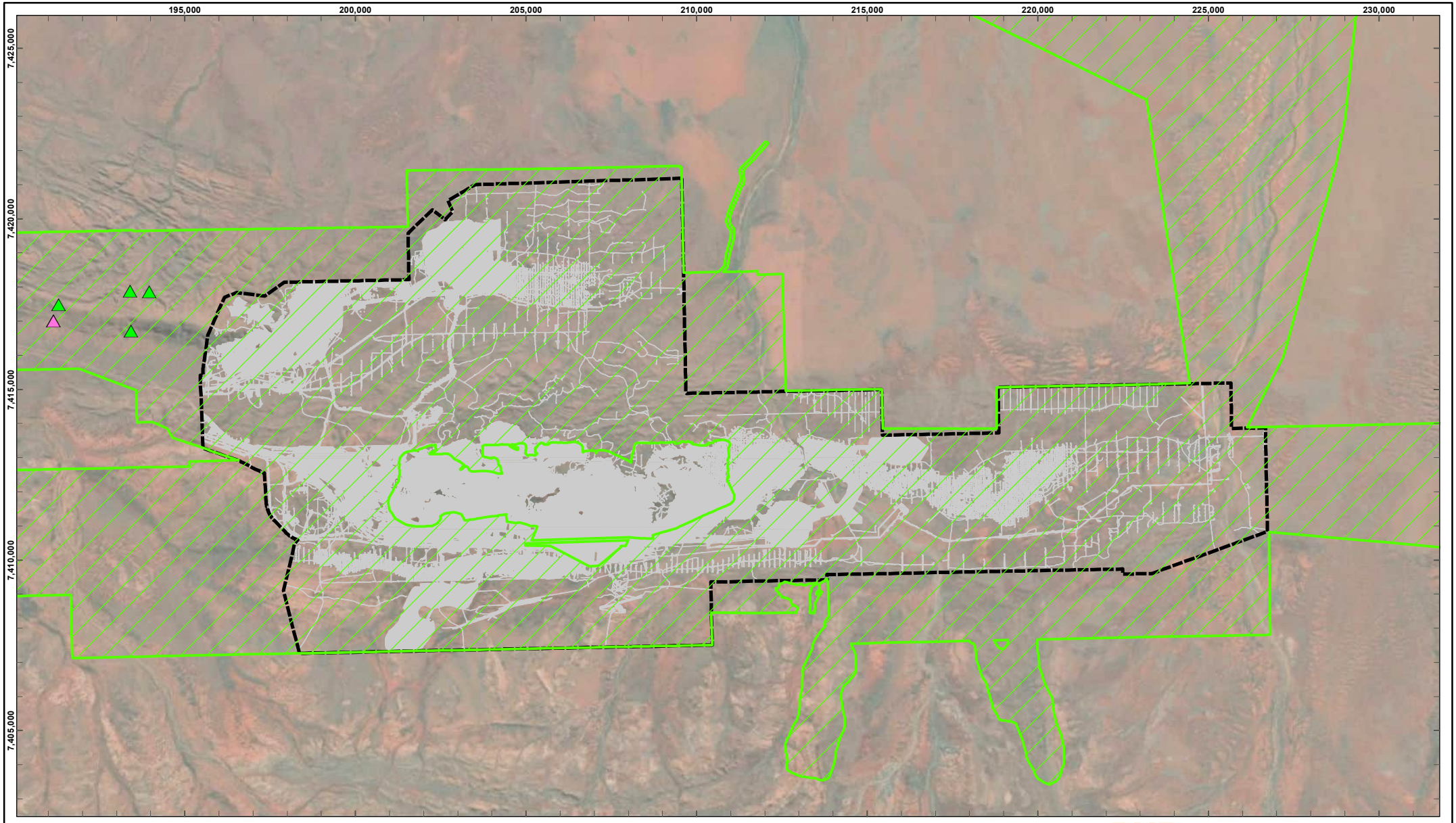
Table 5-15 Pilbara Olive Python habitat

Habitat Description	Within Activity Area (ha)	Within Indicative Footprint (ha)
Critical habitat		
Gorge/Gully	185.3	7.6
Breakaway/Cliff	114.7	2.5
Total	**300**	**10.1**
Supporting habitat		
Minor Drainage Line	328.1	24.7

Habitat Description	Within Activity Area (ha)	Within Indicative Footprint (ha)
Major Drainage Line	486.5	15.9
Total	**814.6**	**40.6**

5.5.3 Pilbara Olive Python Records

There is no evidence of Pilbara Olive Python presence in the Activity Area or in surveyed areas within 500m of the Activity Area despite multiple fauna surveys within the Activity Area. The nearest record is 2.11 km to the west. Given the lack of records, it is considered unlikely that the Pilbara Olive Python occurs within the Activity Area.



Pilbara Olive Python - Sample Method

- Opportunistic
- Other
- Survey Coverage
- Activity Area
- Indicative Cleared Area as at FY2022

N

0 1 2 3 4 5

KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

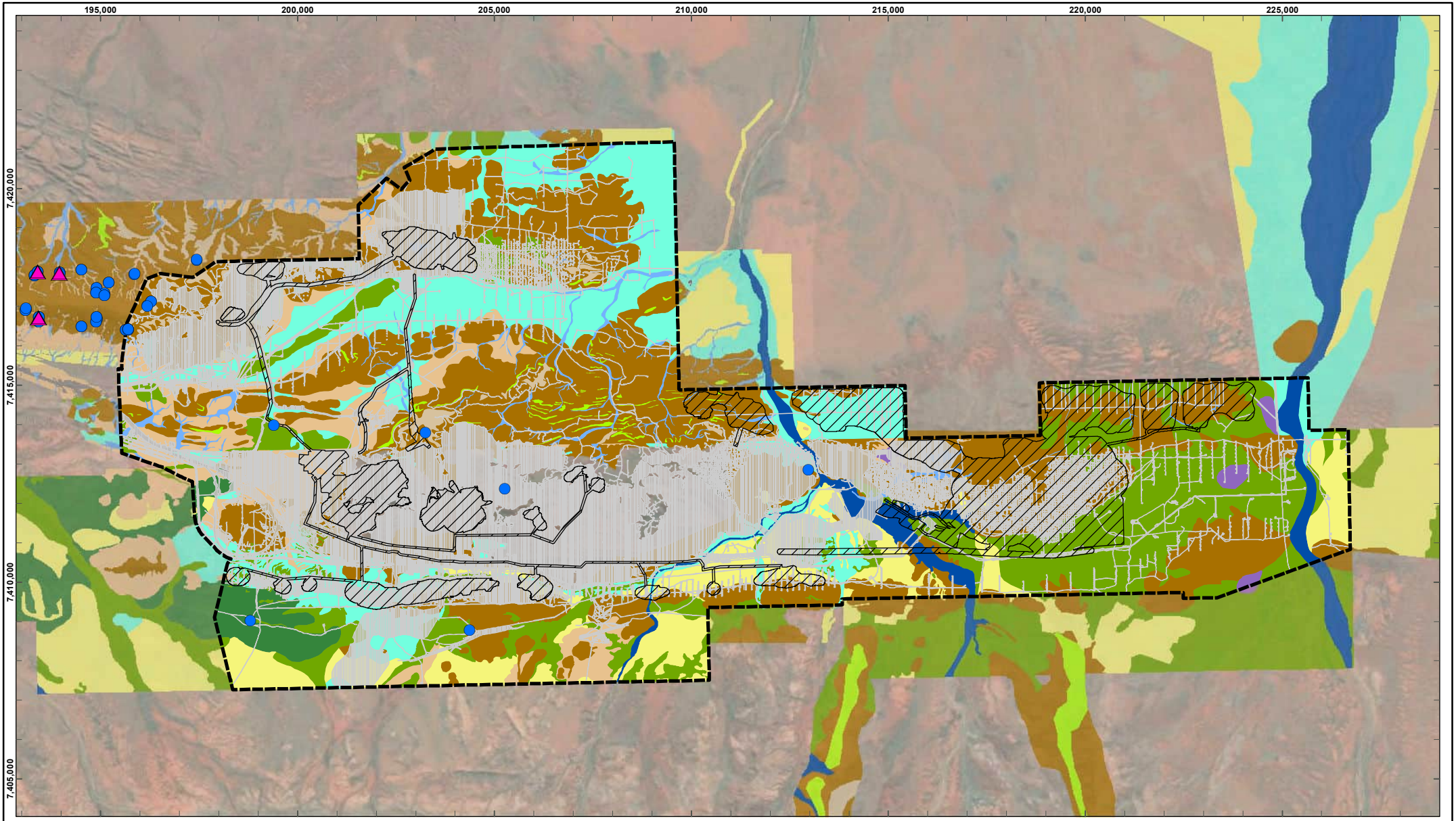
JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Pilbara Olive Python
survey areas and methods

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:150,000	PREPARED:	SPATIAL DATA	FIGURE:	5-13
DATE:	19/02/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/160A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_160_E_JMB_VN_POPSurveys_RevA.mxd



- Pilbara Olive Python (*Liasis olivaceus* subsp. *barroni*) (VU)
- Water feature
- Activity Area
- Indicative Footprint
- Indicative Cleared Area as at FY2022

Habitat Area

- Breakaway/ Cliff
- Calcrete Plain
- Claypan
- Cleared/ Disturbed
- Drainage Area/ Floodplain
- Gorge/ Gully
- Hardpan Plain
- Hillcrest/ Hillslope
- Major Drainage Line
- Minor Drainage Line
- Mulga Woodland
- Sand Plain
- Stony Plain
- Undulating Low Hills

N

0 1 2 3 4 5

KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Pilbara Olive Python mapped habitat and records

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:130,000	PREPARED:	SPATIAL DATA	FIGURE NO:	5-14
DATE:	3/04/2024	REQUESTOR:	ENV. APPROVALS		

1021/161A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_161_E_JMB_VN_POPHabitatandRecords_RevA.mxd

5.5.4 Impact Assessment

The potential direct and indirect impacts to the Pilbara Olive Python from the Activity are considered below.

Habitat Loss

The Activity will result in the direct loss of up to 10.1 ha of critical habitat suitable for denning, breeding and foraging habitat (Gorge/Gully and Breakaway/Cliff) and 40.6 ha of supporting habitat.

Up to 40.6 ha of supporting habitat including 24.7 ha of Minor Drainage Lines and15.9 ha of Major Drainage Line will be impacted as a result of the Activity. It should be noted that individuals are not expected to utilise the entire extent of this supporting habitat, with foraging and dispersal thought to be limited to habitat in close proximity to the critical habitat (Gorge/Gully and Breakaway/Cliff habitats and associated temporary surface water features located north of the Activity Area).

No temporary natural water features will be directly impacted by the Activity. Innawally Pool, which is a permanent pool located within the Activity Area will not be directly impacted by the Activity.

Clearing for the Activity has the potential to fragment habitat; however, given there is no evidence of Pilbara Olive Python presence in the Activity Area, this is not expected to fragment a population.

Habitat Modification

Hot work activities on site and the potential for increased vehicle movements could increase the risk of fire and spread of weeds, respectively. Fire and weed encroachment have the potential to degrade Pilbara Olive Python habitat within and adjacent to the Activity Area. With standard BHP fire management and weed control practices, the potential for increased risk of fire and habitat degradation due to weeds from the Activity, are considered low and is not predicted to result in residual impact to the species.

Alterations to landforms and construction of infrastructure can lead to altered surface water drainage patterns which in turn may cause flooding and erosion in some areas and, rain-shadow effects in other areas. Implementation of surface water management measures will minimize any changes to surface water drainage associated with the Activity.

Vegetation clearing and vehicle movements may result in an increase in airborne particulate matter. Dust can indirectly affect fauna by altering the structure and composition of native vegetation and causing habitat degradation. Degradation of habitat value due to dust emissions from the Activity is considered unlikely due to the implementation of dust monitoring and management measures within the Activity Area.

As a result, the Activity is not predicted to result in a residual impact to the species from habitat modification.

Hydrological changes

The depth to groundwater in the Activity Area ranges from approximately 40 mbgl to 175 mbgl. All temporary surface water features within the Activity Area occur as a result of significant rainfall events, and hold water for a short duration, as water dissipates over time due to evaporation. No groundwater dependent pools are present within the Activity Area. Innawally Pool is supported by a perched aquifer, disconnected from the regional aquifer and will not be directly or indirectly impacted by groundwater changes associated with the Activity. On this basis, the Activity is not predicted to result in indirect impacts to Pilbara Olive Python from groundwater drawdown.

Alterations to landforms and construction of infrastructure can lead to altered surface water drainage patterns which in turn may cause flooding and erosion in some areas and, rain-shadow effects in other areas. With the implementation of surface water management measures, changes to surface water drainage as a result of the Activity will be minimized and are not predicted to result in residual impacts to habitats.

Feral predators

Feral predators such as feral cats (*Felis catus*) and foxes (*Vulpes vulpes*), may prey on the Pilbara Olive Python (TSSC 2008) and/or compete with the Pilbara Olive Python for food (quolls and rock-wallabies) (Pearson 2006). With standard BHP feral cat management practices and given the absence of Pilbara Olive Python records in the Activity Area, the potential impact of feral cats from the Activity on the Pilbara Olive Python is considered very low and is not predicted to result in residual impact to the species. BHP is also currently investigating options to implement ongoing feral cat monitoring, to enhance detection and control measures.

Vehicle and machinery Interaction

Vehicle and machinery movements have the potential to result in fauna strike, causing injury or mortality to fauna individuals. Pilbara Olive Python are vulnerable to vehicle strike due to being a ground dwelling species and the risk of interaction with vehicles is greatest where roads occur in proximity to suitable habitat for the species.

Haul roads and access roads will be required to support the Activity. As there are no records of the species within the Activity Area or within 500m of the Activity Area, the risk of injury or mortality due to vehicle collision is considered very low. Therefore, the Activity is not predicted to result in residual impact to the species as a result of vehicle collision.

5.5.5 Summary

The Pilbara Olive Python Notifiable Action triggers are not applicable as there are no records of Pilbara Olive Python within the Activity Area or within 500m of the Activity boundary. The Activity is not predicted to result in a residual impact to Pilbara Olive Python.

5.6 Pilbara Leaf-nosed Bat

The following sections provide background information to demonstrate that Notifiable Action triggers for Pilbara Leaf-nosed Bat are not met. Impacts to the Pilbara Leaf-nosed Bat are discussed to illustrate that the Program Matter Objective for this species will be met.

5.6.1 General Species Information

The Pilbara Leaf-nosed Bat is listed as 'Vulnerable' under the EPBC Act and occurs over an approximate area of 120 million hectares (Eco Logical 2014b) and is restricted to the Pilbara bioregion of Western Australia. The Pilbara population is regarded as representing a single interbreeding population comprising multiple colonies (TSSC 2016c). Individual colonies vary in size from 10 individuals to 20,000 individuals, although the latter is exceptional (Armstrong 2001; Ecologia Environment 2005, 2006a, 2006b). The size of the Pilbara Leaf-nosed Bat population is unknown (TSSC 2016c).

The most updated conservation advice (Bat Call WA 2021b) indicates there are 48 confirmed permanent day roosts (including maternity roosts) with 38 of these in banded iron formations in the Hamersley Ranges and eastern Pilbara, and six in disused underground gold and copper mines of the eastern Pilbara. The species' area of occupancy in the Pilbara region has been calculated by Woinarski *et al.* (2014) as under 10 km^2.

Pilbara Leaf-nosed Bats roost in undisturbed caves, deep fissures or abandoned mine shafts with a stable warm and humid microclimate because of their poor ability to maintain its heat and water balance (Kulzer et al. 1970; Churchill *et al.* 1988; Jolly 1988; Churchill 1991; Baudinette *et al.* 2000; Armstrong 2001). Caves/abandoned mines with seeps of water, moist wall surfaces and or flooded lower levels are usually of ideal humidity (Bat Call WA 2021b). The species forages within and in the vicinity of roost caves and more broadly along waterbodies with suitable fringing

vegetation supporting prey species (TSSC 2016c). Pilbara Leaf-nosed Bats are predicted to travel up to 20 km from roost caves during nightly foraging (Cramer *et al.* 2016); however, seasonal variation is known to occur, with foraging occurring up to 20 km in the dry season and up to 50 km during the wet season (Bullen 2013).

5.6.2 Local Habitat

The Activity Area falls within the current distribution of the Pilbara Leaf-nosed Bat, whereby the species or species habitat may occur.

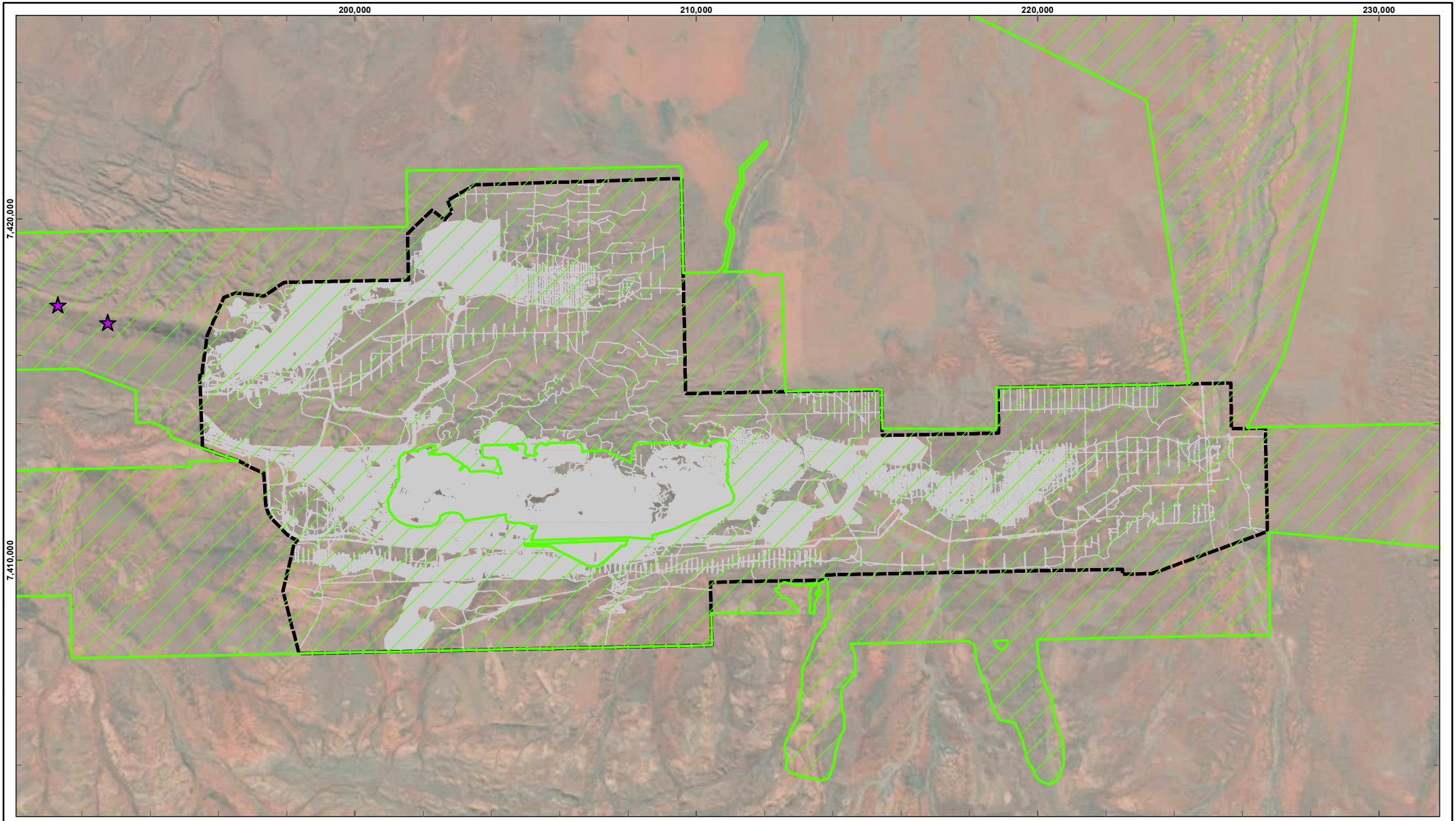
The areas surveyed for Pilbara Leaf-nosed Bat are shown in Figure 5-15. Mapped habitat and records (nil) are shown in Figure 5-16. There is no critical habitat in the Activity Area; however, there is approximately 10,888.7 ha of supporting habitat is present in the Activity Area.

Table 5-16 Pilbara Leaf-nosed Bat habitat

Habitat Description	Within Activity Area (ha)	Within Indicative Footprint (ha)
Supporting habitat		
Gorge/Gully	185.3	7.6
Breakaway/Cliff	114.7	2.5
Major Drainage Line	486.5	15.9
Minor Drainage line	328.1	24.7
Drainage area/Floodplain	3,014.0	269.1
Hillcrest/Hillslope	6,760.1	1,067.1
Total	**10,888.7**	**1,386.9**

5.6.3 Pilbara Leaf-nosed Bat Records

There is no evidence of Pilbara Leaf-nosed Bat within the Activity Area or in surveyed areas within 500m of the Activity Area, despite targeted bat survey effort. Given the lack of records, and lack of critical roosting habitat to support the species, it is considered unlikely that the Pilbara Leaf-nosed bat occurs within the Activity Area.



Pilbara Leaf-nosed Bat - Sample Method

- Bat Detector
- Survey Coverage
- Activity Area
- Indicative Cleared Area as at FY2022

N

0 1 2 3 4 5

KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

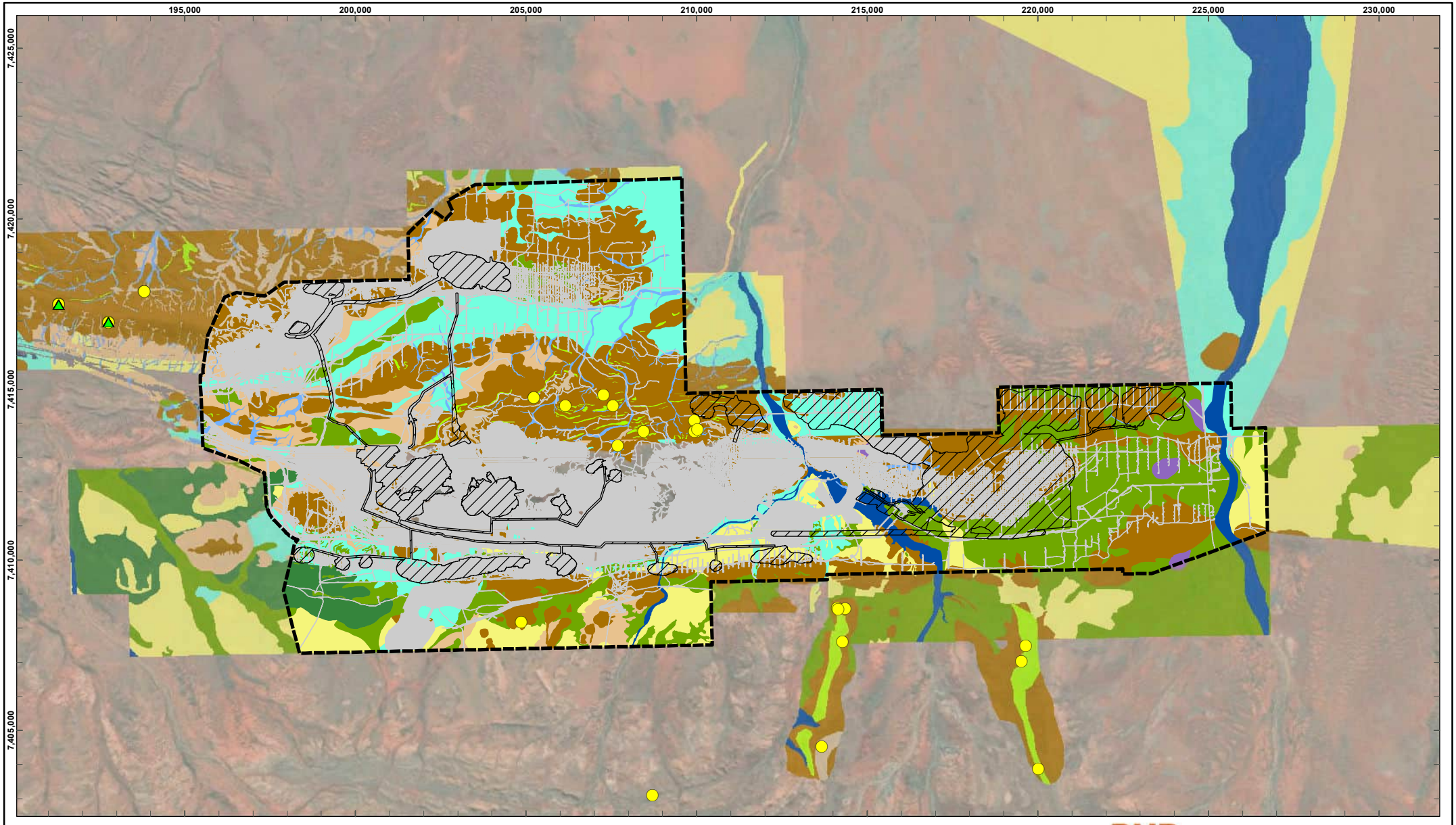
JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Pilbara Leaf-Nosed Bat survey areas and methods

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:150,000	PREPARED:	SPATIAL DATA	FIGURE:	5-15
DATE:	19/02/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/163A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_163_E_JMB_VN_PLNBSurveys_RevA.mxd



- Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*) (VU)
- Cave
- Indicative Footprint
- Activity Area
- Indicative Cleared Area as at FY2022

Habitat Area

- Breakaway/ Cliff
- Calcrete Plain
- Claypan
- Cleared/ Disturbed
- Drainage Area/ Floodplain
- Gorge/ Gully
- Hardpan Plain
- Hillcrest/ Hillslope
- Major Drainage Line
- Minor Drainage Line
- Mulga Woodland
- Sand Plain
- Stony Plain
- Undulating Low Hills

N

0 1 2 3 4 5

KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Pilbara Leaf-nosed Bat
mapped habitat and records

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:150,000	PREPARED:	SPATIAL DATA	FIGURE:	5-16
DATE:	3/04/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/164A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_164_E_JMB_VN_PLNBHabitatandRecords_RevA.mxd

5.6.4 Impact Assessment

The potential direct and indirect impacts to the Pilbara Leaf-nosed Bat from the Activity are considered below.

Habitat Loss

The key impact to the Pilbara Leaf-Nosed Bat is the loss of supporting habitat associated with mining activities. There are no critical roosts located in the Activity Area and no records. Approximately 1,386.9 ha of supporting habitat will be cleared in the Activity Area (Table 5-16). These habitats are contiguous with surrounding areas outside of the Activity Area and are considered to be common in this part of the Pilbara.

No ephemeral or permanent natural water features will be directly impacted. BHP considers that the Activity will not have a residual impact on this species at a local or regional scale through habitat loss owing to the paucity of records in the area for this species and lack of critical habitat within the Activity Area.

Clearing of habitat may also result in fragmentation; however, given that there is no evidence of individuals or a population residing in the Activity Area or within 500m of the Activity Area, the Activity is not predicted to result in a residual impact as a result fragmentation.

Habitat Modification

Hot work activities on site and the introduction and increased vehicle movements could increase the risk of fire and spread of weeds, respectively. Fire and weed encroachment have the potential to degrade Pilbara Leaf-Nosed Bat supporting habitat within and adjacent to the Activity Area. With standard BHP fire management and weed control practices, the potential for increased risk of fire and habitat degradation due to weeds from the Activity, are considered low and are not predicted to result in residual impact to the species.

Alterations to landforms and construction of infrastructure can lead to altered surface water drainage patterns which in turn may cause flooding and erosion in some areas and, rain-shadow effects in other areas. Implementation of surface water management measures will minimize any changes to surface water drainage from the Activity.

Vegetation clearing and vehicle movements may result in an increase in airborne particulate matter. Dust can indirectly affect fauna by altering the structure and composition of native vegetation and causing habitat degradation. Dust emissions from the Activity, with the implementation of dust management measures, are considered unlikely to result in degradation of habitat and are not predicted to result in a residual impact to the species.

Hydrological changes

The depth to groundwater in the Activity Area ranges from approximately 40 mbgl to 175 mbgl and there is no groundwater dependent vegetation within the Activity Area. All temporary surface water features within the Activity Area occur as a result of significant rainfall events, and hold water for a short duration, as water dissipates over time due to evaporation. No groundwater dependent pools are present within the Activity Area. Innawally Pool is supported by a perched aquifer, disconnected from the regional aquifer and will not be directly or indirectly impacted by groundwater changes associated with the Activity. Furthermore, no critical roosts, which can be affected by groundwater changes through humidity changes, are present. On this basis, the Activity is not predicted to result in residual indirect impacts to Pilbara Leaf-nosed Bat from groundwater drawdown from the Activity.

Alterations to landforms and construction of infrastructure can lead to altered surface water drainage patterns which in turn may cause flooding and erosion in some areas and, rain-shadow effects in other areas. With the implementation of surface water management measures, changes to surface water drainage will be minimized and are not predicted to result in residual impacts to habitats.

Vehicle and machinery interaction

As Pilbara Leaf-nosed Bats tend to fly relatively low and display a curiosity for light sources, they are susceptible to vehicle strike (Armstrong 2001). Given the lack of records in the Activity Area, vehicle strike associated with the Activity is not predicted to result in a residual impact.

5.6.5 Summary

The Pilbara Leaf-nosed Bat Notifiable Action triggers are not applicable as there are no records within the Activity Area or within 500m of the Activity Area boundary. The Activity is not predicted to result in any residual impact to Pilbara Leaf-nosed Bat.

5.7 Grey Falcon

The following sections provide background information to demonstrate that Notifiable Action triggers for Grey Falcon are not met. Impacts to the Grey Falcon are discussed to illustrate that the Program Matter Objective for this species will be met.

5.7.1 General Species Information

The Grey Falcon occurs at low densities in arid and semi-arid regions of Australia, including the Murray-Darling Basin, Eyre Basin, central Australia and Western Australia (Marchant and Higgins 1993 as cited in TSSC 2020). The species is typically confined to the arid and semi-arid zones where annual rainfall is less than 500 mm (Schoenjahn 2018 as cited in TSSC 2020). The species frequents timbered lowland plains, particularly Acacia shrublands that are crossed by tree-lined water courses (Garnett *et al*. 2011; Watson 2011; Schoenjahn 2013, 2018; Janse *et al.* 2015; Ley and Tynan 2016 as cited in TSSC 2020). The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland (Olsen and Olsen 1986; Schoenjahn 2018 as cited in TSSC 2020). Eggs are laid in the old nests of other birds, usually in the tallest trees along watercourses or in telecommunication towers (Marchant and Higgins 1993; Schoenjahn 2013, 2018; Falkenberg 2011 as cited in TSSC 2020) or other similar artificial structures. River Red Gum (*Eucalyptus camaldulensis)* and Coolibah (*E. coolabah*) are favoured nesting trees.

5.7.2 Local Habitat

The Activity Area falls within the current distribution of the Grey Falcon, whereby species or species habitat may occur.

The areas surveyed for Grey Falcon are shown in Figure 5-17. Mapped habitat and records are shown in Figure 5-18. There is no critical habitat present in the Activity Area. Up to 16,197 ha of supporting habitat is present.

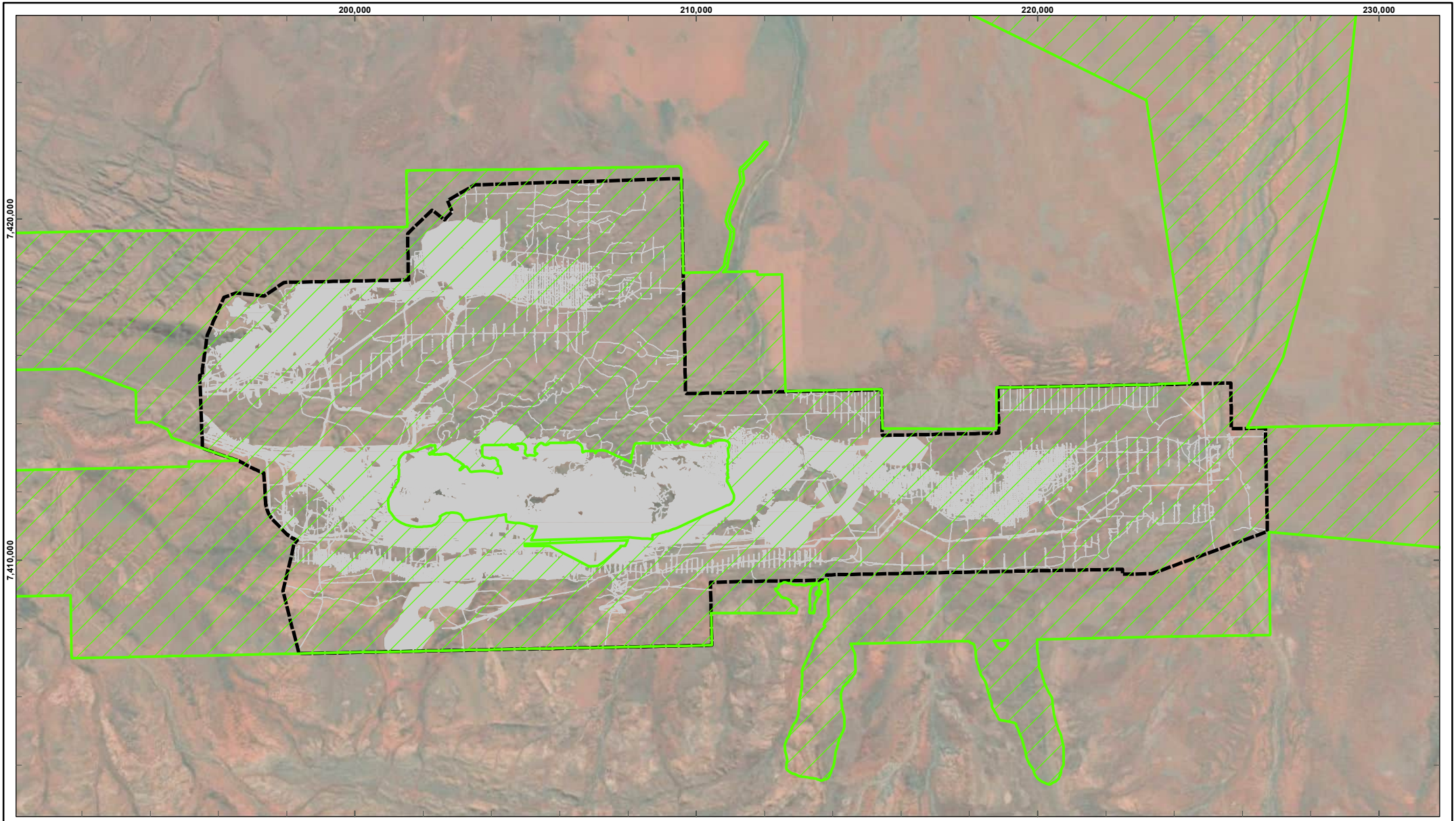
Table 5-17 Grey Falcon habitat

Habitat Description	Within Activity Area (ha)	Within Indicative Footprint (ha)
Supporting habitat		
Drainage area/Floodplain	3,014.0	269.1
Mulga Woodland	3,322.1	492.9
Hillcrest/Hillslope	6,760.1	1,067.1
Sand Plain	1,402.9	24.4
Stony Plain	1,201.2	16.9

Habitat Description	Within Activity Area (ha)	Within Indicative Footprint (ha)
Clay Pan	90.5	0
Hardpan Plain	406.6	0.8
Total	**16,197**	**1,871.2**

5.7.3 Grey Falcon Records

There are no records of Grey Falcon within the Activity Area or in surveyed areas within 500m of the Activity Area. Given the lack of evidence of nesting or critical habitat, it is considered unlikely that the Grey Falcon occurs within the Activity Area as a resident; however, there is potential that it occurs intermittently within the Activity Area.



Survey Coverage
Activity Area
Indicative Cleared Area as at FY2022

N

0 1 2 3 4 5
KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

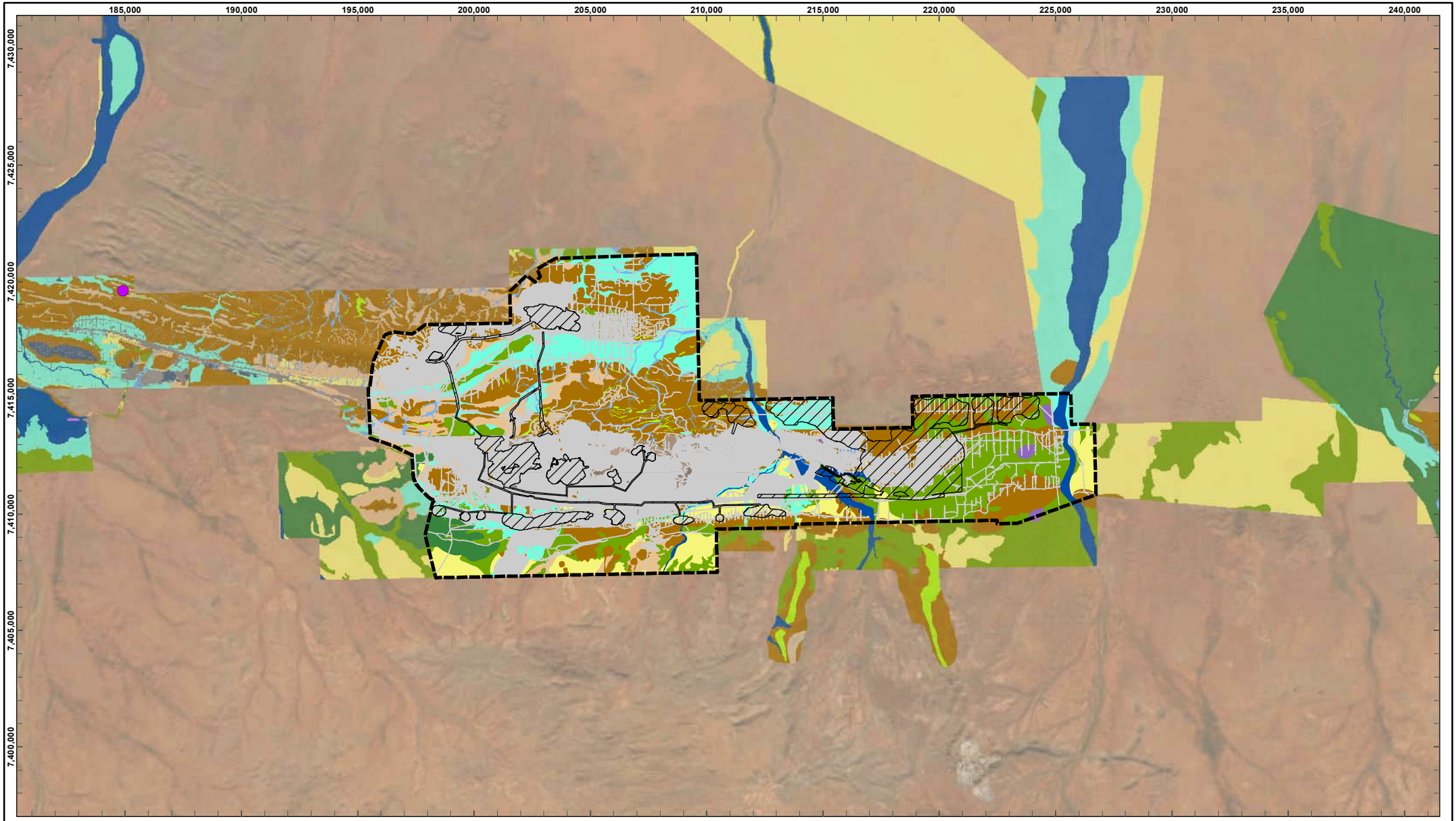
JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Grey Falcon survey areas

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:150,000	PREPARED:	SPATIAL DATA	FIGURE:	5-17
DATE:	19/02/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/165A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_165_E_JMB_VN_GreyFalconSurveys_RevA.mxd



Grey Falcon (Falco hypoleucos)
Indicative Footprint
Activity Area
Indicative Cleared Area as at FY2022

Habitat Area

- Artificial Wetlands
- Breakaway/ Cliff
- Calcrete Plain
- Claypan
- Cleared/ Disturbed
- Dam
- Drainage Area/ Floodplain
- Gorge/ Gully
- Hardpan Plain
- Hillcrest/ Hillslope
- Major Drainage Line
- Minor Drainage Line
- Mulga Woodland
- Sand Plain
- Stony Plain
- Undulating Low Hills

N

0 1 2 3 4 5
KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Grey Falcon
mapped habitat and records

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:220,000	PREPARED:	SPATIAL DATA	FIGURE:	5-18
DATE:	3/04/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/166A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_166_E_JMB_VN_GreyFalconHabitatandRecords_RevA.mxd

5.7.4 Impact Assessment

The potential direct and indirect impacts to the Grey Falcon from the Activity (see Section 2) are considered below.

Habitat loss

Land clearing of the semi-arid zone and overgrazing of arid zone rangelands have been identified as possible threats to Grey Falcon. The Activity will result in the loss of approximately 1,871.2 ha of supporting habitat including Drainage Area/Floodplain, Mulga Woodland, Hillcrest/Hillslope, Sand Plain, Stony Plain, Clay Pan and Hardpan Plain. Given the lack of critical habitat and absence of records of Grey Falcon in the area, habitat loss associated with the Activity is not considered to be a residual impact.

Habitat Modification

Hot work activities on site and the introduction and increased vehicle movements could increase the risk of fire and spread of weeds, respectively. Fire and weed encroachment have the potential to degrade Grey Falcon supporting habitat within and adjacent to the Activity Area. With standard BHP fire management and weed control practices, the potential for increased risk of fire and habitat degradation due to weeds from the Activity, are considered low.

Alterations to landforms and construction of infrastructure can lead to altered surface water drainage patterns which in turn may cause flooding and erosion in some areas and, rain-shadow effects in other areas. Implementation of surface water management measures will minimize any changes to surface water drainage.

Vegetation clearing and vehicle movements may result in an increase in airborne particulate matter. Dust can indirectly affect fauna by altering the structure and composition of native vegetation and causing habitat degradation. Degradation of habitat value due to dust emissions is considered unlikely due to the implementation of dust monitoring and management measures within the Activity Area.

Feral Predators

Feral predators such as feral cats (*Felis catus*) and foxes (*Vulpes vulpes*), may predate on the Grey Falcon. Schoenjahn (2018) documented that Grey Falcons will roost on the bare open ground and evidence of Grey Falcon was recorded in the gut contents of cats. Chicks may also be vulnerable to cat predation at accessible nests. With standard BHP feral cat management practices in place and the lack of Grey Falcon records in the Activity Area, the Activity is not predicted to result in a residual impact on Grey Falcon from feral cats or foxes.

5.7.5 Summary

The Grey Falcon Notifiable Action triggers are not applicable as no records exist within the Activity Area or within 500m of the Activity boundary. The Activity is not predicted to result in any residual impact to Grey Falcon.

5.8 Night Parrot

The following sections provide background information to demonstrate that Notifiable Action triggers for Night Parrot are not met. Impacts to the Night Parrot are discussed to illustrate that the Program Matter Objective for this species will be met.

5.8.1 General Species Information

The Night Parrot is listed as Endangered under the EPBC Act and Critically Endangered under the BC Act. The Night Parrot has long been considered one of Australia's most mysterious birds. The species was presumed extinct until 2013 when, after more than a century since the last widely accepted sighting of a live individual, a population was

discovered in south-west Queensland. Since then, the species has been recorded from isolated populations in south-west Queensland and northern inland Western Australia (TSSC 2016d).

There are two known records of the Night Parrot in the SAA from 1967 (DBCA) and 2005 (Birdlife). The 1967 record is located in the far south-western portion of the SAA. The 2005 record is from Minga Well in the northern portion of the SAA, approximately 2.5 km north of the Fortescue Marsh. Due to confidentiality issues, the location of any other records within the SAA boundary are unable to be sourced from external databases.

The Night Parrot requires access to reliable food sources, shelter for breeding, protection from predators and the elements, and access to either free water or water-rich plant foods (Burbidge 2020). The spatial configuration requirements of Night Parrot habitat features have become increasingly evident through recent records of the species by Paruku Rangers and Birriliburu Rangers and others (Davis and Metcalfe 2008; Jackett *et al*. 2017; Murphy *et al.* 2017; Michelmore and Birch 2020 as cited in Burbidge 2020). The records have occurred at locations where productive feeding habitat (such as ephemeral grasslands, herb-fields or samphire, gilgais, run-on areas, flood plains, or salt lake systems), is interspersed or juxtaposed (at a scale of tens of square kilometres) with old-growth, dense hummock-forming spinifex for roosting/nesting that is broken up into fire-isolated patches by ironstone, rocky bars, salt lakes or samphire flats, within 50 km of free water (Burbidge 2020). The species also appears to rely on roosting/nesting in dense clumps of vegetation that are long-unburnt (TSSC 2016d).

5.8.2 Local Habitat

Survey coverage for Night Parrot is shown in Figure 5-19. Mapped habitat and records (nil) are shown in Figure 5-20.

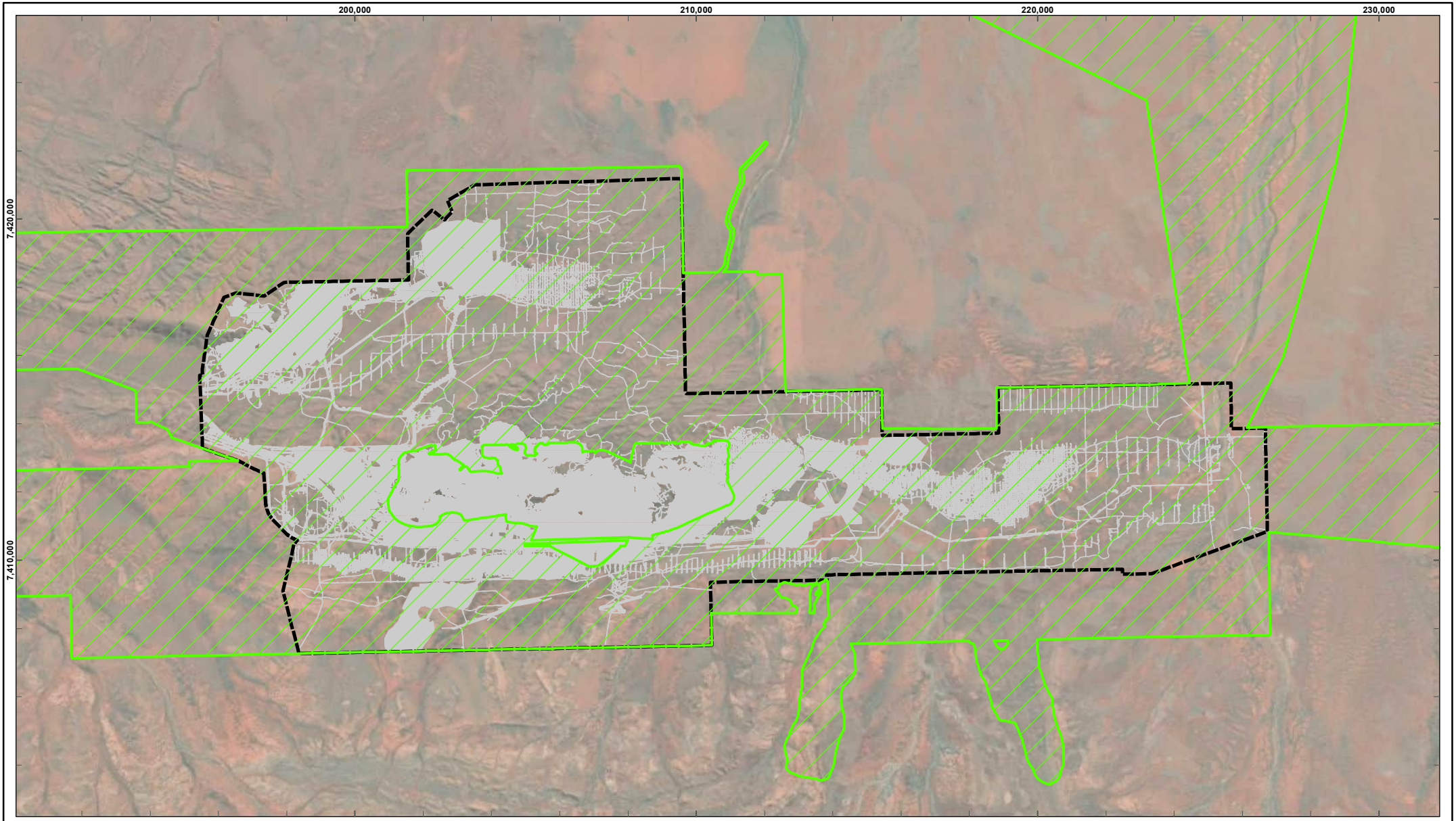
There are no critical habitats present within the Activity Area. Up to 4,712.3 ha of supporting habitats are present including Drainage Area/Floodplain, Stony Plain, Hardpan Plain and Clay Pan habitat.

Table 5-18 Night Parrot habitat

Habitat Description	Within Activity Area (ha)	Within Indicative Footprint (ha)
Supporting habitat		
Drainage Area/Flood Plain	3,014.0	269.1
Stony Plain	1,201.2	16.9
Hardpan Plain	406.6	0.8
Clay Pan	90.5	0
Total	**4,712.3**	**286.8**

5.8.3 Night Parrot Records

There are no records of Night Parrot in the Activity Area or in surveyed areas within 500m of the Activity Area.



Survey Coverage
Activity Area
Indicative Cleared Area as at FY2022

N

0 1 2 3 4 5
KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

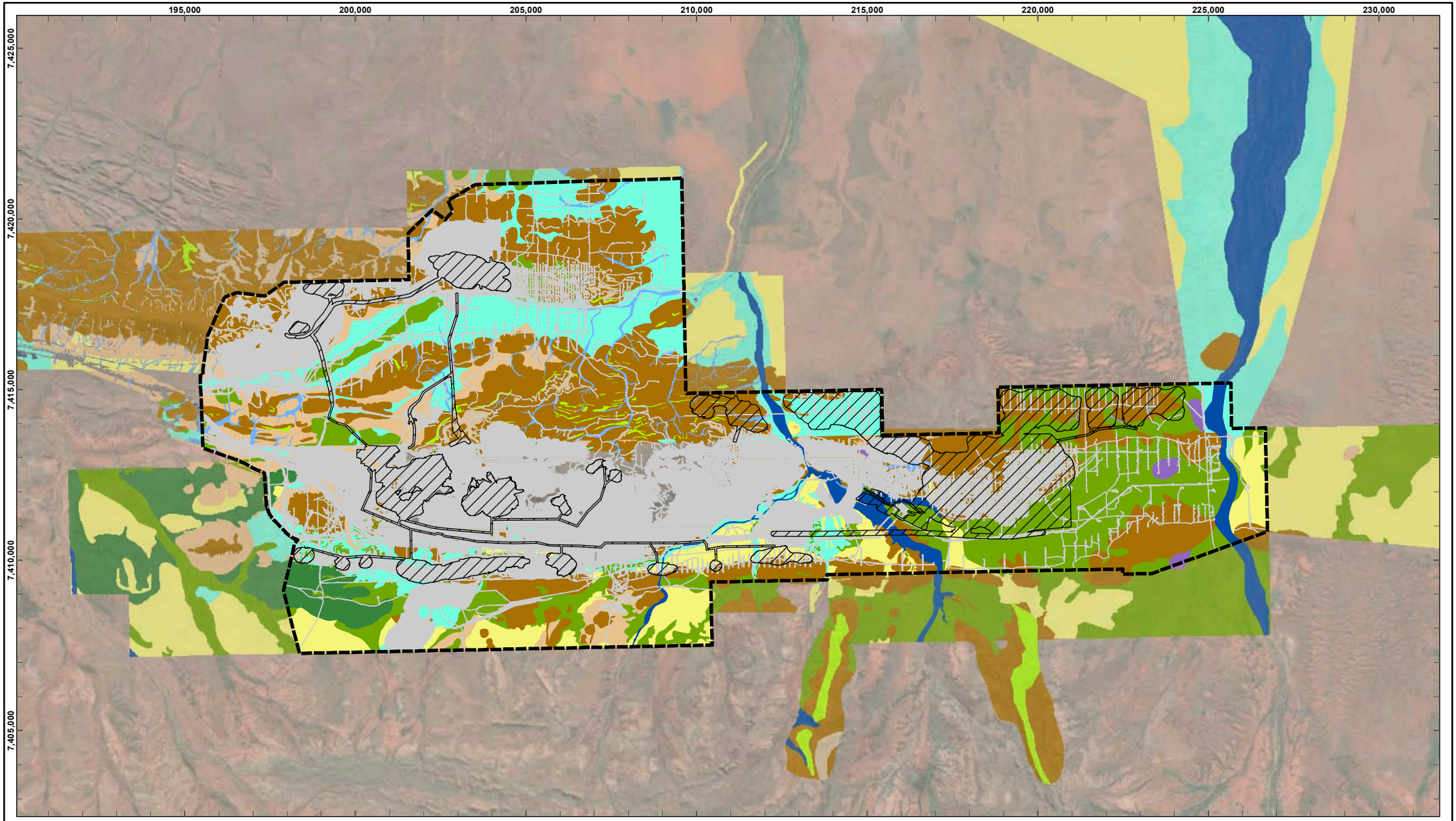
JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Night Parrot survey areas

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:150,000	PREPARED:	SPATIAL DATA	FIGURE:	5-19
DATE:	19/02/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/167A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_167_E_JMB_VN_NightParrotSurveys_RevA.mxd



Indicative Footprint
Activity Area
Indicative Cleared Area as at FY2022

Habitat Area

- Breakaway/ Cliff
- Calcrete Plain
- Claypan
- Cleared/ Disturbed
- Drainage Area/ Floodplain
- Gorge/ Gully
- Hardpan Plain
- Hillcrest/ Hillslope
- Major Drainage Line
- Minor Drainage Line
- Mulga Woodland
- Sand Plain
- Stony Plain
- Undulating Low Hills

N

0 1 2 3 4 5
KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Night Parrot mapped habitat

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:150,000	PREPARED:	SPATIAL DATA	FIGURE:	5-20
DATE:	4/07/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/175A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_175_E_JMB_VN_NightParrotHabitatandRecords_RevA.mxd

5.8.4 Impact Assessment

Habitat loss

The Activity will result in the direct loss of 286.8 ha of supporting habitat suitable for foraging and dispersal.

Clearing for the Activity has the potential to fragment habitat; however, there are no records within the Activity Area or surrounds, the potential impact from the Activity is considered to be very low and is not predicted to result in a residual impact to the species.

Hydrological changes

Groundwater dewatering for the Activity will lower the groundwater table at Jimblebar East, in proximity to the proposed new below water table pits. Riparian vegetation occurs along Jimblebar Creek and Caramulla Creek; however, depth to groundwater in these areas is greater than 50 mbgl, and therefore too deep for roost systems of Eucalyptus species to access. There are also no groundwater dependent pools present in the Activity Area or within the modelled drawdown area. As a result, dewatering from the Activity is not predicted to impact the condition of critical foraging habitat for the Ghost Bat.

Geochemical analysis of tailings demonstrates that tailings are not acid forming and liquids generated from tailings are near neutral pH, low salinity and low metal and nutrient concentrations. The selected short term tailings storage options (De Grey and Swan pits) have been assessed for connectivity to the regional aquifers. The De Grey pit is not hydraulically connected to the regional aquifer due to presence of a hydraulic barrier, while the Swan pit is indirectly hydraulically connected to the regional aquifer via the connection to Orebody 31. Any seepage from Swan pit would be captured by groundwater abstraction at Orebody 31 from ongoing dewatering activity. As a result, in pit tailings is not expected to impact groundwater quality. In addition, as described above, there is no groundwater dependent vegetation or pools present in the Activity Area and therefore, fauna habitats are not predicted to be impacted by in pit tailings deposition.

Alterations to landforms and construction of infrastructure can lead to altered surface water drainage patterns which in turn may cause flooding and erosion in some areas and, rain-shadow effects in other areas. With the implementation of surface water management measures, changes to surface water drainage from the Activity will be minimized and are not predicted to result in residual impacts to habitats.

Habitat modification

Numerous references indicate that the Night Parrot appears to rely on roosting/nesting in dense clumps of vegetation that are long-unburnt (TSSC 2016d). The Night Parrot is therefore considered susceptible to the effects of changes in fire regimes or human-induced fire events. Hot work activities on site and the introduction and increased vehicle movements may increase the risk of fire to Night Parrot supporting habitats within the Activity Area. Further habitat degradation is likely to have been caused through grazing cattle which have been observed in the Activity Area during surveys (Biologic 2020a). Given the lack of records in the Activity Area, the impact of habitat modification from the Activity to the Night Parrot is considered to be very low. With standard BHP fire management and weed control practices, the potential for increased risk of fire and habitat degradation due to weeds from the Activity, are considered low and are not predicted to result in residual impact to the species.

Vegetation clearing and vehicle movements may result in an increase in airborne particulate matter. Dust can indirectly affect fauna by altering the structure and composition of native vegetation and causing habitat degradation. Dust emissions from the Activity, with the implementation of dust management measures, is considered unlikely to result in habitat degradation and is not predicted to result in a residual impact to the species.

Feral predators

The Night Parrot is thought to be vulnerable to predation by feral cats (*Felis catus*) and 22448049(TSSC 2016d). Fauna surveys have recorded feral cats during the 2020 Coombanbunna fauna survey (Biologic 2020b) to the south of the Activity Area. Given the lack of Night Parrot records, the Activity is not predicted to result in any residual impact to Night Parrot as a result of feral cats.

5.8.5 Summary

The Night Parrot Notifiable Action triggers are not applicable as no records exist within the Activity Area or within 500m of the Activity boundary. The Activity is not predicted to result in a residual impact to Night Parrot.

6 Compliance tracking and Annual Reporting

BHP will track compliance of this Validation Notice against the Program at an Activity scale to ensure that the PMOs are being achieved. Detail on compliance tracking is provided in Section 8 and below.

BHP will produce an Annual Environmental Report for all of its environmental obligations for each notifiable action under the Strategic Assessment Approval. As a minimum, the aspects applicable to this Validation Notice to be included in the Annual Environmental Report are:

- status of implementation (planned start date, action commenced and planned completion date; and action completed) of the Notifiable Action
- offsets implemented for the Notifiable Action
- where applicable, accumulated disturbance against PMO
- disturbance areas associated with all actions, whether material or non-material, implemented since the Approval. Both the annual disturbance and the total disturbance (since the Approval) will be included
- monitoring, management and corrective actions implemented during the reporting period to avoid, mitigate and offset impacts to Program Matters
- attainment of Program Matter Objectives and PMOs
- summary of any exceedances of the PMO relevant to each Notifiable Action, and corrective actions taken
- deviations from the Program or from information and management commitments contained in a Validation Notice for a Notifiable Action.

7 Offset Proposal

7.1 Residual Impacts

The Jimblebar Significant Amendment Validation Notice identifies residual impacts to supporting habitat for Northern Quoll and impacts to critical habitat for Ghost Bat, as identified in Table 7-1 below. The residual impact identified for each Program Matter includes the extent of critical and/or supporting habitat that will be directly impacted by the Activity. BHP applies the current offset rate ($/ha) to estimate the total offset liability for the Activity, assuming offsets will be acquitted via payment to the Pilbara Environmental Offsets Fund.

7.2 Offset Requirements

BHP developed the following objective for each of the Program Matters based on *the Standards for Accreditation of Environmental Approvals under the Environment Protection and Biodiversity Conservation Act 1999* and in consultation with the DCCEEW (Section 3.1.1 of the Program):

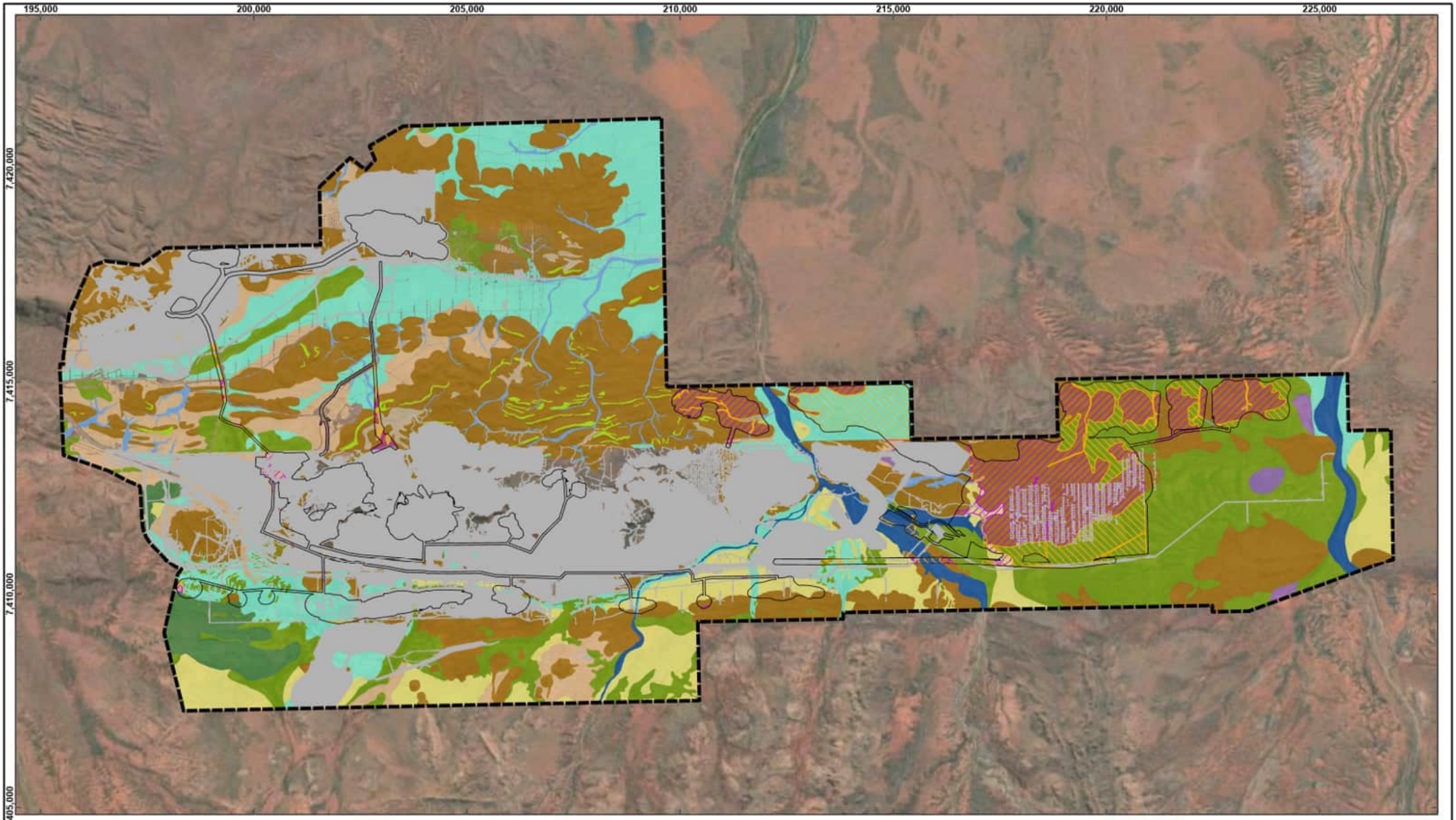
> *'To support the long-term persistence and viability of the Program Matter within the strategic assessment area'.*

Offsets for residual impacts to Northern Quoll and Ghost Bat are required to achieve this PMO. Furthermore, the PMOs identified for each Program Matter must also be achieved. The relevant offsets are identified in Table 7-1 and Figure 7-1.

Table 7-1: Program Matter residual impacts for the Jimblebar Significant Amendment Validation Notice requiring offsetting under the SEA

Residual Impact	Habitat types and extent to be offset (ha)	Total area to be offset (ha)	Habitat Rating	Offset Rate ($/ha) excluding GST (rate to be adjusted annually with CPI)	Total minimum estimated financial offset ($) excluding GST
Northern Quoll					
Clearing of supporting habitat	1,067.1 ha Hillcrest/Hillslope 24.4 ha Sand Plain 16.9 ha Stony Plain	1,108.4	Supporting	1,653	1,832,185.20
Ghost Bat					
Clearing of supporting habitat	24.4 ha Sand Plain 16.9 ha Stony Plain	41.3	Supporting	1,653	68,268.90
Clearing of critical habitat	7.6 ha Gorge/Gully 2.5 ha Breakaway/Cliff	10.1	Critical	3,306	33,390.60
Clearing of critical foraging habitat within 12 km of Category 2 roosts	15.9 ha Major Drainage Line 24.7 ha Minor Drainage Line 492.9 ha Mulga Woodland 268.5 ha Drainage Area/Floodplain	802.0	Critical	3,306	2,651,412
Total Amount to be offset					**4,585,256.70**

Residual Impact	Habitat types and extent to be offset (ha)	Total area to be offset (ha)	Habitat Rating	Offset Rate ($/ha) excluding GST (rate to be adjusted annually with CPI)	Total minimum estimated financial offset ($) excluding GST
Initial 10% pre-payment					458,525.67



Proposed Development Envelope
Indicative Footprint
Indicative Cleared Area

Fauna Habitats subject to Offset payments

Ghost Bat Critical Habitat
Northern Quoll and Ghost Bat Supporting Habitat

Breakaway/ Cliff
Claypan
Drainage Area/ Floodplain
Gorge/ Gully
Hardpan Plain
Hillcrest/ Hillslope

Major Drainage Line
Minor Drainage Line
Mulga Woodland
Sand Plain
Stony Plain

N

0 2 4 6

KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR SIGNIFICANT AMENDMENT VALIDATION NOTICE

Vertebrate Fauna Habitat subject to Offset Payments

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:120,000	PREPARED:	GEOMATICS	FIGURE:	7-1
DATE:	30/10/2024	REQUESTOR:	ENV. APPROVALS	NO:	1021/174D

Document Path: Y:\Jobs\A1001_A1500\A1021\3\Project\A1021_174_E_JIMB_FaunaHabitatOffsets_Rev8.aprx

7.3 Proposed Offset

Typical offset methods available in the Pilbara that BHP may use include, financial, land management and research offsets. The DCCEEW have agreed that contributions to the PEOF will address clearing of critical and supporting habitat. The loss of critical and supporting habitat for Northern Quoll and Ghost Bat is therefore proposed to be offset by a financial contribution to the PEOF. Combined with the avoidance and mitigation measures outlined above in Section 4, this will ensure that the Program Matter Outcomes identified in the APOP are achieved.

The offset package comprises the following:

- Advance payment of 10% of the estimated total offset contribution to be paid into the PEOF within one month of the Validation Notice becoming effective.
- A biannual payment for each hectare of clearing of critical and/or supporting habitat for Northern Quoll and Ghost Bat

Financial contributions to the PEOF to support on ground offset projects in the Pilbara, to the benefit of the relevant Program Matters, will achieve the Program Matter Objective and relevant Program Matter Outcome through investment in one or more conservation projects relevant to Northern Quoll and Ghost Bat, such as:

- Landscape-scale programs address threats like weeds, feral animals, and inappropriate fire across the landscape.
- Priority area programs build on the landscape-scale outcomes to further improve and protect vegetation and species habitat in identified priority areas.
- Site-specific projects protect and improve specific environmental matters such as Priority Ecological Communities or a particular habitat with unique attributes.

Reporting on financial contributions to the PEOF will be included in the Annual Environmental Report.

7.4 Offset Calculation

7.4.1 Baseline Conditions

During the assessment, fauna habitat survey data for each Program Matter is collected. A component of the biological survey information is the identification and mapping of critical and suitable habitats for each Program Matter. As the presence of two Program Matters (Northern Quoll and Ghost Bat) has triggered the need for this Validation Notice, habitat mapping has been reviewed in the determination of offsets.

The following baseline datasets will be provided to the PEOF to assist in determining the offset value to be applied:

- the Activity Area;
- existing disturbance areas (as of FY2022); and
- fauna habitat mapping and relevant Program Matter records.

7.4.2 Offset Value

The following methodology is used to calculate the direct impacts to the Program Matter values that require offsetting utilising the PEOF:

1) Land disturbance data is captured

   BHP captures and prepares a land disturbance dataset to demonstrate the impacts that have occurred within the reporting period, via the following steps:

   - throughout the financial year periodic aerial imagery of the Validation Notice Activity Area is captured

- using the aerial imagery closest to the end and beginning of each financial year, the land disturbance within each reporting period is digitised
- land disturbance data is then categorised and attributed with data according to the standards set out in the Instructions and associated templates
- the land disturbance data further digitised and captured at 1:1,000, meaning that 1 millimetre on the computer screen is equivalent to 1 metre on the ground[2]; this is consistent with the precision of all BHP datasets
- a land disturbance dataset is then available for reconciliation and validation processing.

2) Data reconciliation and validation

   Reconciliation and validation of the land clearing dataset is undertaken to ensure that all land disturbance activities for the reporting period have been streamlined, categorised and attributed according to the Impact Reconciliation Plan, Instructions requirements and from prior feedback from DWER.

3) Processing of datasets

   BHP has developed a methodology which automates the process of comparing the land clearing dataset against the baseline dataset, for calculating the hectares of land disturbance for each area of environmental value (areas subject to offsets), and those with Offset Exclusions.

   The automated methodology ensures the process of deriving the final product is consistent and repeatable, across other approvals and reporting periods.

4) Production of final Impact Reconciliation Report dataset

   An EPBC Act Impact Reconciliation Report (EPBC Act IRR) dataset for each financial year within the reporting period is then developed.

   The EPBC Act IRR dataset will be used for calculating and reporting the total number of hectares with the Program Matter offset requirements within the reporting period and the cumulative totals, in the EPBC Act IRR.

   This EPBC Act IRR dataset and aerial imagery, is submitted to the DWER with the IRR for review and assessment, and will be maintained on record for auditing purposes.

7.4.3 Offset Rates

The relevant financial rates to be used per ha of loss of supporting habitat as determined by the DCCEEW are as follows:

- A minimum of $3,306 per ha of critical habitat
- A minimum of $1,653 per ha of supporting habitat

7.5 Proposed Schedule

Key anticipated steps and the schedule for the provision of advanced and biannual payments to the PEOF are outlined in Table 7-2 and Table 7-3. The offset commencement timing and ongoing contributions are aligned with the requirements of the APOP.

2 BHP captures baseline land disturbance at 1:1,000 (i.e. +/- 0.5m on the ground) hence any polygon slivers or gaps in the dataset under one square metre are ignored and are considered acceptable in the context of analysing datasets at vastly different scales.

Table 7-2: Offsets Reporting period.

Reporting Period	Action	Timing
1 July to 30 June	Offsets implemented for each Notifiable Action	Annual capture with biannual payment

Table 7-3: PEOF Contributions Schedule

Validation Process Stage	Action	Timing
Consultation on PEOF contributions	Provision of the Validation Notice inclusion of Impact Reconciliation Process and spatial data (Section 6 for Contributions to the PEOF)	During 28 day public comment period
Authorisation	Validation Notice becomes effective	20 business days after publication of Final Validation Notice.
Implementation Advanced Payment	Advanced Payment (10% of the estimated total contribution)	Within one month of Validation Notice becoming effective
	BHP to report payment of Advanced Payment in the AER	1 October 2024
Implementation Period 1	First annual reporting period	1 July 2023 to 30 June 2024
	Aerial survey/ground truthing	30 June 2024
	EPBC Impact Reconciliation submitted to DWER	30 September 2024
	BHP to report payment of Offset Payment in the AER	1 October 2024
Implementation Period 2 and so forth until final offset contributions are completed	Second annual reporting period	1 July 2024 to 30 June 2025
	Aerial survey/ground truthing	30 June 2025
	EPBC Impact Reconciliation Report submitted to DWER	30 September 2025
	BHP to report payment of Offset Payment in the AER	1 October 2025

7.6 Offsets Reporting

7.6.1 Payment of Financial Contributions

EPBC IRRs will be submitted biannually to the DWER PEOF administration team and kept on record for auditing purposes**.** In the event this Validation Notice and Offset Proposal are amended and superseded by a new version, a part-year reconciliation will be undertaken for the superseded approval to coincide with the start of the first reporting period.

The following information will be submitted in the IRR:

- clearing undertaken for each financial year of the reporting period;
- supporting information to validate clearing including the aerial imagery, digitised polygons and ground-truthing surveys (undertaken in accordance with the DWER and the DCCEEW guidance) used to determine clearing in each financial year;
- information regarding exempt clearing, other approvals or reductions to contributions to the fund, where relevant; and
- where applicable, information regarding part-year reconciliations required due to a Validation Notice and SEA Offsets Proposal being superseded.
- a forward estimate of clearing.

BHP will also provide notification to DCCEEW of the payment to the PEOF of 10% of the estimated offset within one month of the Validation Notice taking effect. A summary of offset outcomes for Validation Notices will be reported in the Annual Environmental Report.

7.6.2 Implementation of PEOF Projects

BHP will provide a progress summary of the offsets implemented and achievement of outcomes from the funding provided to the PEOF in the AER. Annual reports, evaluations or other progress reports provided by the PEOF and its delivery agents to BHP will be retained for auditing purposes.

8 Commitments

Key commitments of the Validation Notice are summarised in the following sections. Implementation of each of the commitments will be reported in the SEA AER.

8.1 Monitoring Commitments

The monitoring commitments which form part of this Validation Notice are presented in Table 8-1.

Table 8-1: Proposed monitoring commitments – Ghost Bat

Monitoring Commitment	Action	Monitoring And Frequency	Reporting
Ghost Bat			
Ensure no Ghost Bats are present in Category 4 roosts (CJIM-04, CJIM-08, CJIM-17 and CJIM-18) prior to disturbance, if disturbance is required.	Prior to disturbance: • Inspect the Category 4 roosts (CJIM-04, CJIM-08, CJIM-17 and CJIM-18) prior to disturbance • If present, displace Ghost Bats from a roost during the inspection via physical presence in the cave or use of deterrents (i.e. noise or light) Complete roost pre-disturbance checklist to ensure required actions have been undertaken.	Response actions to monitoring targets not being met may include, but are not limited to: • investigate potential cause of monitoring targets not being met • revise pre-disturbance checklist if required • provide the checklist to all personnel required to be involved in pre-disturbance checks	SEA AER
Inspect barbed wire fencing to ensure it is fitted with reflectors to deter bat interaction.	After installation of barbed wire fencing, inspect to ensure reflectors are installed.	If reflectors have not been installed: • Install reflectors as soon as practicable • Reinspect to ensure reflectors have been installed	
Monitor caves (Category 3 roosts CJIM-09 and CJIM-14, and Category 4 roosts CJIM-05, CJIM-06, CJIM-07, CJIM-15 and CJIM-20) and associated buffers to: • to demonstrate evidence of Ghost Bat use at one or more of the monitored caves over a two year period.	Monitoring of caves may include but are not limited to scat monitoring (deposition rate, genetic analyses hormone analyses), ultrasonic recording, cave microclimate monitoring and photo monitoring of caves.	• Category 3 roosts to be monitored at least annually • Category 4 roosts to be monitored at least biennially	

8.2 Clearing Commitments

The clearing commitments which form part of this Validation Notice, inclusive of proposed clearing allowances for each habitat type, are presented in Table 8-2.

Table 8-2: Proposed clearing commitments – Ghost Bat

Clearing Commitment	Action	Monitoring And Frequency	Reporting
No disturbance to Ghost Bat roosts Category 3 roosts CJIM-09 and CJIM-14, and Category 4 roosts CJIM-05, CJIM-06, CJIM-07, CJIM-15 and CJIM-20 and the associated exclusion buffers within the Activity Area	• Ghost Bat locations and exclusion buffers to be identified as exclusion zones in spatial layers as used to inform ground disturbance	• Inspection of caves and habitat within exclusion zones annually to ensure no disturbance has occurred	SEA AER
Clearing of no more than 2,067 ha including no more than: • 2.5 ha Gorge/Gully • 7.6 ha Breakaway/Cliff habitat type	• Implement BHP's land disturbance permit system to ensure clearing does not exceed the identified limits	• Annual review of land clearing undertaken	

8.3 Management Commitments

The management commitments which form part of this Validation Notice are presented in Table 8-3.

Table 8-3: Proposed management commitments – Ghost Bat

Management Commitment	Action	Monitoring And Frequency	Reporting
Restrict barbed wire usage	Avoid use of barbed wire fencing within and surrounding the Activity Area far as practicable, except where required by legislation	Inspect any areas which require barbed wire fencing after installation, to ensure that bat reflectors have been installed	SEA AER
Restrict access to Ghost Bat caves during breeding season	Monitor caves outside of the Ghost Bat breeding season (October to December)	Review timing of proposed monitoring events prior to implementation to ensure it falls outside of the breeding season Annual review of Ghost Bat monitoring report to confirm monitoring was undertaken outside of breeding season	SEA AER
Feral cat control	BHP will implement standard feral cat management measures in response to observations of feral cats	Feral cat presence is monitored incidentally through observations of site teams. Observations are used to inform the location and frequency of control measures.	SEA AER
Implement fire management	Abide by hot work management procedures Firebreaks are maintained Ensure designated smoking areas are available.	During construction and operation phase	SEA AER

8.4 Offset Commitments

The offset commitments which form part of this Validation Notice are presented in Table 8-4.

Table 8-4: Proposed offset commitments

Offset Commitment	Action	Monitoring And Frequency	Reporting
Payment of financial contribution to PEOF	Advanced payment of 10% of offset amount within one month of the Validation Notice becoming effective.	One of payment within one month of Validation Notice becoming effective.	SEA AER
	Biannual payment for clearing of supporting habitat	Disturbance reported annually EPBC IRR provided biannually	SEA AER
Provide PEOF funding progress summary	A progress summary of the offsets implemented and achievement of outcomes from the funding provided to the PEOF will be provided in the AER.	Annually	SEA AER

9 References

Abbott, I (2001). 'The bilby *Macrotis lagotis* (Marsupialia: *Peramelidae*) in south-western Australia: original range limits, subsequent decline, and presumed regional extinction', Records of the Western Australian Museum, vol. 20, pp. 271-305.

Armstrong K. (2001). 'The distribution and roost habitat of the orange leaf-nosed bat, *Rhinonicteris aurantius*, in the Pilbara region of Western Australia', Wildlife Research, vol. 28, pp. 95-104.

Armstrong N.K. and Anstee D.S. (2000). The Ghost Bat in the Pilbara: 100 years on. Australian Mammalogy. vol.22 pp. 83-101

Augusteyn J., Hughes J., Armstrong G., Real, K and Pacioni C. (2018) Tracking and tracing central Queensland's Macroderma – determining the size of the Mount Etna ghost bat population and potential threats. Australian Mammalogy, vol 40(2), pp. 243-253

Bat Call WA (2021a). *A review of ghost bat ecology, threats and survey requirements*. DWER.

Bat Call WA (2021b). *A review of Pilbara leaf-nosed bat ecology, threats and survey requirements.* DWER.

Baudinette R.V., Churchill S.K., Christian K.A., Nelson J.E. and Hudson P.J. (2000) Energy, water balance and the roost microenvironment in three Australian cave-dwelling bats (Microchiroptera). Journal of Comparative Physiology. B 170:439–446

BHP (2023). *Pilbara Strategic Assessment– Assurance and Offsets Plan. Revision 2.3.* BHP Pty Ltd. Perth, Western Australia.

BHP (2019). *Communications, Community and External Engagement Our Requirements*

BHP (2018a). *BHP Pilbara Strategic Assessment Impact Assessment –Assurance Plan.* BHP Pty Ltd. Perth, Western Australia.

BHP (2018b). *BHP Pilbara Strategic Assessment Impact Assessment –Offsets Plan.* BHP Pty Ltd. Perth, Western Australia.

BHP (2017). *BHP Pilbara Strategic Assessment Impact Assessment –The Program*. BHP Pty Ltd. Perth, Western Australia

Biologic (2020a). Jimblebar *Greenhouse Gas Abatement Study Basic Vertebrate Fauna Survey*. Unpublished report prepared for BHP.

Biologic (2020b). *Developments in knowledge of ghost bat home range and foraging areas, and its application at Mining Area C - South Flank*. Unpublished report prepared for BHP Western Australian Iron Ore Biologic Environmental Survey, East Perth, WA

Biologic (2019). *Shearer's West Targeted Vertebrate Fauna and Short-range Endemic Fauna Assessment.* Unpublished report prepared for BHP.

Braithwaite, R. W., and Griffiths, A. D. (1994). Demographic variation and range contraction in the northern quoll, *Dasyurus hallucatus (Marsupialia: Dasyuridae)*. *Wildlife Research, 21*, 203-217.

Bullen, R. D. (2021). Ghost bats in the Pilbara, *Macroderma gigas*: Summary of current data on distribution, energetics and threats. Presentation made to Curtin University workshop, 2 March 2021.

Bullen B. (2013). Pilbara Leaf-Nosed Bat (PLN) *Rhinonicteris aurantia*: Summary of current data on distribution, energetics, threats, Microsoft PowerPoint presentation prepared by Bob Bullen. Viewed 10 October 2014. Available at: www.sustainable.net.au/pilbara-leaf-nosed-bat/.

Burbidge, A. (2020) 'Night Parrot habitats'. Interim Night Parrot Habitat Statement, Leading Night Parrot Conservation. Available from https://nightparrot.com.au/index.php/2022/04/05/night-parrot-habitats/.

Bush B. and Maryan B. (2011). *Field Guide to Snakes of the Pilbara, Western Australia*. Western Australian Museum. Western Australia, Perth.

Churchill S.K. (1991) Distribution, abundance and roost selection of the Orange Horseshoe-bat, Rhinonycteris aurantius, a tropical cave dweller. Wildlife Research. 18:343–353.

Churchill S.K., Helman P.M. and Hall L.S. (1988) Distribution, populations and status of the Orange Horseshoe Bat, *Rhinonicteris aurantius* (Chiroptera: Hipposideridae). Australian Mammalogy. 11(1):27–33.

Cramer, V.A., Dunlop, J., Davis, R., Ellis, R., Barnett, B, Cook, A., Morris, K. and van Leeuwen, S. (2016a). Research priorities for the northern quoll (*Dasyurus hallucatus*) in the Pilbara region of Western Australia. *Australian Mammology* 38(2): 135-148

Cramer, V. A., Armstrong, K. N., Bullen, R. D., Ellis, R., Gibson, L. A., McKenzie, N. L., van Leeuwen, S. (2016b). Research priorities for the Pilbara leaf-nosed bat (*Rhinonicteris aurantia* Pilbara form). *Australian Mammalogy,* 38(2), 149-157.

Davis R.A. and Metcalfe B.M. (2008). The Night Parrot (*Pezoporus occidentalis*) in northern Western Australia: a recent sighting from the Pilbara region. *Emu* 108: 233-236.

DCCEEW (2023b). Recovery Plan for Greater Bilby (*Macrotis lagotis*). DCCEEW, Canberra.

DotE (2023c). *Dasyurus hallucatus* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: https://www.environment.gov.au/sprat.

DoE (2016). *EPBC Act referral guideline for the endangered northern quoll Dasyurus hallucatus*. Canberra, Australian Capital Territory: DoE.

DoE (2013). *Significant Impact Guidelines 1.1: Matters of National Environmental Significance*. DoE, Canberra, Western Australia

Doughty, P, Rolfe, J, Burbidge, A, Pearson, D and Kendrick, P (2011). 'Herpetological assemblages of the Pilbara biogeographic region, Western Australia: ecological associations, biogeographic patterns and conservation', Records of the Western Australian Museum- Supplement 78, pp. 315–341.

Dziminski M.A. and Carpenter F. (2017). The conservation and management of the bilby (Macrotis lagotis) in the Pilbara. Progress Report (April 2017). Department of Biodiversity, Conservation and Attractions, Perth, WA

Ecologia Environment (Ecologia) (2005). Pilbara Leaf-Nosed Bat, (Rhinonicteris aurantius) and Ghost Bat, (Macroderma gigas) monitoring survey at Nimingarra and Cattle Gorge 2005. Unpublished report prepared for BHP, Western Australia, Perth.

Ecologia Environment (Ecologia) (2006a). Goldsworthy bat monitoring, February 2006. Unpublished report prepared for BHP, Western Australia, Perth.

Ecologia Environment (Ecologia) (2006b). Hashimoto terrestrial fauna survey. Unpublished report prepared for BHP, Western Australia, Perth.

Eco Logical Australia (Eco Logical) (2014b). BHP Proposal: Cumulative Impact Assessment, Species Synopsis – Pilbara Leaf-Nosed Bat. Unpublished report prepared for BHP, Western Australia, Perth.

Falkenberg, I. D. (2011). Aspects of the ecology of the Grey Falcon *Falco hypoleucos* in the South Australian arid zone. Corella 35: 23–28.

Garnett, S. T., Szabo, J. K. and Dutson, G. (2011). *The Action Plan for Australian Birds 2010*. CSIRO, Melbourne.

GHD (2021) Jimblebar Targeted Ghost Bat Survey. Unpublished report prepared for BHP Billiton Iron Ore Pty Ltd, Western Australia, Perth.

Jackett N.A., Greatwich B.R., Swann G. and Boyle A. (2017) A nesting record and vocalisations of the Night Parrot 'Pezoporus occidentalis' from the East Murchison, Western Australia. *Australian Field Ornithology* 34: 144-150

Janse, I., Kloecker, U., Roshier, D. and Witte, I. (2015) Breeding diet and behaviour of a pair of Grey Falcons *Falco hypoleucos* and their offspring in north-western New South Wales. *Corella* 39: 46–51.

Johnson, K.A (2008). Bilby, *Macrotis lagotis*. In '*The Mammals of Australia*.' (pp. 191-193) Third edition.

Jolly S. (1988) Five colonies of the Orange Horseshoe Bat, Rhinonycteris aurantius (Chiroptera: Hipposideridae), in the Northern Territory. Australian Wildlife Research. 15:41–49.

Kulzer E., Nelson, J.E., McKean, J.L. and Mohres F.P. (1970) Untersuchungen über die Temperaturregulation australischer Fledermäuse (Microchiroptera). Zeitschrift fuer Vergleichende Physiologie. Vol 69, pp. 426–438.

Ley, A. and Tynan, B. (2016). Observations on nesting Grey Falcons*, Falco hypoleucos*. *South Australian Ornithologist* 41: 49–64.

Marchant, S. and Higgins, P. J. (Eds) (1993). *Handbook of Australian, New Zealand & Antarctic Birds*, Vol. 2: Raptors to Lapwings. Oxford University Press, Melbourne.

McKenzie, N.L. and Bullen, R.D. (2009). The echolocation calls, habitat relationships, foraging niches and communities of Pilbara microbats. *Records of the Western Australian Museum*, Supplement 78: 123–155.

Murphy, S.A., Silcock, J., Murphy, R., Reid, J. and Austin, J.J. (2017) Movements and habitat use of the night parrot *Pezoporus occidentalis* in south-western Queensland. Austral Ecology 42: 858-868.

Oakwood, M. (2008). Northern Quoll *Dasyurus hallucatus*. *The Mammals of Australia*. (Ed: R. Strahan). Sydney, Reed New Holland.

Oakwood M. (2004). The effect of cane toads on a marsupial carnivore, the northern quoll, *Dasyurus hallucatus*. Report to Parks Australia.

Oakwood M. (2002). Spatial and social organization of a carnivorous marsupial *Dasyurus hallucatus* (Marsupialia: Dasyuridae). *Journal of Zoology London* 257: 237-248.

Olsen, P. D. and Olsen, J. (1986). Distribution, status, movements and breeding of the Grey Falcon *Falco hypoleucos*. *Emu* 86: 47–51.

Pearson D. (2006). Giant Pythons of the Pilbara, *Landscope*, vol. 19, pp. 32-39.

Schoenjahn, J. (2018). Adaptations of the rare endemic Grey Falcon *Falco hypoleucos* that enable its permanent residence in the arid zone of Australia. PhD Thesis. University of Queensland

Schoenjahn, J. (2013). A hot environment and one type of prey: investigating why the Grey Falcon (*Falco hypoleucos*) is Australia's rarest falcon. Emu 113: 19–25.

Southgate, R. and S. Carthew (2006). Diet of the bilby (Macrotis lagotis) in relation to substrate, fire and rainfall characteristics in the Tanami Desert. Wildlife Research 33, 507-519.

Southgate, R., Paltridge, R., Masters, P., and Carthew, S. (2007). Bilby distribution and fire: a test of alternative models of habitat suitability in the Tanami Desert, Australia. Ecography 30, 759–776.

Southgate, R., Dziminski, M., Partridge, R., Schubert, A., and Gaikhorst, G. (2018). Verifying bilby presence and the systematic sampling of wild populations using sign-based protocols – with notes on aerial and ground based techniques and asserting absence. *Australian Mammalogy*.

Strahan, R. (1995). The Mammals of Australia. Reed New Holland 1995.

TSSC (2016a). *Conservation advice: Macroderma gigas, ghost bat*. TSS, Canberra, Australian Capital Territory.

TSSC (2016b). *Conservation advice: Macrotis lagotis Greater Bilby*. TSSC, Canberra, Australian Capital Territory.

TSSC, Threatened Species Scientific Committee (2016c). *Conservation advice: Rhinonicteris aurantia (Pilbara form), Pilbara leaf-nosed bat*. TSSC, Canberra, Australian Capital Territory.

Threatened Species Scientific Committee (2016d). Conservation advice: *Pezoporus occidentalis*, Night Parrot, TSSC, Canberra, Australian Capital Territory.

Threatened Species Scientific Committee (2020). Conservation advice: *Falco hypoleucos*, Grey Falcon. TSSC, Canberra, Australian Capital Territory. Available from: https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=929.

Watson, C. (2011) A failed breeding attempt by the Grey Falcon *Falco hypoleucos* near Alice Springs, Northern Territory. Australian Field Ornithology 28, 167–179.

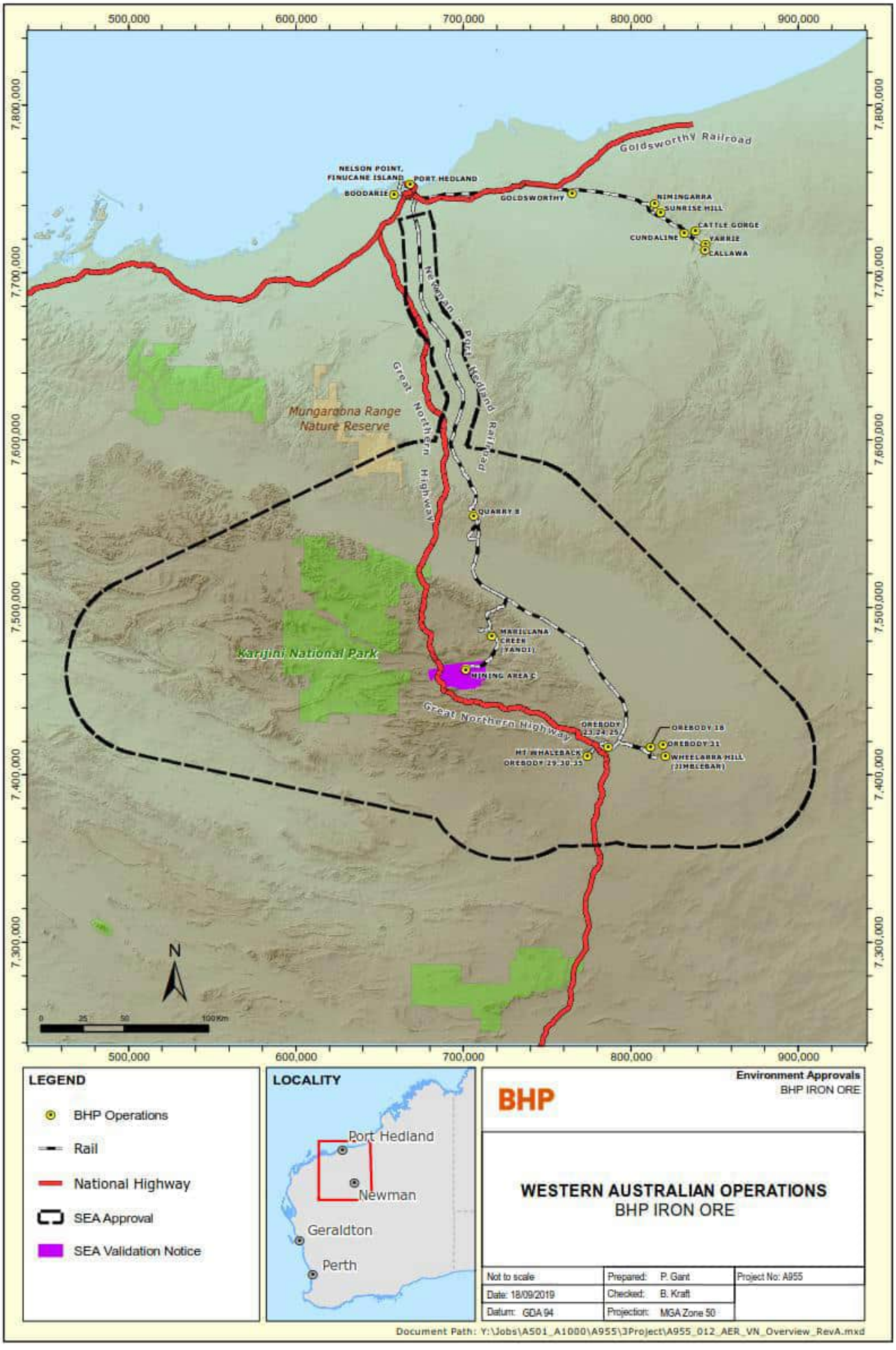
Woinarski, J. C. Z., Burbidge, A. A., and Harrison, P. L. (2014). The Action Plan for Australian Mammals 2012. CSIRO Publishing, Collingwood.

van Vreeswyk, A., Leighton, K A. Payne, A L. and Hennig, P. (2004). *An inventory and condition survey of the Pilbara region, Western Australia*. Department of Primary Industries and Regional Development.

van Dyck S. and Strahan R. (2008). *The Mammals of Australia*, ed. 3, Reed New Holland, Sydney.

Appendices

Appendix 1: Strategic Environmental Assessment Approval Area


500,000
600,000
700,000
800,000
900,000
7,800,000
7,700,000
7,600,000
7,500,000
7,400,000
7,300,000
Goldsworthy Railroad
NELSON POINT, FINUCANE ISLAND
PORT HEDLAND
BOODARIE
GOLDSWORTHY
NIMINGARRA
SUNRISE HILL
CATTLE GORGE
CUNDALINE
YARRIE
CALLAWA
Newman - Port Hedland Railroad
Great Northern Highway
Mungaroona Range Nature Reserve
QUARRY 8
MARILLANA CREEK (YANDI)
Karijini National Park
MINING AREA C
Great Northern Highway
OREBODY 23, 24, 25
OREBODY 18
OREBODY 31
MT WHALEBACK OREBODY 29, 30, 35
WHEELARRA HILL (JIMBLEBAR)
N
0 25 50 100 Km
LEGEND
BHP Operations
Rail
National Highway
SEA Approval
SEA Validation Notice
LOCALITY
Port Hedland
Newman
Geraldton
Perth
BHP
Environment Approvals
BHP IRON ORE
WESTERN AUSTRALIAN OPERATIONS
BHP IRON ORE
Not to scale
Prepared: P. Gant
Project No: A955
Date: 18/09/2019
Checked: B. Kraft
Datum: GDA 94
Projection: MGA Zone 50
Document Path: Y:\Jobs\A501_A1000\A955\3Project\A955_012_AER_VN_Overview_RevA.mxd

Appendix 2: Contemporary Terrestrial Fauna Survey Reports

Appendix 3: Ghost Bat Roost Categorisation Schemes

Appendix 3a: Ghost Bat roost categorisation according to Bat Call WA (2021a)

Roost Type	Roost Features
Category 1 maternity/diurnal roost sites with permanent ghost bat occupancy	Permanent colonies with large but fluctuating populations. Usually represented by underground mines in the Pilbara. There are no documented Category 1 caves in the Hamersley Ranges. Caves are deep and dark with one or more elevated roosting chambers Considered critical habitat
Category 2 maternity/diurnal roost caves with regular occupancy	Caves with regular but not continuous presence of Ghost Bats. Similar cave features to Category 1 caves but less complex with only a single inner chamber and located in less productive areas. These caves may form an 'apartment block' with other nearby caves. Considered critical habitat.
Category 3 diurnal roost caves with occasional occupancy	Caves or adits with less developed cave structure which are occupied occasionally or rarely by Ghost Bats or used as feeding sites. Reproducing females may visit these caves on occasion. Caves may enable the long distance movement of individuals across the landscape. Considered critical habitat only if located adjacent to a Category 2 cave as they may form an 'apartment block'.
Category 4 nocturnal roost caves with opportunistic usage	Shallow caves, shelters or deep overhangs used opportunistically by itinerant Ghost Bats. Not considered critical habitat.

Appendix 3b: Ghost Bat roost categorisation according to Biologic (2021)

Roost Type	Roost Features
Night Roost/ Feeding Roost	Only used at night habitually or for transitory visits. Typically shallow shelters that are well lit during the day. Often high in the strata and poorly insulated from the elements. Often contain guano scatters and middens
Potential Night Roost	Attributes as above but with no scats present
Day (Diurnal) Roost	Deeper and more complex than a Night Roost, typically these have one or more large chambers in the rear in the fully dark regions making them

Roost Type	Roost Features
	suitable for shelter during the day. They typically have a minimum roof height of 2-3m to protect form predators. Often these roosts are located at mid-level or lower in the strata and are well insulated overhead providing a stable temperature environment. Typically they contain multiple scat piles and middens of guano and food remains.
Potential Day Roosts:	Attributes as for Day Roost, but with no evidence of Ghost Bats present
Maternity Roost	Diurnal roosts which provide additional features, to support reproduction, namely, an interior chamber that is rising towards the rear thereby trapping more humid and warmer air allowing suitable conditions for pups and females. Typically heavy scat deposition is present. Pregnant females and pups are present in the breeding season.
Potential Maternity Roost	Same attributes as Maternity Roost, Ghost Bats (not confirmed pregnant females or pups) present in breeding season.

Appendix 4: Hydrological studies

Appendix 5: Jimblebar Terrestrial Fauna Management Plan

BHP

Jimblebar Hub Terrestrial Fauna Environmental Management Plan

FINAL

August 2024
Version 1.1

Version Control

Version	Description	Key changes	Date
Version 0	Draft version for Traditional Owner review	Original document	10/09/2023
Version 1	Final version submitted with referral of Jimblebar Hub Significant Amendment	Minor amendments to management approach text; additional rationale included for choice of management actions; update to reporting requirements	07/12/2023
Version 1.1	Updated version to align with commitments in the Jimblebar Significant Amendment Validation Notice	Minor update to monitoring targets for Ghost Bat	12/08/2024

Abbreviations and Definitions

Term	Meaning
AER	Annual Environment Report
BHP	BHP Iron Ore Pty Ltd
CEO	Chief Executive Officer The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the *Environmental Protection Act 1986*, or the CEO's delegate
Clearing	As defined in section 51A of the *Environmental Protection Act 1986*
DWER	Department of Water and Environmental Regulation
EMP	Environmental Management Plan
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986*
TFEMP	Terrestrial Fauna Environmental Management Plan
GIS	Geographic Information System
MS	Ministerial Statement

Contents

Tables

Figures

Summary

Jimblebar Terrestrial Fauna Environmental Management Plan	
Proposal name	Jimblebar Hub Iron Ore Mining Operations
Proponent name	BHP Iron Ore Pty Ltd
Ministerial Statement	XXXX
Purpose of the EMP	To meet the requirements of implementation Condition B3-3 (Terrestrial Fauna Environmental Management Plan) of Ministerial Statement XXXX
Key environmental factors and EMP objectives	**Terrestrial Fauna** (1) avoid and minimise direct impacts on Ghost Bat and their roost habitats within the Development Envelope
Condition clauses	Condition B3 Terrestrial Fauna (B3-2 and B3-3)
Key components of the plan	Objective-based components to avoid and minimise direct impacts on Ghost Bat and their roost habitats
Proposed construction date	Not applicable. Approved proposals are in operations (Jimblebar Iron Ore Project - Revised Proposal, Orebody 31 Iron Mine and Orebody 18 Iron Ore Mine)
EMP required pre-construction?	Not applicable - required for multiple approved proposals which are in operations

1 Context, scope and rationale

BHP Iron Ore Pty Ltd (BHP) has prepared this Jimblebar Hub Terrestrial Fauna Environmental Management Plan (TFEMP) to meet the requirements under Part IV of the *Environmental Protection Act 1986* (EP Act). The plan is submitted as a draft with the referral documentation for the *Jimblebar Hub Iron Ore Mining Operations Significant Amendment* (BHP 2023) and may be updated during the assessment period. The intent is for the TFEMP to meet the requirements of Ministerial Statement XXXX (MSXXXX) Condition B3-3 Terrestrial Fauna Environmental Management Plan, should the Significant Amendment be approved for implementation.

BHP has prepared this TFEMP to be consistent with the *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans* (the Instructions) (EPA 2021).

1.1 Proposal

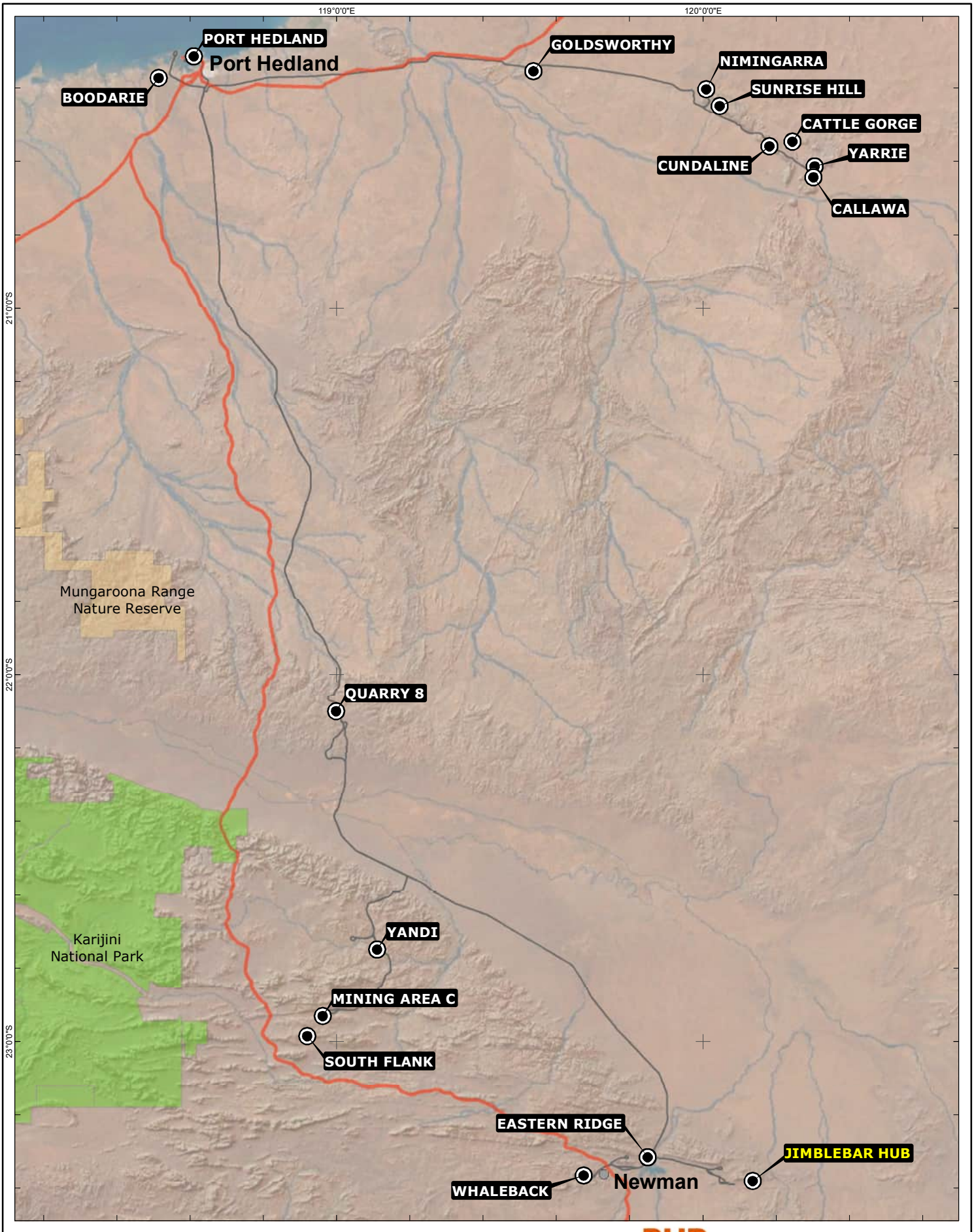
The scope of the TFEMP is the management of Terrestrial Fauna values at the Jimblebar Hub.

The Jimblebar Hub is located approximately 40 kilometres (km) east of Newman (Figure 1). The Jimblebar Hub comprises existing operations at Jimblebar, Orebody 31 and Orebody 18, currently approved under Part IV of the EP Act by MS1126, MS1021 and MS439 (as amended by MS1012) (Approved Proposals) (Figure 2).

The Jimblebar Hub Iron Ore Mining Operations Significant Amendment (the Proposal) includes an expansion of existing mining operations (Figure 2), including but not limited to the extension of above and below water table mining at Jimblebar East, new overburden storage areas (OSAs) north of Jimblebar East, and new haul roads and creek crossings (Jimblebar Creek).

The Proposal includes the additional clearing of 2,067 ha of native vegetation (including 814 ha critical foraging habitat for Ghost Bat). The assessment concluded that there may be the potential for direct impacts on Ghost Bats and their roost habitats.

The Proposal also includes the amalgamation of the Approved Proposals for the Jimblebar, Orebody 31 and Orebody 18 mines. BHP has requested that one new MS is issued for the Amended Proposal (Approved Proposals as amended by the Significant Amendment) (BHP 2023a). Therefore this TFEMP addresses the management of terrestrial fauna for the Amended Proposal.



BHP mine
National Park
Nature Reserve
Highway
Rail

N

0 10 20 30 40
KILOMETRES

GCS GDA 1994

BHP

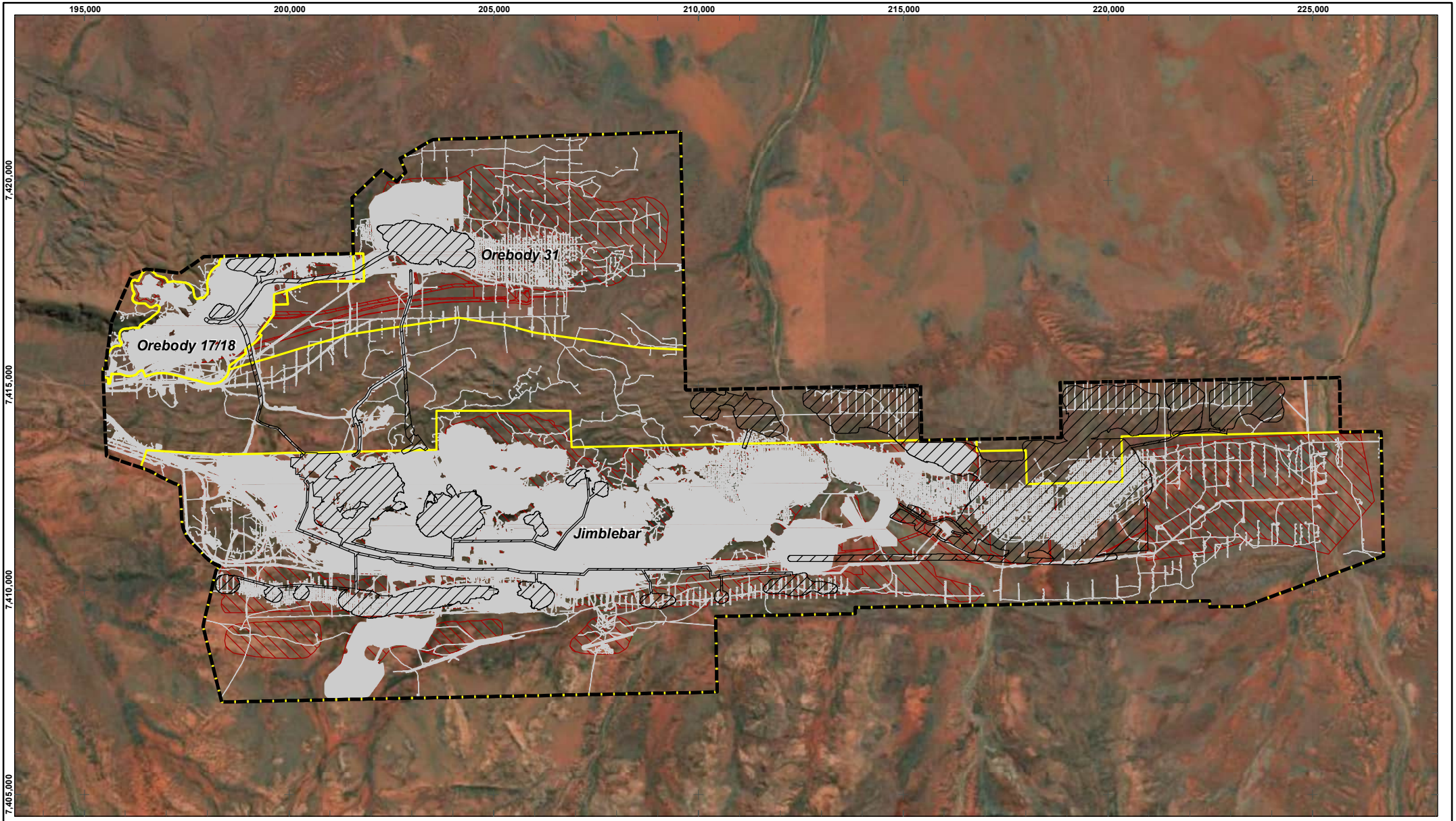
PUBLIC

JIMBLEBAR HUB
TERRESTRIAL FAUNA
ENVIRONMENTAL MANAGEMENT PLAN
Regional location

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:1,500,000	PREPARED:	SPATIAL DATA	FIGURE:	1
DATE:	13/11/2023	REQUESTOR:	ENV. APPROVALS	NO:	A1021/065B

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_065_E_JMB_TFEMP_RegionalLocation_RevB.mxd



- Proposed Development Envelope
- Indicative Footprint
- Indicative Cleared Area as at FY2022
- Previously Assessed Areas
- Approved Proposal Ministerial Statement boundaries

N

0 1 2 3 4

KILOMETRES

GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR HUB
TERRESTRIAL FAUNA
ENVIRONMENTAL MANAGEMENT PLAN

Proposed Development Envelope
and Indicative Footprint

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:125,000	PREPARED:	SPATIAL DATA	FIGURE:	2
DATE:	16/11/2023	REQUESTOR:	ENV. APPROVALS	NO:	1021/067B

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_067_E_JMB_TFEMP_DE_IF_RevB.mxd

1.2 Key environmental factors

The key environmental factor relevant to this TFEMP is Terrestrial Fauna. Table 1 describes the environmental values, activities and potential impacts on Terrestrial Fauna addressed in this TFEMP.

Table 1: Key environmental values, activities and potential impacts

Key environmental factor	Environmental values	Proposal activities	Actual/ Potential impacts[1]
Terrestrial Fauna	Significant terrestrial vertebrate fauna (Ghost Bat) and their habitat	Direct clearing of native vegetation for mining and associated activities within the Development Envelope	**Direct impacts** Potential loss of Ghost Bat Category 4 roost caves
		Use of barbed wire fencing within the Development Envelope	**Direct impacts** Potential injury or mortality of Ghost Bats from entanglement in barbed wire fencing

1.3 Condition requirements

BHP has provided the condition requirements of MS XXXX Condition B3-3 Terrestrial Fauna Environmental Management Plan in the previsions table (Section 2), which the Instructions allow for, if there are multiple conditions and/or condition clauses.

Condition C1-6 of MSXXXX requires publication of EMPs. BHP will published the endorsed TFEMP on the BHP website and provide to Department of Water and Environmental Regulation (DWER) in a suitable electronic form for online publication, to meet the condition requirements.

1.4 Rationale and approach

As required by the Instructions, this section provides a concise description of the rationale and approach for the components (referred to as 'provisions' in previous versions of the Instructions) in this TFEMP.

1.4.1 Management approach

BHP uses a regional and site-specific approach to manage the impacts of its operations on environmental values. BHP applies the following approach to EP Act Part IV EMPs:

- Sub-regional level EMPs are developed to manage potential impacts to regional environmental values (e.g. Ethel Gorge Aquifer Stygobiont Community Threatened Ecological Community) from multiple BHP hubs.
- Site level EMPs are developed to manage potential impacts to local environmental values from one BHP mine/hub.

As outlined in Section 1.1, this TFEMP addresses the management of terrestrial fauna for the Amended Proposal, which includes the amalgamation of the Approved Proposals for the Jimblebar, Orebody 31 and Orebody 18 mines (approved under MS1126, MS1021 and MS439 (as amended by MS1012)). There were no specific terrestrial fauna management actions in the MSs for the Approved Proposals, beyond standard management practices, to incorporate into this TFEMP.

For this TFEMP, BHP applied a risk-based approach to identify and prioritise the components of this TFEMP. The purpose of the components is to protect the environmental values identified in Table 1. In developing the

components, BHP has used available scientific information from recent targeted investigations and has applied learnings from the management of terrestrial fauna at other BHP and third party mine sites in the Pilbara.

1.4.2 Rationale

Table 2 describes the rationale for the TFEMP components in Section 2, including:

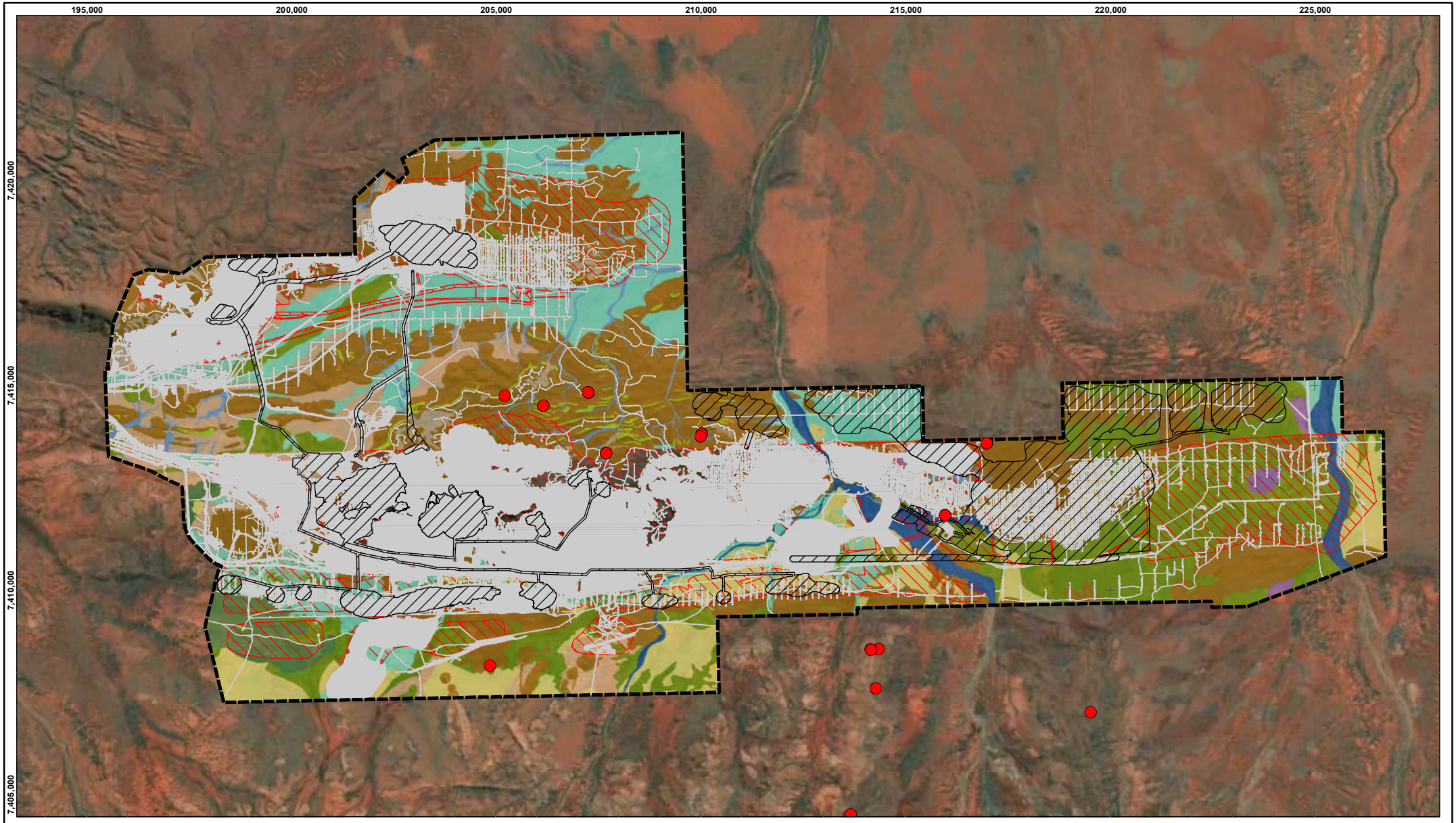
- management objectives
- survey and study findings
- key assumptions and uncertainties
- rationale for choice of management actions.

Table 2: Rationale for TFEMP Components

Surveys and studies	Survey and study findings	Key assumptions and uncertainties	Risk-based approach and rationale for choice of management actions
Value: Ghost Bat and their habitat within the Development Envelope **Objective:** Avoid and minimise direct impacts on Ghost Bat and their roost habitats within the Development Envelope			
Ghost Bat surveys/studies *Western Ridge and Jimblebar Ghost Bat Monitoring Program 2021-2022* (Biologic 2023a) *Eastern Pilbara Ghost Bat Cave Categorisation* (Biologic 2023b) *Jimblebar Targeted Ghost Bat Survey* (GHD 2021) *A review of ghost bat ecology, threats and survey requirements* (Bat Call WA 2021) **Terrestrial Fauna surveys/studies[1]** *Mesa Gap Targeted Vertebrate Fauna Survey* (Astron 2023) *Jimblebar Greenhouse Gas Abatement Study Basic Vertebrate Fauna Survey* (Biologic 2020) *Caramulla Miscellaneous Licence Level 1 and Targeted Vertebrate Fauna Survey* (Biota 2020) *North Jimblebar Fauna Survey* (GHD 2019a) *Jimblebar East and Caramulla Fauna Survey* (GHD 2019b) *Shearers West Targeted Vertebrate and Short-range Endemic Invertebrate Fauna Assessment* (Biologic 2019) *Jimblebar North Level 1 Vertebrate Fauna Survey* (Onshore Environmental 2019) *Caramulla Level 1 Vertebrate Fauna Assessment* (Biologic 2018)	**Ghost Bat** • Ghost Bat is listed as Vulnerable under the *Biodiversity Conservation Act 2016* and the *Environment Protection and Biodiversity Conservation Act 1999*, and is a Matter of National Environmental Significance. • Evidence of the Ghost Bat has been recorded from 11 records from within the Development Envelope (Figure 3). Nine of the records are associated with cave locations (seven records of scats, one record with ultrasonic calls from an individual, and one record of foraging evidence), and the remaining two records comprise a foraging individual from within a drainage line and potential feeding evidence at an overhang. **Fauna habitat** • Eleven (11) fauna habitat types have been described and mapped within the Development Envelope (Figure 4): – Breakaway/ Cliff (0.5%) – Claypan (0.4%) – Drainage Area/ Floodplain (12.2%) – Gorge/ Gully (0.7%) – Hardpan Plain (1.6%) – Hillcrest/ Hillslope (27.4%) – Major Drainage Line (2.0%) – Minor Drainage Line (1.3%) – Mulga Woodland (13.5%) – Sand Plain (5.7%) – Stony Plain (4.9%). • These habitat types are not considered regionally significant as they are broadly distributed and well represented across the Pilbara and Gascoyne bioregions. • Critical Ghost Bat foraging habitat within the Development Envelope has been identified as habitats that contain perch trees, and include Drainage Area/ Floodplain, Major Drainage Line, Minor Drainage Line and Mulga Woodland, where they occur within 12 km of the two Category 2 roosts (CJIM-03 and CNIN-03) (Figure 4). Note that these two caves occur outside of the Development Envelope. • No formally recognised Threatened or Priority Ecological Communities have been recorded from within, or adjacent to, the proposed Development Envelope. **Habitat features** • Twelve (12) cave structures have been identified within the Development Envelope (Figure 4). The caves are located within the microhabitats of the broader Hillcrest/Hillslope habitat types, specifically Gorge/Gully or Breakaway/Cliff habitats. • Of the 12 caves: – Three (3) are classified as Category 3 roosts (CJIM-09, CJIM-14 and CJIM-21)	**Assumptions** • Given the extensive survey and monitoring effort over the Development Envelope and surrounding area, it is considered that Ghost Bat is likely to occur within the Development Envelope have been identified, and all habitat types and habitat features (i.e. caves) that occur have been mapped. • Access to all caves for monitoring may not be possible due to safety constraints or heritage restrictions, and as such, the caves listed are provisional only. • Disturbance to a cave is considered to be a change or alteration to the cave which renders it unsuitable for Ghost Bat utilisation. • A ground disturbance buffer of a minimum of 50 m from caves with evidence of usage by Ghost Bat is sufficient to prevent flushing of bats from caves based on studies undertaken to date. • Activities that will be permitted within a Ghost Bat cave buffer include minor works to maintain light vehicle access or culverts. Any mining activity including clearing, blasting or other excavations for non-mining related activities will be excluded from these buffers to avoid impacts to Ghost Bats and their habitats. **Uncertainties** • Natural variation of the Ghost Bat population in the Pilbara and sub-regions (Hamersley and Chichester) is currently unknown. Further seasonal and annual Ghost Bat monitoring data is required to determine natural variability in population size and cave usage. • Ghost Bats are known to move between caves, such that not all caves will be utilised at all times. It is not known what the underlying factors are for these absences.	**Type of components** BHP has chosen objective-based components, as the potential direct impacts are able to be avoided or minimised through appropriate management actions. A sufficient understanding of the population dynamics or population size/occurrence of Ghost Bat does not yet exist at Jimblebar Hub; thus, outcomes-based components based on population size cannot yet be developed. **Choice of management actions** Management actions and targets focus on the management of and prevention of unauthorised physical clearing of habitat. Management actions and targets will be used to improve our understanding of the population dynamics and size/occurrence of Ghost Bat from which outcome-based components may be able to be developed in the future. <u>Physical clearing of habitat</u> The key risk to Ghost Bat at Jimblebar Hub is potential loss of roost caves and critical foraging habitat from direct clearing of native vegetation. The management actions and targets (Table 3) minimise this risk by avoiding and minimising disturbance to certain caves and surrounding habitats through the implementation of cave buffers. BHP considers that its internal land disturbance permit process is an appropriate tool to manage clearing, to minimise impacts to Ghost Bat roosts and foraging habitats. Maintenance of current GIS spatial layers for regulatory requirements (including any mining buffers around Ghost Bat caves) is key to minimising the risk to Ghost Bat from the loss of roost and/or critical foraging habitat by ensuring that clearing remains within defined limits and extents. <u>Pre-disturbance roost inspections</u> Buffers have been applied to a number of Ghost Bats roosts within the Jimblebar Hub Development Envelope, as identified in Appendix 1 (buffers applied under Condition B3-1 of MSXXXX) (Figure 5). If disturbance is required to a cave that falls outside the buffers, BHP proposes to implement pre-disturbance roost inspections to confirm the absence of Ghost Bats prior to cave disturbance/ impact. The cave will be inspected prior to disturbance. If Ghost Bats are present, they will be displaced during the evening/ night. If the bats are considered likely to re-enter the cave and if the cave entrance is of suitable structure/dimensions, the cave entrance will be sheeted. Disturbance to caves will occur during daylight hours when bats are unlikely to be present (as the caves are not suitable for diurnal roosting). <u>Use of barbed wire fencing</u> An identified risk of injury or mortality to Ghost Bats is from the entanglement in barbed wire fencing. To reduce this risk, BHP proposed to only use barbed wired fencing where it is required by legislation. Where barbed wire fencing is required, it will be installed with single strand top wire and bat reflectors. Bat reflectors aim to minimise the risk of entanglement by making the fence line detectable to foraging bats. <u>Improvement of knowledge of Ghost Bat population dynamics, abundance and cave usage</u> Monitoring of the local Ghost Bats population and their roosts within the Jimblebar Hub and surrounds commended in September 2021 (Biologic 2023). BHP proposes to continue this monitoring programme based on retained and buffered Ghost Bat caves (which are able to be accessed), to monitor Ghost Bat presence and to detect any temporal changes in abundance. This data collection may enable the development of outcomes-based components in future reviews of this TFEMP.

Surveys and studies	Survey and study findings	Key assumptions and uncertainties	Risk-based approach and rationale for choice of management actions
	– Nine (9) are classified as Category 4 roosts. • No Category 1 or 2 roosts occur within the Development Envelope. • There are an additional 14 caves located adjacent (within 5 km) to the Development Envelopment, of which, two are classified as Category 2 roosts, seven as Category 3 roosts and the remaining five as Category 4 roosts. • Eleven (11) water features have been mapped within the Development Envelope (Figure 4), comprising Innawally Pool (semi-permanent), an artificial water feature and nine temporary small surface water pools forming in Gorge/ Gully or Mulga Woodland habitats following rainfall. **Mining activities and interaction with Ghost Bats** Examples of outcomes of studies related to mining activities and interaction with Ghost Bats are summarised below: • Bat Call WA (2017) assessed Ghost Bat caves within Rio Tinto's Robe Valley to determine the impact of mining on Ghost Bat presence. Bat Call WA (2017) concluded that the retention of a façade greater than 20 metres (m) around the mesa perimeter will result in no loss of roosts. Rio Tinto have committed to retain a 40 m mining exclusion zone between the back of each cave and the proposed mine pit to protect the integrity of roosts. • Process Minerals International's Poondano Iron Ore Project applied a minimum buffer zone of 50 m from a Ghost Bat cave. Ghost Bats were recorded in this cave during 2009 and following the commencement of mining in 2012 they were subsequently recorded in this cave in 2012, 2013, 2014 and 2015 (Rio Tinto 2017). • At BHP Goldsworthy operations a long-term (10 year) study of Ghost Bats and Pilbara Leaf-nosed Bats (*Rhinonicteris aurantia*) was undertaken at a cave located approximately 400 m from an active pit (Gleeson & Gleeson 2012). This study showed no change in bat activity for either species over the duration of the monitoring.		Monitoring of Ghost Bat caves will avoid the Ghost Bat breeding period (i.e. late pregnancy and pre-weaning - October to December), when pregnant females and juveniles may be present. A risk-based site selection for caves suitable for Ghost Bat monitoring has considered: • the value of the Ghost Bat cave (e.g. Category 3 roosts of higher value than Category 4 roosts) • the frequency of usage of the cave by Ghost Bats – site selection will target caves more frequently used by Ghost Bats • site access restrictions due to safety and or heritage concerns. Caves are monitored based on their roost category, with caves considered to be most suitable for Ghost Bat occupation proposed to be monitored more frequently. As a general rule, Category 3 roosts will be monitored at least annually and the retained Category 4 roosts will be monitored biennially. It is assumed that should high activity be indicated at these caves between monitoring events, the monitoring frequency and roost category may need to be reviewed. A range of monitoring techniques are implemented based on the roost category and/or access to each cave. These monitoring techniques may include: • scat collection and analysis - determine presence and absence, deposition rates, genetic analyses (to determine individual genotypes and genetic diversity), population estimates, hormone analyses (to identify visitation by pregnant females) and use of caves across the local area • ultrasonic recording and motion cameras • roost microclimate analysis (e.g. temperature and humidity) • trapping and tagging of Ghost Bats to increase our understanding of the species (e.g. foraging / flight distances, heights etc.).

1. Only surveys from the past five years are listed (i.e. surveys undertaken since 2018). Refer to Appendix 11 of the *Jimblebar Hub Iron Ore Mining Operations Significant Amendment* (BHP 2023) for a full list of vertebrate fauna surveys/studies undertaken for the Jimblebar Hub.



Proposed Development Envelope
Indicative Footprint
Indicative Cleared Area as at FY2022
Previously Assessed Areas
Ghost Bat (*Macroderma gigas*)

Habitat type

Breakaway/ Cliff
Claypan
Drainage Area/ Floodplain
Gorge/ Gully
Hardpan Plain
Hillcrest/ Hillslope
Major Drainage Line
Minor Drainage Line
Mulga Woodland
Sand Plain
Stony Plain

N

0 1.5 3 4.5 6
KILOMETRES

GDA 1994 MGA ZONE 51

BHP

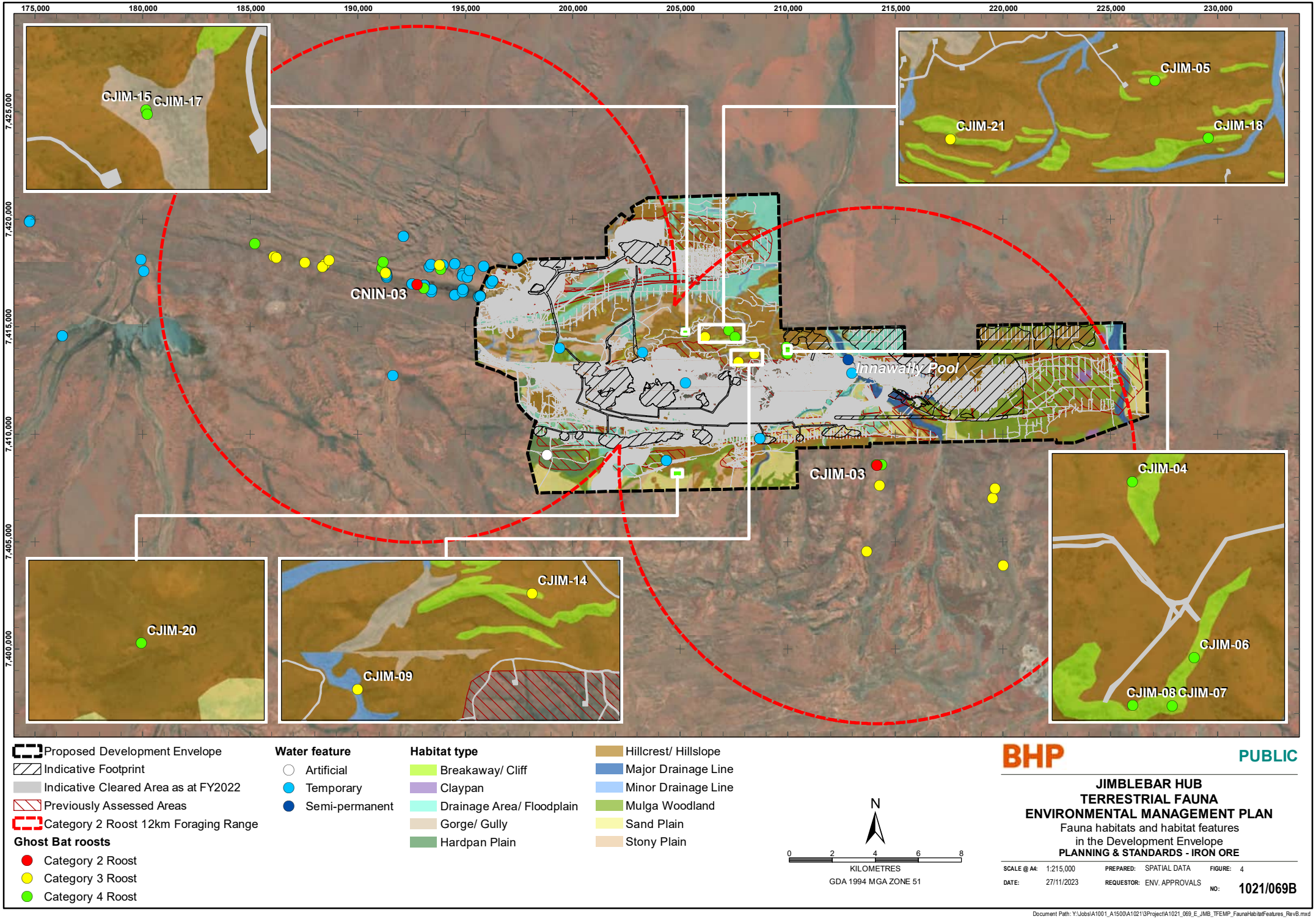
PUBLIC

JIMBLEBAR HUB
TERRESTRIAL FAUNA
ENVIRONMENTAL MANAGEMENT PLAN
Ghost Bat records in the Development Envelope

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:125,000	PREPARED:	SPATIAL DATA	FIGURE:	3
DATE:	15/11/2023	REQUESTOR:	ENV. APPROVALS	NO:	1021/068A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_068_E_JMB_TFEMP_GBrecords_RevA.mxd


175,000
180,000
185,000
190,000
195,000
200,000
205,000
210,000
215,000
220,000
225,000
230,000
7,425,000
7,420,000
7,415,000
7,410,000
7,405,000
7,400,000
CJIM-15
CJIM-17
CJIM-05
CJIM-21
CJIM-18
CNIN-03
Innawally Pool
CJIM-03
CJIM-04
CJIM-06
CJIM-08
CJIM-07
CJIM-20
CJIM-14
CJIM-09
Proposed Development Envelope
Indicative Footprint
Indicative Cleared Area as at FY2022
Previously Assessed Areas
Category 2 Roost 12km Foraging Range
Ghost Bat roosts
Category 2 Roost
Category 3 Roost
Category 4 Roost
Water feature
Artificial
Temporary
Semi-permanent
Habitat type
Breakaway/ Cliff
Claypan
Drainage Area/ Floodplain
Gorge/ Gully
Hardpan Plain
Hillcrest/ Hillslope
Major Drainage Line
Minor Drainage Line
Mulga Woodland
Sand Plain
Stony Plain
N
0
2
4
6
8
KILOMETRES
GDA 1994 MGA ZONE 51
BHP
PUBLIC
JIMBLEBAR HUB
TERRESTRIAL FAUNA
ENVIRONMENTAL MANAGEMENT PLAN
Fauna habitats and habitat features
in the Development Envelope
PLANNING & STANDARDS - IRON ORE
SCALE @ A4: 1:215,000
PREPARED: SPATIAL DATA
FIGURE: 4
DATE: 27/11/2023
REQUESTOR: ENV. APPROVALS
NO: 1021/069B
Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_069_E_JMB_TFEMP_FaunaHabitatFeatures_RevB.mxd

2 EMP Components

BHP has provided detail of the TFEMP components in Table 3, as per the preferred approach outlined in the Instructions. BHP has not used the ‘Schedule’ approach (which the Instructions state may be used), as this TFEMP covers only one operation. BHP may adopt the ‘Schedule’ approach in future for this TFEMP, should additional activities, operations or Ministerial Statements apply.

Table 3: Objective-based components

Purpose: To meet requirements of Condition B3-3 of Ministerial Statement XXXX

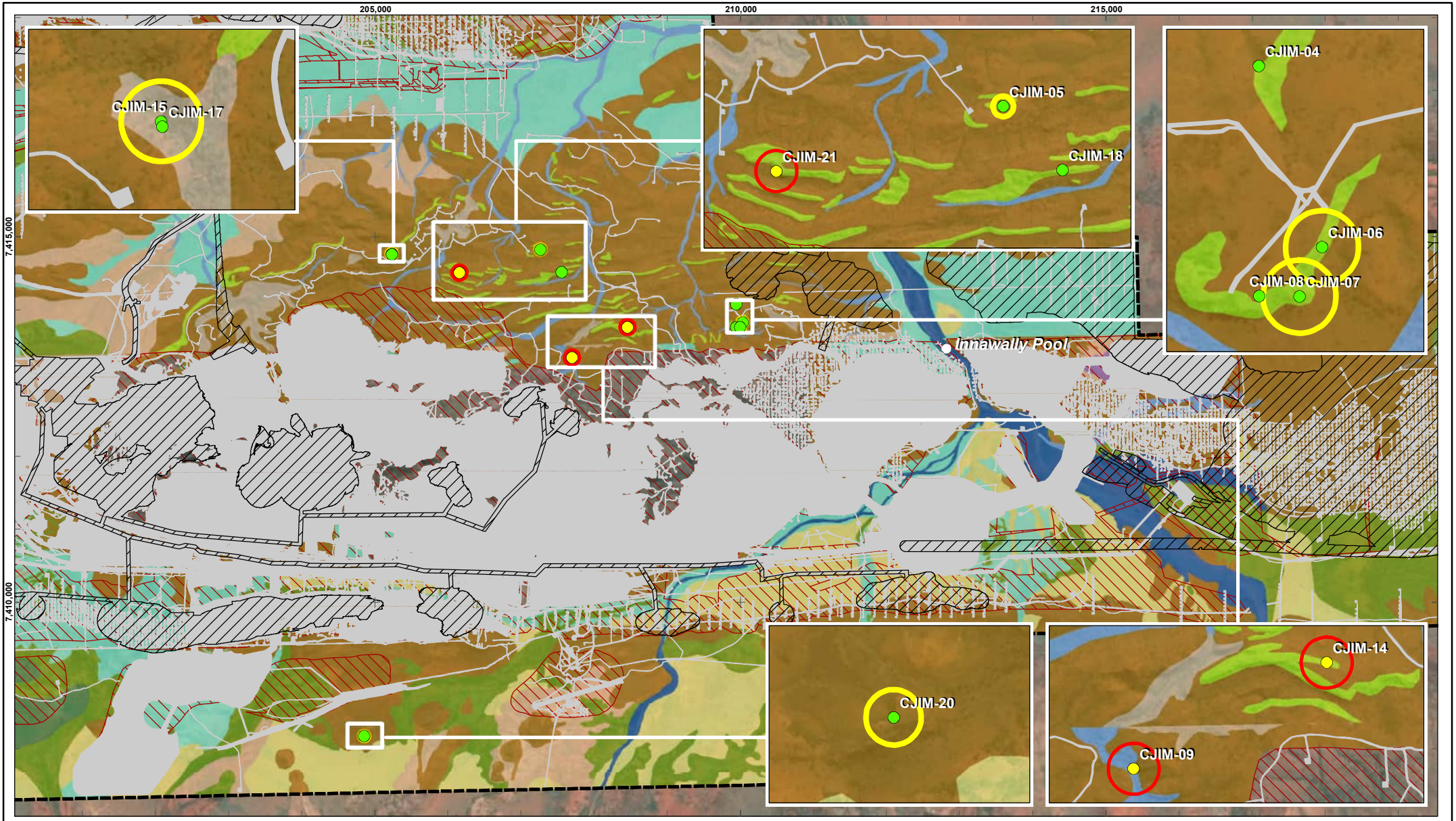
Rationale: Objective-based components to meet the intent of Condition B3-2

EPA factor and objective:	**Terrestrial Fauna** – to protect terrestrial fauna so that biological diversity and ecological integrity are maintained
Key environments values:	Ghost Bat and their habitat within the Development Envelope
EMP objectives:	**Condition B3-2** (1) avoid and minimise direct impacts on Ghost Bat and their roost habitats within the Development Envelope
Key impacts and risks:	Risk to the ecological integrity of the local population of Ghost Bat, due to the potential direct loss of roost caves from clearing or potential direct impact to individuals attributable to Jimblebar Hub mining activities

MSXXXX Condition clauses - Objective-based components			
Management targets	**Management actions**	**Monitoring and timing / frequency of actions**	**Reporting**
Condition B3-3 The proponent must implement the Jimblebar Hub Terrestrial Fauna Environmental Management Plan, with the purpose of ensuring the environmental objective in condition B3-2 is achieved, monitored and substantiated.			
Condition C4-1 The environmental management plans required under condition B3-3 must contain provisions which enable the achievement of the relevant objectives of those conditions and substantiation of whether the objectives are reasonably likely to be met, and must include: (2) **management targets**	**Condition C4-1** The environmental management plans required under condition B3-3 must contain provisions which enable the achievement of the relevant objectives of those conditions and substantiation of whether the objectives are reasonably likely to be met, and must include: (1) **management actions** (3) **contingency measures** if **management targets** are not met **Condition C3-2** Without limiting condition C1-1, the failure to achieve an environmental objective, or implement a **management action**, regardless of whether **contingency measures** have been or are being implemented, represents a non-compliance with these conditions. **Condition D1-1** If the proponent becomes aware of a potential non-compliance, the proponent must: (2) implement contingency measures; (3) investigate the cause; (4) investigate environmental impacts; (5) advise rectification measures to be implemented; (6) advise any other measures to be implemented to prevent no further impact.	**Condition C4-1** The environmental management plans required under condition B3-3 must contain provisions which enable the achievement of the relevant objectives of those conditions and substantiation of whether the objectives are reasonably likely to be met	**Condition C4-1** The environmental management plan required under condition B3-3, must contain provisions which enable the substantiation of whether the relevant outcomes of those conditions are met, and must include: (4) reporting requirements. **Condition D1-1** If the proponent becomes aware of a potential non-compliance, the proponent must: (1) report this to the CEO within seven (7) days; (7) provide a report to the CEO within twenty-one (21) days of being aware of the potential non-compliance, detailing the measures required in conditions D1-1(2) to D1-1(6). **Condition D2-1** The proponent must provide an annual Compliance Assessment Report to the CEO for the purpose of determining whether the implementation conditions are being complied with. **Condition D2-4** (1) state whether each condition of this Statement has been complied with, including: (b) achievement of environmental objectives; (d) requirements to implement environmental management plans; (f) implement **contingency measures**; (g) requirements to implement adaptive management; and (h) reporting requirements. (2) include the results of any monitoring (inclusive of any raw data) that has been required under Part C in order to demonstrate that the limits in Part A, and any outcomes or any objectives are being met; (3) provide evidence to substantiate statements of compliance, or details of where there has been a non-compliance; (4) include the corrective, remedial and preventative actions taken in response to any potential non-compliance.

Objective-based components			
Management targets	**Management actions**	**Monitoring and timing / frequency of actions**	**Reporting**
1. No disturbance to the Category 4 roosts (CJIM-04, CJIM-08, CJIM-17 and CJIM-18) without prior inspection to verify presence/absence of Ghost Bats	1. Inspect the Category 4 roosts (CJIM-04, CJIM-08, CJIM-17 and CJIM-18) prior to disturbance 2. If present, displace Ghost Bats from a roost during the inspection via physical presence in the cave or use of deterrents (i.e. noise or light) 3. Complete roost pre-disturbance checklist to ensure required actions have been undertaken	• Inspection of caves to be completed prior to disturbance • Annual review of Ghost Bat roost pre-disturbance checklist	**Annual reporting** Report against the requirements of Condition D2-4, in the annual Compliance Assessment Report required by Condition D2-1, including: • achievement of environmental outcomes against the trigger and threshold criteria and implementation of contingency measures (response actions), if trigger and/or threshold criteria were exceeded • monitoring results to demonstrate environmental outcomes have been met • if the threshold criterion was exceeded during the reporting period (representing a potential non-compliance), include the corrective, remedial and preventative actions taken (including the threshold contingency actions). **Exception reporting** • Notify Superintendent within 72 hours of BHP identifying an exceedance of a trigger criterion. • Notify Superintendent and General Manager within 24 hours of BHP identifying an exceedance of a threshold criterion (potential non-compliance). • As required by Condition D1-1: – notify the CEO of DWER in writing within 7 days of being aware of the potential non-compliance (exceedance of a threshold criterion) – provide a report to the CEO within 21 days of being aware of the potential non-compliance, detailing the measures required in conditions D1-1(2) to D1-1(6).
2. Minimise risk of injury or mortality to Ghost Bats from entanglement in barbed wire fencing installed within the Development Envelope	4. No use of barbed wire fencing within the Development Envelope, except where required by legislation 5. Where barbed wire fencing is required to be installed within the Development Envelope, design and install fencing with single strand top wire and bat reflectors, to deter bat interaction	• Inspect any areas which legally require barbed wire fencing after installation, to ensure that bat reflectors have been installed	
3. Monitor Ghost Bat caves (Category 3 roosts CJIM-09 and CJIM-14, and Category 4 roosts CJIM-05, CJIM-06, CJIM-07, CJIM-15 and CJIM-20)to demonstrate evidence of Ghost Bat usage at one or more cave over a two year period.	6. Monitoring of caves within Ghost Bat cave buffers (Category 3 roosts CJIM-09 and CJIM-14, and Category 4 roosts CJIM-05, CJIM-06, CJIM-07, CJIM-15 and CJIM-20)[1, 2]	• Category 3 roosts (Figure 5) to be monitored at least annually • Category 4 roosts (Figure 5) to be monitored at least biennially • Monitoring methods may include (but are not limited to) scat collection and analysis, use of motion sensor cameras, ultrasonic recordings and/or microclimate recordings	
4. Restrict access to Ghost Bat caves during breeding season	7. Monitor caves outside of the Ghost Bat breeding season (October to December)	• Review timing of proposed monitoring events prior to implementation to ensure it falls outside of the breeding season • Annual review of Ghost Bat monitoring report to confirm monitoring was undertaken outside of breeding season	

1. The retained and buffered caves within the Jimblebar Hub Development Envelope which are accessible will be monitored. In some instances, due to safety reasons or other access constraints, some caves may not be monitored each monitoring round.
2. Category 3 roost CJIM-21 is not able to be monitored due to access constraints to this cave due to heritage restrictions.



Proposed Development Envelope
Indicative Footprint
Indicative Cleared Area as at FY2022
Previously Assessed Areas

Ghost Bat roosts

Category 3 Roost
Category 4 Roost

50m mining exclusion
100m mining exclusion

Habitat type

Breakaway/ Cliff
Claypan
Drainage Area/ Floodplain
Gorge/ Gully
Hardpan Plain
Hillcrest/ Hillslope
Major Drainage Line
Minor Drainage Line
Mulga Woodland
Sand Plain
Stony Plain

N

0 1 2 3
KILOMETRES
GDA 1994 MGA ZONE 51

BHP

PUBLIC

JIMBLEBAR HUB
TERRESTRIAL FAUNA
ENVIRONMENTAL MANAGEMENT PLAN
Ghost Bat management buffers

PLANNING & STANDARDS - IRON ORE

SCALE @ A4:	1:70,000	PREPARED:	SPATIAL DATA	FIGURE:	5
DATE:	15/11/2023	REQUESTOR:	ENV. APPROVALS	NO:	1021/070A

Document Path: Y:\Jobs\A1001_A1500\A1021\3Project\A1021_070_E_JMB_TFEMP_GB_buffers_RevA.mxd

3 Adaptive management and review of the EMP

3.1 Adaptive management approach

BHP applies an adaptive management framework for implementing management measures identified in this EMP, which is consistent with the Instructions. Adaptive management is a structured, iterative process to decision making. The framework embeds a cycle of monitoring, reporting and implementing change where required. It allows an evaluation of the management and mitigation measures so that they are progressively improved and refined, or alternative solutions adopted, to ensure that environmental objectives and outcomes in the plan are achieved. The key steps of the adaptive management approach are outlined in Figure 6.

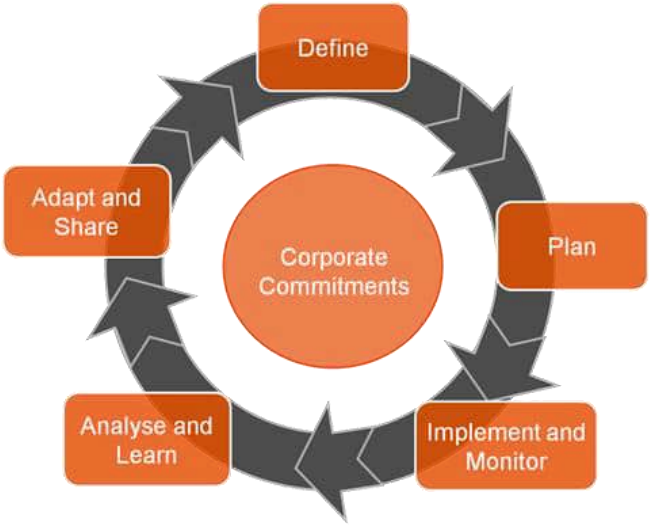


Figure 6: BHP's adaptive management approach

As this EMP is a requirement of a MS condition, BHP will seek formal endorsement from the DWER to amend the TFEMP based on information gained through adaptive management.

3.2 Review and revision of this EMP

BHP will review this EMP (and revise it if required), to ensure that it achieves the identified environmental objectives and meets MS conditions. A review may arise from the following:

- where required by a MS condition
- if initiated by BHP as part of the adaptive management process
- if triggered by a MS condition (e.g. for a non-achievement of management targets and/or failure to implement management actions).

Changes to the endorsed version of the EMP may arise from the following:

- BHP reviews the EMP if the EPA or relevant government agencies develop new or amend existing guidance or policy
- BHP adds components when a new operation (or amendment to an existing operation) is proposed

- BHP adds or amends components when new proposals are approved and conditioned through Part IV of the EP Act or due to a change to MS conditions
- The CEO of DWER directs BHP to revise the EMP
- The CEO of DWER confirms by notice in writing that it has been demonstrated that the relevant requirements for the EMP have been met, or are able to be met under another statutory decision-making process, in which case the implementation of the EMP is no longer required.

As provided for in proposed Condition C1-3 of MSXXXX, BHP may make minor revisions to this EMP (i.e. excluding changes to components in Table 3) without seeking endorsement from DWER. If BHP makes minor revisions to this EMP, BHP will provide the revised EMP with an explanation and justification of the minor revisions, according to the requirements in proposed Condition C1-4.

In accordance with proposed Condition C1-1(1), BHP must implement the implement the most recent version of the confirmed EMP.

4 Stakeholder consultation

BHP discussed the *Jimblebar Hub Iron Ore Mining Operations Significant Amendment* (BHP 2023a) (the Proposal) including Terrestrial Fauna related aspects, with the Traditional Owners, through Karlka Nyiyaparli Aboriginal Corporation (KNAC) during 2023. BHP provided a draft version of this EMP (TFEMP) to KNAC with the draft Environmental Review Document (referral supplementary report) for the Proposal.

BHP will consult with government agencies (including decision-making authorities), local authorities, groups and individuals, where relevant, in relation to the revision of this TFEMP.

5 Changes to an EMP

Table xx summarises the key changes in this version of the EMP (TFEMP V1.1 compared to the original version submitted to the EPA in December 2023 with the referral documentation for the Jimblebar Significant Amendment.

Table 4 Changes to the EMP

Complexity of changes			**Minor revisions ☑**	**Moderate revisions**	**Major revisions**
Number of key environmental factors			**One ☑**	**2-3**	**>3**
Date revision submitted to DWER		August 2024			
Proponent's operational requirement timeframe for approval of revision		**< One month**	**< Six months ☑**	**>Six months**	**None**
Reason for timeframe		Approval of EMP to align with issue of Part IV approval			
Item no.	**EMP Section no.**	**EMP page no.**	**Summary of change**	**Reason for change**	
1.		page i	Version control table updated to include this version 1.1	To reflect the revision to the plan.	
2.	Section 2	page 13	Update of management target for Ghost Bat	To address comment provided by DCCEEW on the draft Jimblebar Significant Amendment Validation Notice	

6 References

Astron (2023) *Mesa Gap Targeted Vertebrate Fauna Survey*. Report prepared for BHP Iron Ore Pty Ltd, June 2023, Western Australia.

Bat Call WA (2021) *A review of Ghost Bat ecology, threats and survey requirements.* Paper prepared for Department of Agriculture, Water and Environment.

Bat Call WA (2017) *Robe Valley Mesa A to Mesa 2405A, Impact of mining on Ghost Bat presence and activity, April 2017, including assessment of caves on Mesa F and G*. Unpublished report prepared for Rio Tinto.

BHP (2023) *Jimblebar Hub Iron Ore Mining Operations Significant Amendment, Environmental Review Document - referral supplementary repor*t. BHP Iron Ore Pty Ltd, XX 2023.

Biologic (2023a) *Western Ridge and Jimblebar Ghost Bat Monitoring Program*. Report prepared for BHP Iron Ore Pty Ltd, June 2023, Western Australia.

Biologic (2023b) *Eastern Pilbara Ghost Bat Cave Categorisation*. Internal memo prepared for BHP Iron Ore Pty Ltd, June 2023, Western Australia.

Biologic (2020) *Jimblebar Greenhouse Gas Abatement Study Basic Vertebrate Fauna Survey*. Report prepared for BHP Billiton Iron Ore Pty Ltd, December 2020, Western Australia.

Biologic (2019) *Shearers West Targeted Vertebrate and Short-range Endemic Invertebrate Fauna Assessment.* Report prepared for BHP Billiton Iron Ore Pty Ltd, January 2019, Western Australia.

Biologic (2018) *Caramulla Level 1 Vertebrate Fauna Assessment*. Report prepared for BHP Billiton Iron Ore Pty Ltd, September 2018, Western Australia.

Biota (2020) *Caramulla Miscellaneous Licence Level 1 and Targeted Vertebrate Fauna Survey*. Report prepared for BHP Billiton Iron Ore Pty Ltd, June 2020, Western Australia.

EPA (2021) *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans*. Environmental Protection Authority. Perth, Western Australia. Version 1.1 Published March 2020.

GHD (2021) *Jimblebar Targeted Ghost Bat Survey*. Report prepared for BHP Billiton Iron Ore Pty Ltd, June 2021, Western Australia.

GHD (2019a) *North Jimblebar Fauna Survey*. Report prepared for BHP Billiton Iron Ore Pty Ltd, April 2019, Western Australia.

GHD (2019b) *Jimblebar East and Caramulla Fauna Survey*. Report prepared for BHP Billiton Iron Ore Pty Ltd, August 2019, Western Australia.

Gleeson, J. and Gleeson D., (2012) *Reducing the Impacts of Development of Wildlife*. CSIRO Publishing.

Onshore Environmental (2019) *Jimblebar North Level 1 Vertebrate Fauna Survey*. Report prepared for BHP Western Australia Iron Ore Pty Ltd, January 2019, Western Australia.

Rio Tinto (2017) *Referral of Proposed Action Mesa H Proposal*. Available at http://epbcnotices.environment.gov.au/_entity/annotation/1b36373a-fc86-e711-994c-005056ba00a8/a71d58ad-4cba-48b6-8dab-f3091fc31cd5?t=1508204283249

Appendices

Appendix 1: Potential impacts to caves recorded within the Development Envelope

Cave ID	Roost classification	Evidence of use by Ghost Bats	Proposed avoidance and mitigation	Avoid or impact
CJIM-04	Category 4	None	No direct avoidance measures	Outside of Indicative Footprint and unlikely to have direct impacts
CJIM-05	Category 4	Yes	50m mining exclusion buffer applied	Direct impacts avoided
CJIM-06	Category 4	Yes (unconfirmed)	50m mining exclusion buffer applied	Direct impacts avoided
CJIM-07	Category 4	Yes (unconfirmed)	50m mining exclusion buffer applied	Direct impacts avoided
CJIM-08	Category 4	None	No direct avoidance measures	Outside of Indicative Footprint and unlikely to have direct impacts
CJIM-09	Category 3	Yes	100m mining exclusion buffer applied	Direct impacts avoided
CJIM-14	Category 3	None	100m mining exclusion buffer applied	Direct impacts avoided
CJIM-15	Category 4	Yes	50m mining exclusion buffer applied	Direct impacts avoided
CJIM-17	Category 4	None	No direct avoidance measures[1]	Direct impacts avoided (via buffer applied to CJIM-15)
CJIM-18	Category 4	None	No direct avoidance measures	Outside of Indicative Footprint and unlikely to have direct impacts
CJIM-20	Category 4	Yes	50m mining exclusion buffer applied	Direct impacts avoided
CJIM-21	Category 3	Yes	100m mining exclusion buffer applied	Direct impacts avoided

Grey rows indicate caves with proposed avoidance/ mitigation

1. No direct avoidance measures are proposed for CJIM-17; however, due to the close proximity, CJIM-17 it is located within the 50 m mining exclusion buffer applied to CJIM-15

Appendix 6: Jimblebar Mine Closure Plan

Appendix 7 Responses to comments

BHP response to DCCEEW comments on the Jimblebar Significant Amendment Validation Notice July 2024

Section	DCCEEW comment	BHP response
Letter	DCEEEW recommends that BHP republish the draft Validation Notice for public comment.	Comment noted. Historically, BHP has only received comments on draft Validation Notices from DCCEEW and the relevant Aboriginal corporation. On this occasion, BHP has received comments from DCCEEW and KNAC and has prepared written responses to these. It is therefore not expected that further publication will result in additional public comments. Nevertheless, will republish the validation notice for a further public comment period.
Project description and impact quantification	The project description requires revision. Most of the project elements are simply listed with no further detailed description of what the activity involves and no analysis of potential impacts to Program Matters. We acknowledge that some project elements can be briefly described such as borrow and laydown areas, while others such as hydrological changes, overburden management and closure activities require more thorough information. While the draft validation notice includes a cursory discussion on in pit tailings deposition, it does not provide specifics of the activity and does not identify or discuss potential impacts such as acid and metalliferous drainage risk. The mine decommissioning and closure discussion is also generic and requires more detail.	Section 2.2 identifies all key components of the Activity. Additional information has been included describing mine dewatering and surplus water management, beneficiation, tailings management and the overland conveyor.
Indirect impacts to the Ghost Bat	Potential indirect impacts to the Ghost Bat from the Activity such as habitat modification from hydrological changes, fire and weeds, artificial light, feral animals and cane toads, noise and vibration, dust, hydrological changes, and infrastructure such as communication towers are not identified and assessed in the draft validation notice. Section 4.4.5 Impact Assessment of the draft validation notice only identifies the	Potential indirect impacts and mitigation measures for these have now been included in the Ghost Bat section. Baseline environmental data is provided in Table 4-7 including Ghost Bat records for the

	direct impact of habitat loss from clearing and consequently the mitigation hierarchy has just been applied to this direct impact and not potential indirect impacts. This is a significant omission and is not in accordance with the consideration of indirect impacts in Section 7 Validation Process for Notifiable Actions of the Assurance Plan and Offsets Plan Revision 2.3 as outlined below: Section 7.1 Review Baseline Environmental Data states that baseline environmental data will be used to validate direct and indirect impacts to Program Matters and to inform the application of the mitigation hierarchy and development of appropriate mitigation measures. Section 7.2 Review Proposed Activity Information states that information about the proposed activity will be reviewed to consider whether the relevant Program Matters Outcomes will be met as specified in section 7.1 of the Program. The information will include any construction or operational activities that could result in indirect impacts to Program Matters, and water supply source or network, or water management required to access ore below the water table. Section 7.3 Apply Mitigation Hierarchy states for each Notifiable Action, BHP will apply the mitigation hierarchy to avoid and mitigate impacts to Program Matters as far as practicable and ensure that Program Matter Outcomes are met. This section states that indirect impacts may include, but are not limited to, changes to groundwater regimes or quality, changes to surface water regimes or quality, light and noise pollution, increased human access to bat roosts, vibration, and habitat fragmentation. Section 7.4 Determine Residual Impacts states that residual impacts to Program Matters, determined as part of the validation process and reported in the Validation Notice, will have regard to the identification of direct and indirect impacts associated with the Notifiable Action and the application of the mitigation hierarchy. Section 7.6 Develop a Draft Validation Notice states that a discussion of direct and indirect impact using contemporary information, threat abatement plans and data, and demonstration that the Program Matters Outcomes can be met through application of the mitigation hierarchy, including details of offsets proposed, must be included in Validation Notices.	Activity Area. Additional information is included on cave features and openings. BHP used baseline environmental data to inform the Validation Notice and implemented avoidance measures to ensure avoidance of direct impact to all Ghost Bat caves in the Activity Area. After application of the mitigation hierarchy, BHP considers that the Program Matter outcome for Ghost Bat will be met.

Figures	Many of the figures in the draft validation notice are inadequate as they lack sufficient detail including: Figure 1-2 – does not show the proposed location of the project elements of the activity such as proposed pits and OSAs, and infrastructure such as haul roads, pipelines, the beneficiation plant and the overland conveyer, to assist the reader to identify potential impacts to Program Matters. No figure is included showing Ghost Bat cave locations, cave identifiers (ID) and cave categories/features of all recorded Ghost Bat roosts within the Activity Area and surrounding the Activity Area as well as the habitat types. Figure 4-11 shows existing Ghost Bat monitoring locations (the 'Target Bat Caves') as stars rather than the cave categorisations and cave IDs. Figures 4-10 and 4-11 do not include enlargements showing Ghost Bat records and caves in close proximity to one another, so that the location and number of records in that area can be accurately discerned by the reader.	Figures have been updated to include pits and OSAs, beneficiation plant and in pit tailings storage. Cave identifiers have been added to the Ghost Bat figures. Figures have been amended to include enlargements to better display location and records.
Survey information	The discussion of survey results used to determine Notifiable Actions for Program Matters is absent is some instances. Further discussion demonstrating the adequacy of surveys to detect evidence or signs of Program Matters presence – to support and provide credibility to the conclusion that the Notifiable Action triggers will not be met by this action - is required.	Surveys and survey results are identified for all Program Matters in the draft Validation Notice, in a similar manner to presentation of this data in previous Validation Notices. Note that 'surrounds' has been replaced with 'within 500m of the Activity Area'. Section 4.2.1 describes the contemporary surveys undertaken and compliance with survey requirements. Additional discussion on surveys has been added to section 4.2.1.
Public comment and publishing date	Section 7.8 of the Assurance Plan and Offsets Plan Revision 2.3 states 'The draft validation notice will be made publicly available on BHP's website (or equivalent) for a period of 28 days along with instructions on how to make comment on the document. Interested parties will be advised when each draft validation notice is made available.' There does not appear to be instructions on how to make comments on the draft validation notice either within the document itself or on the BHP webpage where it is published.	Comment noted. BHP published the draft Validation Notice on its website and notified DCCEEW and the relevant state government departments and KNAC of the public comment period. Comments were received from DCCEEW and KNAC. No comments were received from other stakeholders.

	Also, the date of the draft validation notice is 20 February 2024, however Table 3-1: Stakeholder Engagement states the draft validation notice was published on the BHP website for public comment on 19 February 2024, and the department was notified that the publishing date was 21 February 2024. We note that ambiguity in publishing dates also occurred for the Newman Hub Western Ridge draft validation notice. Please ensure the commencement and closure date for the public consultation is clear, accurate and consistent.	
Glossary and abbreviations	Consider removing acronyms COS and DMIRS from the Glossary and Abbreviations table as they are not referenced in the draft validation notice, and adding the acronym, KNAC, which is used in Section 3 Stakeholder Engagement.	Updated.
1.4.1	Include all parts of the proposed action in the Activity description (p. 4) to align with the actions listed at Section 2.2 (p. 13). Please also include how many new iron ore pits are proposed, to inform scope.	Updated. Note that section 1.4 provides a summary of the Activity, while the detailed description is provided in section 2.2, to avoid duplication. This is in keeping with previous Validation Notices.
1.4.2	1.4.2 In Figure 1.2 (p.6), the Indicative Footprint should include the proposed location of the project elements of the Activity listed in Section 1.4, such as proposed pits and OSAs and infrastructure such as haul roads and the overland conveyer, to assist the reader to identify potential impacts to Program Matters.	This comment is a repeat of a previous comment. Figure amended.
1.6	1.6 As this section on timeframes (p. 4) states that the Notifiable Action is forecast to be completed by 2046 and the predicted life span of the mine operation includes construction, mine operation, decommissioning, rehabilitation and closure, all project elements related to these activities should be included in the Activity list at Section 1.4 (p. 4), it should not be limited to mine construction and operation.	Updated.
Table 1.2	Unintentional error: Table 1-2 Notifiable Action triggers for the Activity (p. 7) states there are a total of twelve caves present in the Activity Area, including two Category 2 roosts. However, Section 4.4 Ghost Bat indicates that the two Category 2 roosts are outside the Activity Area boundary and more than 500 m from the Activity Area boundary.	Additional text included in Table 1-2 to clarify that all caves in the Activity Area are Category 3 or Category 4 roosts.

Table 1.2	As commented by the department in other draft validation notices, for each Program Matter where a Notifiable Action trigger is not met, include a summary of the purpose and scope of surveys referenced to support claims of no species presence.	A summary of surveys is provided in Table 4-1. Further detail on survey coverage is provided in Table 1-2 to demonstrate the scope of surveys and to provide rationale as to why triggers are met or are not met.
2.1	Project Disturbance and Description (p. 12) states that Section 2.2 documents unchanged project components from the Revised Jimblebar Optimisation Project Validation Notice and Section 2.3 documents new project elements. Section 2.2 is titled Jimblebar Significant Amendment with a list of activities associated with the current draft validation notice. There is not a section (or a section numbered 2.3) documenting unchanged project components from the Revised Jimblebar Optimisation Project Validation Notice. Please revise this section so that the content and sections correspond and make sense to the reader. As all project components from the Revised Jimblebar Optimisation Project Validation Notice are unchanged, as per Section 1.4 Activity (p. 4) which states that the current draft validation notice '…does not reassess or change the previous Activity or impacts associated in the original Jimblebar Optimisation Project Validation Notice (2020) or the Jimblebar Optimisation Project Revised Validation Notice (August 2023)', including a list of unchanged project components may be redundant.	Section 2 text amended to remove reference to unchanged components from the revised Jimblebar Optimisation Project Validation Notice.
2.2	Project Disturbance and Description (p. 12) states that Figure 1-2 illustrates the location of the proposed works comprising the Activity. As mentioned in the Introduction section, this figure only shows the Indicative Footprint as shaded areas and does not illustrate the proposed location of the project elements of the Activity.	This comment is a repeat of a previous comment. Figure amended.
2.2.1	Other than a brief description of tailing deposition and standard closure and decommissioning wording, this section primarily lists the project elements (p. 13) and does not describe the activities in enough detail to assist the reader to identify potential impacts to Program Matters. Based on the list of project elements, we recommend that the following are described: Hydrological changes – describe hydrological analysis and modelling that addresses changes in groundwater levels from dewatering, the management of surplus mine dewater and changes to surface water regimes from mine pit excavation, construction of infrastructure, creek	Section 2.2 identifies the activity elements. Further description has been included on beneficiation, tailings deposition and overland conveyor. Further detail on the potential impacts of hydrological changes, beneficiation and tailings deposition is provided in Section 4 for each Program Matter.

	diversions and discharge of surplus water, changes to water quality and an analysis of potential impacts for Program Matters. This includes analysis supporting any conclusion that Program Matters and their habitat will not be impacted by these changes (both within and outside the Activity Area). Please also provide a topographic map showing local hydrology including water features and catchments. Overburden management – discuss whether the tailings will be from the new beneficiation plant and whether an Acid and Metalliferous Drainage risk assessment was undertaken for in-pit tailings deposition and overburden storage areas, and an analysis of potential impacts for Program Matters. We also suggest that the draft validation notice describes, and provides analysis of potential impacts to Program Matters from: Processing infrastructure – the beneficiation plant and overland conveyer. Communications infrastructure – the number of new communication towers and any communication rooms, and whether clearing for earthwork pads to install the towers is required. Decommissioning, rehabilitation and closure - include any activities that might be included during the decommissioning, rehabilitation or closure stage of the project.	Clearing for all infrastructure required for the Proposal is included in the total clearing extent which is 2,067 ha. The current approved life of mine, which is 2055 is expected to be extended by 5 years for this Proposal. Given the significant time period to closure, detail on specific activities to be undertaken during decommissioning and closure are not yet available. Acid and metalliferous drainage risk assessment was undertaken and determined the risk of acid drainage to be low. Additional information has been provided in the impact assessment section.
2.2.2	In regard to the description of hydrological activities, the department made comment on the draft validation notice Newman Hub Western Ridge on 20 August 2023 that analysis of hydrological changes should include discussion and justification even where BHP's analysis shows no impact will occur and that all relevant hydrological surveys or assessments supporting this analysis should be provided as appendices or attachments to the draft and final validation notice. Further, the department requested at a meeting with BHP on 12 January 2024 that relevant hydrological impact assessment reports are to be included as appendices to this draft validation notice, to which BHP agreed. No such reports have been included as appendices.	BHP will publish the hydrological appendices with the final Validation Notice
2.2.3	The department also made comment on the draft validation notice Newman Hub Western Ridge that 'for all future validation notices for projects that will involve hydrological changes, ensure that analysis of potential impacts extends to potential impacts to program matter habitat that may occur outside the activity area such as creek diversions	Additional discussion of potential impacts of hydrological changes is included in Section 4 in relation to Ghost Bat and Northern Quoll, as

	resulting in increased water flows and dewatering of pits impacting aquifers extending beyond the activity area. Surveys for program matter habitat and occurrence may need to be extended beyond the activity area to support analysis of these potential impacts.'	these are the only two species recorded in the Activity Area or within 500m of the Activity Area.
3.1	Refer to the interim first nations engagement guidelines on our website for more information on the department's expectations of proponents for engaging First Nations stakeholders throughout an environmental assessment process.	Noted. BHP consulted with Nyiyaparli Traditional Owners in relation to the Proposal in May and August 2023, as identified in Table 3-1. This included on site visits to the Jimblebar mine and the Activity Area. Additional detail is provided in Table 3-1.
3.2.1	The public consultation commencement date is stated as 19 February 2024. However, the draft Validation Notice is dated 20 February 2024 and the department was notified that it was published on the BHP website for public comment on 21 February 2024. Table 3-1 also records the public consultation date as 19 February 2024.	The misalignment in dates is noted; however more than the required 28 day public comment period was enabled as public comments closed on 22 March 2024. The publication of documents on BHP's regulatory website is processed by an independent BHP team and can take 24 hours or longer to process, therefore the date included in the validation notice is as accurate as possible at the time of transmission of the documents to the publication department.
3.2.2	Karlka Nyiyaparli Aboriginal Corporation (KNAC) – possible unintentional error: it is stated that BHP provided the draft validation notice to KNAC for review on 22 February 2024, although the draft validation notice is dated 20 February 2024 and was published on the BHP website for public comment on 21 February 2024.	The draft Validation Notice was provided to KNAC on 21 February, inviting comments and providing opportunity for further time to review and respond, if required. KNAC provided comments to BHP on 22 March 2024.
3.2.3	The draft validation notice does not include instructions on how to make comments on the document and instructions also do not appear to be on the BHP webpage where it is published (noting that it has been published under the WAIO – Jimblebar – Consultation and Public Comment section of the Regulatory Information page and note the WAIO – Consultation and Public Comment section). This is not in accordance with Section 7.8 of the Assurance Plan and Offsets Plan Revision 2.3, as already discussed int the General Comments section.	Noted. This was an administrative error. It should be noticed that key stakeholders were notified directly of the public comment period via email including DBCA, DWER, PEOF, KNAC and DMIRS. To date, BHP has only received comments from DCCEEW and the relevant Aboriginal corporation on draft validation notices. BHP will include instructions on how to provide comment for future validation notices.

4.2.1	As mentioned in the department's comments on other validation notices, lettering or number of the published surveys as appendices is recommended for ease of reference. The appendices should be ascribed to the surveys/studies listed in Table 4.1 Terrestrial fauna – recent studies and surveys in the draft validation notice and the corresponding survey/study on the BHP website.	BHP will provide numbering or lettering of appendices for publication of the final Validation Notice.
4.2.2	Hydrological reports (see comment at 2.2.2)	Noted. BHP will append the hydrological reports to the final Validation Notice.
4.2.3	Acid and metalliferous drainage risk assessment – the department has previously requested that these reports are provided as appendices. Please provide a copy of the risk assessment if one has been undertaken.	Noted. This is a repeat of a previous comment. The AMD risk assessment is not provided as it contains commercially sensitive information and is not publicly available.
4.3.2	The discussion under Regional habitat and Baseline Modelling Data on the baseline modelling data from the Impact Assessment Report (Eco Logical 2015) can be removed for each Program Matter as this is not fit for purpose at the scale of the Validation Notice. The discussion should instead focus on contemporary survey results (less than five years old) clearly demonstrating whether Program Matter triggers will be met or not. We also note that the Regulatory information page of the BHP website only has a copy of the Draft Impact Assessment Report. Please update this page to include the Final Impact Assessment Report.	Regional habitat and baseline modelling information has been included in Validation Notices to date as it provides a comparison between the records and habitat modelling undertaken for the SEA, to the local environment. It also enables BHP to validate the Activity against the impacts assessed in the SEA. BHP includes all contemporary surveys in Validation Notices and historical surveys, where relevant. BHP does not agree that this information should be removed from Validation Notices. The final IAR report dated 4 May 2017 will be published on the BHP website.
4.3.3.1	Please include the Indicative Footprint in Figure 4.7 (p. 31) to show the Northen Quoll supporting habitat that is predicted to be directly impacted.	Figure amended.
4.3.3.2	Please explain in this section that while habitat types that may support denning for the Northern Quoll are present within the Activity Area, the	Additional text added to Section 4.3.2.

	habitat is not classified as critical habitat for the Northern Quoll under the Assurance Plan and Offsets Plan Revision 2.3 Table 5.10 as there is no 'home range' due to no evidence of a colony or residing individuals.	
4.3.4.1	In regard to Northern Quoll records, the statement, 'Given the lack of further evidence, it is unlikely that the species occurs in the Activity Area' (p. 29) is inaccurate, as while there may be no evidence of a residing Northern Quoll population or colony in the Activity Area an occurrence of the species has been detected within the Activity Area.	BHP considers that while one scat has been recorded in the Activity Area, regular occurrence in the Activity Area, or occurrence of a population in the Activity Area is unlikely given that no further evidence of presence has been detected, despite targeted survey effort. Additional text has been added to Section 4.3.3 to expand on the explanation.
4.3.6.1	An occurrence of Northern Quoll has been recorded in the Activity Area and there is Northern Quoll supporting habitat in the Activity Area. Direct and indirect impacts have been identified and the impact assessed. However, the full mitigation hierarchy has not been adequately applied in the draft validation notice (p. 33) and a more detailed discussion to demonstrate that the loss of Northern Quoll habitat has been minimised through avoidance and mitigation measures is required.	The Activity will utilise existing infrastructure and activities have been placed on existing cleared areas, to minimise disturbance required. Additional text has been added to Section 2.1 to this effect.
4.3.6.3	Given the stated duration of this activity, including operation and closure, of 46 years – discuss how future changes in risk of cane toad incursion will be monitored and managed. What preventative measures will BHP adopt to reduce this risk? We note that naturally occurring water features may be ephemeral or semi-permanent, however mine sites often have permanent artificial water features such as water treatment pools and cane toads can 'hitchhike'.	There are no permanent water treatment pools included in the scope of the Activity. A permanent pool known as Innawally Pool is present at Jimblebar. This pool varies in size and depth in response to rainfall events. The Activity will not alter the surface water flow to this pool and is not expected to increase the risk of Cane Toad incursion into the Activity Area. In the event that Cane Toad is observed within the Activity Area, BHP will report the observation to the relevant state and federal regulators and implement mitigation measures, if required, in consultation with regulators.

4.3.7	The consideration of the significance of residual impacts (p. 33) is not in accordance with the Assurance Plan and Offsets Plan Revision 2.3 as no significance test is to be applied to consideration of residual impact under the Assurance Plan and Offsets Plan Revision 2.3 and therefore no judgement of significance is required during validation processes. The department has provided BHP this same advice on numerous occasions over the last 12 months.	Comment noted. BHP has amended wording to refer to residual impacts.
4.3.9	4.3.9 We do not agree that no monitoring is required (p. 33). A commitment to monitor the quantity of Northern Quoll supporting habitat directly and indirectly impacted/cleared is required to ensure it does not exceed the 1206.5 ha limit committed to in this draft validation notice. This is of particular importance given the limited analysis of potential impact to supporting habitat from hydrological changes.	Additional text regarding hydrological changes is included in Section 5.2.5 BHP commits to clearing no more than 2,067 ha including no more than 7.6 ha of Gorge/Bully and 2.5 ha of Breakaway/Cliff. This is more clearly identified in Table 4-3. Note the addition of a new Section 5.1 providing overview of fauna habitats in the Activity Area and Indicative Footprint. BHP does not consider that monitoring of Northern Quoll is required given that a single scat was previously recorded in 2021, with no other direct or indirect evidence of presence of the species, either as transient individuals, or as a population, despite targeted survey effort. BHP commits to monitoring clearing to ensure that clearing remains within the approved limits.
4.4.3.1	Under Local Habitat (p. 36), the draft validation notice states that critical and supporting habitat are present in the Activity Area. We suggest this sentence be amended to state that critical and supporting habitat are present in the Activity Area or within 500 m of the Activity Area boundary, to align with the Notifiable Action triggers in Table 5.14 of the Assurance Plan and Offsets Plan Revision 2.3.	Text amended.
4.4.3.2	There is no map/figure showing cave locations, cave identifiers (ID) and cave categories/features of all recorded Ghost Bat roosts within the Activity Area and surrounding the Activity Area as well as the habitat types (as per Figure 4.7 in the published Jimblebar Optimisation Project	Noted. This is a repeat of a previous comment. Figures amended to include cave location and identifier.

	Revised Validation Notice). Figure 4-10 (p. 40) only shows the location of Ghost Bat records, and Figure 4-11 (p. 44) only shows existing Ghost Bat monitoring locations with no cave IDs, cave categorisation or habitat types included. This information, in conjunction with a figure showing the proposed location of the project elements of the Activity, as discussed at comment 1.4.2, is important for transparency and to enable the reader to assess potential impacts to the Ghost Bat.	
4.4.3.3	Please provide enlarged areas for Figure 4-10 (p. 40), where there are multiple Ghost Bat records in close proximity to one another, so the number of records in that area can be accurately discerned by the reader.	Figures amended to include enlargements of Ghost Bat records.
4.4.3.4	In Figure 4-11, showing existing Ghost Bat monitoring locations (p44), the 'Target Bat Caves' are designated by black stars. It does not show the cave categorisations and cave IDs. Please amend. Please also provide enlarged areas where there are multiple monitoring sites in close proximity.	Noted. This is a repeat of a previous comment. Figure amended.
4.4.3.5	4.4.3.5 For ease of reading, please include a more detailed discussion of the roosts, such as the number of caves and categorisation (currently the document requires the reader to tally up the number of Category 3 and 4 caves in Table 4-7) and cave features, in the critical habitat and supporting habitat discussion (p.36) as per the Jimblebar Optimisation Project Revised Validation Notice. Please also include the distance of the two Category 2 roosts from the Indicative Footprint to help the reader to assess that they are located sufficiently far so as not be impacted by the activity (noting that, as discussed below, activities that may potentially impact these caves such as hydrological changes have not been assessed).	Text amended as follows: 'A total of 12 caves have been recorded in the Activity Area, including three Category 3 caves and nine Category 4 caves.'
4.4.3.6	Please explain why Category 4 roost CJIM-22, which was identified in the Jimblebar Optimisation Project Revised Validation Notice in Figures 4.6, 4.7 and 4.8 and was 170 m west of the Indicative Footprint, is not listed in Table 4-7 Ghost Bat roosts present in the Activity Area and surrounds (p. 36) of the draft validation notice. Please also explain why information relating to CJIM-22 (other than the figures already cited) that was in the Draft Jimblebar Optimisation Project Revised Validation Notice has been removed from the final Jimblebar Optimisation Project	Further survey of CJIM-22 determined that it is not a cave. The location is a very shallow rocky overhang that does not constitute a cave. CJIM-22 has been removed from BHP's records as a cave.

	Revised Validation Notice published 24 August 2023. Specifically, the roost description in Section 4.3.3 Local Habitat, the paragraph in Section 4.3.5 Impact Assessment, and Table 4.4: Ghost Bat roosts located within the activity Area or withing 500 m of the Activity Area boundary.	
4.4.3.7	Table 4-7 Ghost Bat roosts present in the Activity Area and surrounds (p. 36) is categorised into 'Caves within the Activity Area' and 'Caves outside the Activity Area'. We recommend this categorisation is amended to 'Roosts located in the Activity Area or within 500 m of the Activity area boundary' and 'Roosts located beyond 500 m of the Activity Area'. For those roosts located in the Activity Area or within 500 m of the Activity Area boundary, please include situational information (as per the corresponding table in the Jimblebar Optimisation Project Revised Validation Notice) such as cave opening orientation, distance to existing disturbance and distance to the Indicative Footprint. This information is important to enable the reader to assess potential indirect impacts such as light spill if situated near a haul road. For those roosts located beyond 500 m of the Activity Area, please include the distance to the Indicative Footprint.	The term 'cave' is used as not all caves have evidence of roosting. As a result, use of the term 'roost' is not entirely accurate for all caves. Additional information on cave structure, openings and distance from existing disturbance and the Indicative Footprint has been included in Table 4-8.
4.4.3.8	Table 4-7 (p. 36) - Please include the scope of 'surrounds'. For example, is this within 5 km of the Activity Area boundary?	'Surrounds' refers to within 500m of the Activity Area. Text amended.
4.4.5.1	In regard to impact assessment and habitat loss (p. 41), the draft validation notice states that the activity will avoid impact to all Ghost Bat roosts within the Activity Area. This is repeated in Section 4.4.6 (p. 41) with the statement 'The Proposal will avoid direct impacts to all Ghost Bat roosts within the Development Envelope' and in the Program Matter Outcome Assessment in Table 4-10 (p. 42). However, Table 4-9 Ghost Bat avoidance measures indicates that four Category 4 roosts (CJIM-04, CJIM-08, CJIM-17 and CJIM 18) are: 'Outside of Indicative Footprint and unlikely to have direct impacts'. Also, the Monitoring Commitment in Table 4-12 (p. 45) and the Clearing Commitment in Table7-2 (p. 80) both state there will be no disturbance to these four Category 4 roosts without prior inspection to verify presence/absence of Ghost Bat. Please make it clear that there is the potential for direct impacts to these roosts if disturbance occurs outside of the Indicative Footprint, even if it is considered unlikely.	Additional text has been added to Section 4.4.4 to explain that if disturbance occurs outside of the Indictive Footprint, there is potential for impact to the four Category 4 roosts; however, this is unlikely.

4.4.5.2	Please discuss if any other measures, other than buffers, to avoid direct impacts on the Ghost Bat were considered and applied through improved project design and project planning. For example, the location of OSAs or other infrastructure.	The Activity utilises existing infrastructure where possible which minimises clearing required. Additional explanation has been provided in Section 2.1.
4.4.5.3	As discussed under the General Comments section, the impact assessment (p. 41) only identifies the direct impact from habitat loss. It does not discuss the potential indirect impacts to the Ghost Bat from the Activity such as habitat modification from hydrological changes, fire and weeds, artificial light, feral animals and cane toads, noise and vibration, dust, hydrological changes, infrastructure such as barbed wire fences and communication towers and human disturbance.	Additional text on indirect impacts has been included in Section 5.3.5.
4.4.6.1	The mitigation hierarchy has not been applied to indirect impacts to the Ghost Bat from the Activity. There is a brief reference to the implementation of a Terrestrial Fauna Environmental Management Plan with no detail provided as to what this entails and no further mention of this plan within the draft validation notice.	Additional information on indirect impacts to Ghost Bat has been included in Section 5.3.5 and the fauna management plan is provided.
4.4.6.2	As indirect impacts have not been identified, assessed and the mitigation hierarchy applied, the department, other targeted stakeholders and the public, cannot provide comment on the effectiveness of the avoidance and mitigation measures for indirect impacts.	This omission has been addressed with inclusion of impact assessment and mitigation relating to hydrological changes, habitat modification, light, feral predators, infrastructure and human disturbance.
4.4.6.3	In regard to Ghost Bat records (p. 41), the draft validation notice states there has been one direct observation of a Ghost Bat outside the Activity Area however, Table 4-7 (pp. 36-38) indicates there has been one direct observation of an individual at cave CJIM-03 and two records of direct observations of individuals at cave CNIN-9. Please amend.	Section 5.3.4 Ghost Bat records states that twelve records of Ghost Bat have been recorded in the Activity Area and evidence has been recorded outside of the Activity Area. The records are provided in Table 5-7. Text amended from ‘one direct observation’ to ‘direct observations.’
4.4.6.4	Noting that some caves have ‘mining exclusion buffers’ (also referred to as exclusion zones within the draft validation notice) (pp. 41 42), please explain what is avoided in these buffers, is it all disturbance? Can blasting/mining occur up to the boundary of the mining exclusion buffer? Potential indirect impacts have not been addressed to show that these buffers will provide adequate protection to the roosts. Please discuss how you have determined mining activities adjacent to the	Mining exclusion zones exclude clearing, blasting and excavation. These activities can occur outside of these buffers. Given these caves are not critical habitat and are all Category 3 caves (diurnal with occasional roosting) and Category 4 caves (nocturnal foraging) the buffers applied are considered

	mining exclusion buffers will not impact each relevant Ghost Bat roost and provide supporting evidence for this discussion for each potential impact pathway e.g. geotechnical analysis of potential vibration and noise impacts to Ghost bat use of these roosts.	appropriate to ensure ongoing use of the caves for these purposes.
4.4.6.5	How are the mining exclusion buffers to be applied to the roosts? For example, is it a 50 m or 100 m radius from the cave entrance, will the application vary depending on the cave characteristics? Please make it clear how the buffers will be measured and consider including a topographic map showing the mining exclusion buffer areas.	Buffers vary depending on cave category, as identified in Table 5-9 and are measured from the cave entrance.
4.4.7.1	As per the Assurance Plan and Offsets Plan Revision 2.3, residual impact is determined following the application of avoidance and mitigation measures, as noted above these have not been applied for indirect impacts to the Ghost Bat.	Mitigation measures have been applied as specified in the previous Jimblebar Optimisation Project Revised Validation Notice. This Validation Notice does not alter the commitments contained within that Validation Notice. Additional text is added to Section 5.3.5 and 5.3.7 in relation to dust.
4.4.7.2	The residual impact (p. 42) is stated as 'the loss of up to 10.1 ha of critical foraging habitat and 820.ha of critical foraging habitat'. Please clarify if this should be 10.1 ha of critical habitat (being Gorge/Gully and breakaway/Cliff habitat type)? Does this calculation of 'up to 10.1 ha' consider the potential direct impact to roosts CJIM-04, CJIM-08, CJIM-17 and CJIM-18?	Caves CJIM-04, 08, 17 and 18 are outside of the Indicative Footprint and are unlikely to be directly impacted. The impact to 10.1 ha of critical habitat does not include these roosts.
4.4.7.3	We note that Sand Plain and Stony Plain habitats were assessed as critical foraging habitat and supporting habitat for the Ghost Bat in the Jimblebar Optimisation Project Revised Validation Notice. Please explain/provide more detail as to why these habitats are considered not structurally suitable to support foraging for the Ghost Bat for this Activity (pp. 36 & 38).	Relevant vertebrate fauna surveys reports (GHD 2019a, 2019b and 2021; Biologic 2019b and 2022; Astron 2023) generally do not classify Sand Plain and Stony Plain as Ghost Bat foraging habitat (as they do not contain suitable perching trees), or these habitat types are classified as Supporting Foraging Habitat. BHP has taken a conservative approach and classified these habitats as Supporting Foraging Habitat. Additional text provided in Section 5.3.3.

4.4.7.4	Ghost Bat supporting habitat of Major Drainage, Minor Drainage, Mulga Woodland and Drainage Area/Floodplain is present in the Activity Area. Please also state in the residual impact calculation (p. 42) whether this supporting habitat is to be directly disturbed, and whether it has been included within critical foraging habitat.	Table 5-10 states that up to 820.2 ha of critical foraging habitat will be impacted and offset. In addition, Table 7-1 demonstrates that impacted Minor Drainage, Major Drainage, Mulga Woodland and Drainage Area/Floodplain habitats will be offset. Additional text is included in Section 5.3.5 and 5.3.10 to this effect.
4.4.9.1	Table 4-11 (p. 43) lists cave microclimate recording as a monitoring method with the monitoring parameters being temperature and humidity. While an impact assessment of indirect impacts to the Ghost Bat has not been included in the draft validation notice, we note that although Ghost Bats are less sensitive to this factor compared to the Pilbara Leaf-nosed Bat, disruption to microclimate should be considered under a hydrological assessment for Ghost Bat roosts.	Assessment of the potential impacts of altered hydrology was not included, given depth to groundwater and lack of groundwater dependent vegetation. In addition, the activity is not predicted to result in significant impacts to surface water. Nonetheless, additional information has been provided to demonstrate no potential impacts from groundwater drawdown in Sections 5.3.5 and 5.3.6.
4.4.9.2	In Table 4-12 Ghost Bat monitoring commitments (pp. 45-46), the first row lists the Monitoring Target as ‘’No disturbance to the Category 4 roosts (CJIM-04, CJIM-08, CJIM-17 and CJIM-18) without prior inspection to verify presence/absence of Ghost Bats’. We consider this to be a pre-clearance check rather than a monitoring commitment. Also, the corresponding corrective and contingency actions in column 3 are misaligned with the monitoring target as they relate to investigating potential causes of monitoring targets not being met; consultation with experts; comparison of changes with other Ghost Bat monitoring programs; increasing monitoring frequency and expanding the monitoring program. Please amend.	Monitoring target revised to ‘Ensure no Ghost Bats are present in Category 4 roosts (CJIM-04, CJIM-08, CJIM-17 and CJIM-18) prior to disturbance.’ Corrective and contingency actions to include review of the pre-disturbance checklist if required and provision of the checklist to relevant personnel.
4.4.9.3	The Monitoring Targets in Table 4-12 (pp. 45-46) relating to barbed wire fencing and restricting access to Ghost Bat caves during breeding season are management commitments rather than monitoring commitments. As such, we note that they are both recorded as proposed management commitments in Table 7-3 (p. 81). Please amend.	Monitoring target in Table 5-12 amended.

4.4.9.5	How will the Monitoring Target of 'Improve understanding of the local Ghost Bat population abundance/dynamics' in Table 4-12 (pp. 45-46) demonstrate that BHP is meeting the Program Matter Outcomes for the Ghost Bat? The Category 3 roosts and Category 4 roosts that are to be monitored cannot be identified in Figure 4-11 (p. 43) as the individual roosts are identified by stars and not by cave IDs.	It is important to improve knowledge of Ghost Bats use of caves at Jimblebar, as at present, there is no long term monitoring data. Improved knowledge of how the species uses this habitat will inform adaptive management. Figures have been amended to show Cave ID.
4.4.9.6	Figure 4-11 (p. 43) shows existing Ghost Bat monitoring locations. There are seven roosts listed to be monitored in Table 4-12 (pp. 45-46) yet there are more than seven stars on Figure 4-11. Please explain this discrepancy. Is it due to a reduction in the overall number of roosts being monitored?	BHP is monitoring more than seven caves, as required under state Ministerial Statement 1126, to improve the understanding of Ghost Bat presence and habitat use.
4.4.9.7	We recommend Table 4-11 Monitoring Targets (p. 43) be updated to include recorded presence of Ghost Bat at each Ghost Bat roost committed to being retained at least once every two years of the life of the Activity (i.e. to demonstrate successful application of avoidance measures, noting that potential reasons for results showing temporary absence of Ghost Bats – such as movement between roosts in the region can be discussed when reporting results in the Annual Environmental Reports).	BHP does not consider this to be a realistic target given that Ghost Bats have not been recorded either directly or indirectly at a number of the caves currently being monitored or proposed to be monitored, within the Activity Area.
4.4.9.8	The caves to be monitored are the caves with buffers applied, which is two Category 3 caves with a 100 m buffer and five Category 4 caves with 50 m buffers. Has BHP considered whether these buffers will allow access to the caves for monitoring purposes once construction and mining activities have commenced? We note that the BHP Strategic Environmental Assessment - Annual Environmental Report 2022/23 identified that some caves at Mining Area C could not be accessed for monitoring purposes due to pit progression.	Preliminary assessment indicates that all caves targeted for monitoring will remain accessible.
4.4.9.9	We note the proposed monitoring locations and timeframes (pending safe access and heritage restrictions) in the published Jimblebar Optimisation Project Revised Validation Notice are as follows: • Category 2 roosts (CJIM-03 and CNIN-03) - at least 6 monthly	BHP will continue to monitor the caves identified for monitoring in the Jimblebar Optimisation Project Revised Validation Notice.

	• Category 3 roosts (CNIN-01, CNIN-13, CJIM-09) at least yearly • Category 4 roosts (CJIM-03, CJIM-05, CJIM-06, CJIM-08, CJIM15, CJIM17, CJIM-20), at least two yearly We note that five of the Ghost Bat caves proposed to be monitored in this draft validation notice are already listed above, namely CJIM-05, CJIM-06, CJIM-09, CJIM-15 and CJIM-20, with the remaining two caves being CJIM-07 and CJIM-14. While this draft validation notice does not include monitoring commitments for the Category 2 caves CJIM-03 and CNIN-03, we expect theses caves to continue to be monitored as per the Jimblebar Optimisation Project Revised Validation Notice commitments, along with those caves listed above that are not listed as monitoring commitments in this draft validation notice. We note that two Category 4 caves, CJIM-08 and CJIM-18, listed to be monitored in the Jimblebar Optimisation Project Revised Validation Notice are identified as potentially being directly impacted in this draft validation notice. Will additional sites be included in the monitoring program if these caves are directly impacted?	Additional text has been included in Table 5--12. CJIM-08 and CJIM-18 are unlikely to be impacted.
4.5.4.1	Under Impact Assessment (p. 52) it is concluded that habitat loss associated with the Activity is not significant and that 'Direct and indirect impacts to the Greater Bilby are not considered significant'. Significance of impact is not the test to be applied here. Instead, include further discussion demonstrating the adequacy of surveys to detect evidence or signs of Greater Bilby presence – to support and provide credibility to your conclusion that the triggers for Greater Bilby will not be met by this action, i.e. were surveys undertaken by a suitably qualified professional? Were they undertaken in accordance with relevant survey guidelines? Did survey coverage extend across all potentially suitable habitat within, and 500 m outside the activity area? Please also include closest known record of the species.	All surveys were completed by qualified professionals in accordance with the relevant guidance, as reported in the Validation Notice and in the appended fauna surveys. Surveys were commissioned prior to the revision of the APOP and therefore did not all cover the 500m buffer around the Activity Area. Since revision of the APOP, BHP is extending survey coverage to ensure this requirement is met for future surveys. The closest known record of Greater Bilby is from over 3km east of the Activity Area. This is included in Section 5.4.3 in the Validation Notice.
4.5.4.2	Unintentional error: Impact Assessment (p. 52) there is a reference to Grey Falcon rather than the Greater Bilby.	Amended.
4.6.1	Pilbara Olive Python	Amended

	See comment 4.5.4	
4.7.1	Pilbara Leaf-nosed Bat See comment 4.5.4	Amended
4.7.3.1	The Pilbara Leaf-nosed Bat Records section (p. 59) states there is no evidence of Pilbara Leaf-nosed Bat within the Activity Area or the surrounds, despite targeted bat survey effort. From the surveys published as appendices, we note the Jimblebar targeted ghost bat survey (GHD 2020) was commissioned by BHP to undertake a targeted Ghost Bat survey covering the Jimblebar area. We also note the Warrawandu Targeted Fauna Survey (Biologic 2023) included the Pilbara Leaf-nosed Bat as a target species. Although it included a large desktop assessment, according to Figure 4-1 Contemporary Vertebrate Fauna Surveys undertaken in the Activity Area (p. 21), the study area was linear, along Jimblebar Railway. Please identify or provide any other surveys that targeted the Pilbara Leaf-nosed Bat?	The targeted Ghost Bat survey was also intended to record Pilbara Leaf-nosed Bat, if present. Acoustic recordings were analysed for both Ghost Bat and Pilbara Leaf-nosed Bat. All fauna surveys undertaken included methods to monitor for presence of threatened bat species, targeting both Ghost Bat and Pilbara leaf-nosed Bat. Surveys include Mesa Gap, Shearers West, Jimblebar greenhouse gas abatement survey, Western Ridge and Jimblebar monitoring, Caramulla Miscellaneous licence, North Jimblebar, East Jimblebar and Caramulla, Jimblebar targeted fauna survey. The Western Ridge and Jimblebar monitoring program included 344 nights of continuous monitoring at caves within or adjacent to the Activity Area between September 2021 and September 2022 using SM4 bat detectors capable of detecting a broad spectrum of bat calls and has not detected any presence of Pilbara Leaf-nosed Bat.
4.7.3.2	This section states there is no evidence of Pilbara Leaf-nosed Bat within the Activity Area or the surrounds, despite targeted bat survey effort. Please explain the scope of 'surrounds'? We note Table 4-1 (pp. 19-20) indicates the Warrawandu Targeted Fauna Survey (Biologic 2023) recorded ultrasonic calls of Pilbara Leaf-nosed Bat. The survey report indicates they were recorded at two locations (from three individual ultrasonic calls) within Mulga Woodland and Drainage Area/Floodplain habitat of the study area but more than 500 m outside of the Activity Area. Please state the distance of these calls from the closest point of the western boundary of the Activity Area. The survey report also states	Surrounds refers to within 500m of the Activity Area. Given the surveys were commissioned prior to the revision to the APOP, they did not consistently extent 500m beyond the Activity Area. Since revision of the APOP, BHP is extending survey coverage to ensure this requirement is met for future surveys.

	that caves monitored for the Jimblebar Ghost Bat monitoring program show no indication of Pilbara Leaf-nosed Bats roosting, but sporadic nocturnal visits were recorded at caves CNIN-01 (Category 4), CNIN-03 (Category 2) and CNIN-09 (Category 3) throughout 2022. Please discuss these records and habitat in the draft validation notice.	The distance of caves CNIN-01,03 and 09 at Ninga, from the Activity Area have been included in Table 5-6.
4.7.3.3	The draft validation notice states that given the lack of records, and lack of critical roosting habitat to support the species, it is considered unlikely that the Pilbara Leaf-nosed Bat occurs within the Activity Area. Figure 4.20 (p. 62) shows three caves (no cave IDs) to the west of the Activity Area, two of which have Pilbara Leaf-nosed Bat records. Please discuss these records, including identifying the distance of these caves from the closest point of the western boundary of the Activity Area. The distance of the records from the Activity Area is important because, as cited in the draft validation notice, Pilbara Leaf-nosed Bats are predicted to travel up to 20 km from roost caves during nightly foraging, however, seasonal variation is known to occur, with foraging occurring up to 20 km in the dry season and up to 50 km during the wet season. We note there is approximately 10,888.7 ha of supporting habitat present in the Activity Area. We also note that Figure 4-18 (p. 60) shows numerous other Pilbara Leaf-nosed Bat records further to the west of the Activity Area.	There are no Pilbara Leaf-nosed Bat records including either caves or evidence of individuals or populations within the Activity Area or within 500m of the Activity Area. Pilbara Leaf-nosed Bat records are present to the west of and outside of the Activity Area, and greater than 500m from the Activity Area. Given these records are outside of these locations, the Notifiable Action Trigger is not met for this species. BHP has minimised clearing by placing infrastructure in existing cleared areas and utilising existing infrastructure where practicable.
4.7.4.2	The distance of the roosts/records from the Activity Area is also important from a hydrological perspective. Although the draft validation notice determines that potential impacts to Pilbara Leaf-nosed Bat as a result of altered hydrological regimes are expected to be negligible, this only considers direct impacts. Depending on the distance of the cave from the Activity Area, indirect impacts to hydrology may include water quality, which may reduce prey availability, and impacts to cave microclimate. As stated in the Project Description and Impact Quantification section, analysis of hydrological impacts extends to potential impacts to Program Matter habitat that may occur outside the Activity Area such as dewatering of pits impacting aquifers extending beyond the Activity Area.	Pilbara Leaf-nosed Bat roosts are broadly understood to occur within approximately 7 km of surface water sources. There are no Pilbara Leaf-nosed Bat roosts present in the Activity Area or known within 500m of the Activity Area. Ghost Bats are not known to be dependent on surface water availability, therefore water quality is not a consideration. In addition, given there is no groundwater dependent vegetation present, it is not expected that groundwater drawdown will alter the climatic conditions within caves.
4.7.4.3	The roost assessment for the Jimblebar targeted ghost bat survey (GHD 2020) states that site CAV-02 was categorised as a potential	CAV-02 (now referred to as CJIM-02) is located over 2.4 km south of the Activity Area relevant

	diurnal roost (unknown type) because the habitat assessment determined 'the roost has potential for the Pilbara Leaf-nosed Bat. It is unlikely that this roost provides ongoing diurnal refuge for the Ghost Bat, however the structural characteristics and microclimate may provide day roosting (albeit transitory) for the Pilbara Leaf-nosed Bat'. The monitoring notes indicate that this roost was to be monitored and considered further for Pilbara Leaf-nosed Bats. Did this occur and what was the outcome?	to this Validation Notice. It can only be accessed by helicopter due to difficult terrain. The location is off tenure. This cave was revisited in February 2024 to install a scat collection sheet, cave photo point and microclimate logger. Results are yet to be collected from this location.
4.8.1	Grey Falcon See comment 4.5.4	Amended
4.9.1	Night Parrot See comment 4.5.4	Amended
6.2.1	Please change significant residual impact to residual impacts (p. 73).	Amended
6.2.2	Table 6-1 residual impacts requiring offsetting (p.101): as previously advised by the department, please include a note in column 5 stating offset rate ($/ha) is the current rate (GST excl.), with Perth CPI to be applied annually to any subsequent payments. The heading (Total financial offset) in column 6 should be minimum offset payment (as the total may increase over time due to annual application of CPI).	Amended.
6.3	Noting the Pilbara Environmental Offset Fund (the Fund) is still under development, and delivery of offsets for the relevant Program Matters may not be achieved, BHP should be prepared to deliver an alternative offset in this scenario. The Fund is not always an adequate pathway to offset all residual impacts, and in some instances, alternative offset pathways will need to be proposed.	Comment noted.
6.6.2	Summaries of offset outcomes included in Annual Environmental Reports are expected to be provided in enough detail for stakeholders to understand whether reasonable conservation outcomes are being	Comment noted.

	achieved for the impacted species/program matter and the time between impact occurring and offset outcomes has been minimised as far as practicable.	
7.1.1	The discussion of avoidance and mitigation measures in this draft validation notice is not of sufficient detail to adequately inform the department's assessment of suitable monitoring commitments. Please consider the department's comments on monitoring commitments in previous validation notices and include sufficient discussion demonstrating application of the mitigation hierarchy to this activity and relevant monitoring commitments in a revised draft validation notice.	Comment addressed as described in response to previous DCCEEW comments above.
7.1.2	Please include a commitment to monitor the quantity of Northern Quoll supporting habitat directly and indirectly impacted/cleared to ensure it does not exceed the 1206.5 ha limit specified in this draft validation notice.	Note this is a repeat of a previous comment above.
7.2.1	Please clearly identify, as a clearing commitment, each roost that is to be retained (impact avoided) for ongoing Ghost Bat use.	Section 5.3.5 states that based on the current Indicative Footprint, the activity is intended to avoid direct impact to all Ghost Bat roosts. In the event that the footprint is modified, caves in exclusion zones will be protected. Impacts to caves not included in exclusion zones are also unlikely.
7.2.2	Please include a clearing commitment that no clearing will occur within the mining exclusion buffers applied to the relevant Category 3 and Category 4 caves within the Activity area.	Section 5.3.6 states that no clearing or mining activities will occur within the buffers. Additional text added to Section 4.4.5.
7.2.3	Please include a commitment that clearing does not exceed the following limits: • Total disturbance of 2,067 ha For Ghost Bat critical habitat and critical foraging habitat (dependant on the application of the mitigation hierarchy being applied for direct and indirect impacts), up to:	The Validation Notice commits to clearing no more than 2,067 ha. BHP also commits to clearing no more than 7.6 ha of Gorge/Gully and up to 2.5 ha of Breakaway/Cliff habitat types. For all other habitat types, the extent of clearing identified is based on the current Indicative Footprint. In the event that clearing

	• 7.6 ha Gorge/Gully • 2.5 ha Breakaway/Cliff • 16 ha Major Drainage Line • 24.9 ha Minor Drainage Line • 510 ha Mulga Woodland • 269.3 ha Drainage Area Floodplain For Northern Quoll supporting habitat, up to: • 1,159.8 ha Hillcrest/Hillslope • 29.5 ha Sand Plain • 17.2 ha Stony Plain	occurs outside of the Indicative Footprint, the total clearing extent will remain up to 2,067 ha. To increase clarity, text in Section 5.3.5 and Table 8-2 4.4.5 has been updated to reflect this by referring to clearing of up to 7.6 ha Gorge/Gully and 2.5 ha Breakaway/Cliff, and approximating the extent of hectares to be cleared for other habitat types.
7.3.1	Update management commitments to include feral cat abatement, light pollution, and fire management to align with the commitments in the Jimblebar Optimisation Project Revised Validation Notice.	Additional text added.
7.3.2	Please clearly identify as a management commitment each roost that is to be retained (impact avoided) for ongoing Ghost Bat use.	This is repeat of a previous comment. Section 5.3.5 states that the activity will direct impacts to all Ghost Bat roosts. This is also identified in Table 5-6 and Table 5-9.
7.4.1	As commented above, this draft validation notice does not sufficiently identify indirect impacts to Program Matters. As a result, confidence in the accuracy of the calculated residual impact is low and we are unable to confirm the accuracy of offset payment calculations.	This is a repeat of previous comments. Additional text has been added related to indirect impacts.
7.4.2	The offset commitment (Payment of financial contribution to the Fund) is not sufficient. Commitment needs to include achievement of conservation outcomes equal to or greater than the impact (e.g. habitat loss).	Additional text added to Section 7.3 as follows 'Combined with the avoidance and mitigation measures, this will ensure that the Program Matter Outcomes identified in the APOP are achieved.'

7.4.3	Reporting needs to include evidence of payment to the department of on-time payments into the Fund (including minimum 10% within 1 month of validation notice becoming effective), and summary of offset outcomes in Annual Environment Report to the department and public.	Additional text added to Section 7.6.1 as follows 'BHP will also provide notification to DCCEEW of the payment to the PEOF of 10% of the offsets within one month of the Validation Notice taking effect. A summary of offset outcomes will be reported in the Annual Environment Report.

BHP response to DCCEEW comments on the updated Jimblebar Significant Amendment Validation Notice August 2024

Section	DCCEEW comment	BHP response
General comments	Exclusions The department notes that 1.4 Activity Overview (p. 4) includes 'Exclusions' and states that: 'The validation notice does not assess activities undertaken in accordance with: • State Ministerial Statement (MS 439) for Orebody 18, approved in 1997 prior to the introduction of the EPBC Act. • MS1021 for Orebody approved in 2015 prior to the EPBC Strategic Program Both Orebody 18 and Orebody 31 are considered previously approved at the time of the Strategic Environmental Assessment.' In accordance with the EPBC Act, which commenced on 16 July 2000, individual actions that are likely to have a significant impact on matters of national environmental significance must be referred to the Commonwealth government for assessment and approval under Part 7 of the EPBC Act. There is a statutory requirement for the referral of projects which are likely to have a significant impact. Only actions or activities that are within the scope of the strategic assessment but have prior approval under Part 9 of the EPBC Act are excluded from consideration under the endorsed Program. Approval granted by a State Minister in accordance with state legislation is not an approved action for the purpose of	Noted. MS439 was issued in 1997, prior to the EPBC Act coming into effect. Therefore, activities permitted under this approval are considered previously approved. MS1021 approving Orebody 31 was issued in 2015 prior to the Strategic Program being endorsed in 2017 and therefore in accordance with the Program, meets the following definition of exclusions '*Approval is not being sought for the following activities within the Strategic Assessment Area:* • *activities in any existing National Park, including Karijini National Park, as shown on Figure 1; and* • *activities associated with any existing BHP Billiton Iron Ore operations and infrastructure that has been previously approved*.' In addition, at the time of the referral of the Orebody 31 mine, no threatened MNES were recorded within the Development Envelope and no significant impacts were predicted. Low numbers of two migratory bird species were recorded, including Rainbow Bee-eater and Fork-tailed Swift. Fork-tailed Swift was recorded overhead. No significant residual impacts to these species were predicted and Rainbow Bee-eater is no longer listed as Migratory.

Section	DCCEEW comment	BHP response
	the endorsed Program, or class of actions approval, therefore, they are not excluded from consideration under the endorsed BHP Billiton Iron Ore Pilbara strategic assessment program or class of actions approval, or referral under Part 7 of the EPBC Act. The exclusion of previously cleared areas from the scope of the validation notice may unintentionally lead to some parts of the proposed action being 'unapproved' under the endorsed Program unless a decision report is developed for that component.	
1 Introduction	1.4.1 Activity overview (p.4) – please refer to general comments above regarding exclusions.	Noted.
	1.4.2 Figure 1.2 *Activity Area and Indicative Footprint* – Please confirm whether the 'Previously Assessed Areas' within the Activity Area reflect area assessed only in relation to the EPBC Act such as approvals under Part 9 or previous validation notices.	Previously assessed areas have been assessed under the existing Validation Notices in place for Jimblebar and under previous Ministerial Statements.
	1.5 *Activity Area* (p. 5) states that the Activity will encompass additional clearing of up to 2067 ha of native vegetation with an Indicative Footprint of 3788 ha. Please provide an explanation for this discrepancy in this section (noting that Table 5-1 indicates 1256 ha of the Indicative Footprint is cleared area).	The Proposal requires clearing of up to 2,067 ha in an Indicative Footprint of 3,788 ha. A total of 1,256 ha in the Indicative Footprint is already cleared. Error in Table 5-1 corrected to show 465 ha previously assessed and total of 3,788 ha. There is no change to the extent proposed to be cleared.
	1.7.1 *Decision for a Validation Notice* – Table 1-2 *Notifiable Action Triggers for the Activity* (p. 12) - Please add '*or within a 500m buffer of the Activity Area*' to the first row of the Applicable Trigger column for the Night Parrot to align with the relevant notifiable action trigger in the *BHP Billiton Iron Ore Pilbara Strategic Assessment Assurance and Offsets Plan (Version 2.3)* (APOP*).*	Text reads as follows: 'Within the Activity Area and or within a 500m buffer of the Activity boundary there is: Presence of Night Parrot critical habitat and or supporting habitat **AND**

Section	DCCEEW comment	BHP response
		Presence or sign(s) of Night Parrot population(s) or residing individuals'
	1.7.2 *Decision for a Validation Notice* – Table 1-2 *Notifiable Action Triggers for the Activity* (p. 9) Given the elusive nature of the Pilbara Olive Python, the difficulty in surveying for the species and the proximity of records to several water features inside the Eastern edge of the Activity Area boundary (Figure5-14 *Pilbara Olive Python mapped habitat and records*), did any of the listed surveys include eDNA monitoring?	None of the surveys completed used sampling of surface water for e-DNA. In collaboration with contractors, DBCA, and research institutions, BHP has pioneered the use of eDNA sampling for Pilbara Olive Python in the Pilbara. Some of this work started in 2013 with DBCA and has only been refined over the past 3 years. This work included publishing and sharing results with publishing partners on the application of the method. BHP worked closely with the DBCA to recognise this method before it was applied at Western Ridge. Most of the surveys at Jimblebar were completed before the methodology was recognised by DBCA.
3 Stakeholder Engagement	3.2.1. The department acknowledges that for the updated draft validation notice (Version 1) instructions on how, and the timeframe to make comments, was included on the BHP webpage where it was published, in accordance with Section 7.8 of the APOP.	Noted.
	3.2.2 *Public Consultation* (p. 17) Please ensure the final validation notice includes the public consultation details for the updated draft validation notice (Version 1) and that Table 3-1 *Stakeholder Engagement* (pp. 18-19) is also updated accordingly.	Section 3.2 updated.
	3.2.3 The department notes that Table 3-1 indicates Karlka Nyiyaparli Aboriginal Corporation (KNAC) provided written comments on the original draft validation notice (Version 0). Please confirm if BHP provided the updated draft validation notice (Version 1) to KNAC for comment (noting that information such as indirect impacts to the Ghost Bat was not included in the original draft validation notice).	BHP provided the updated draft Validation Notice to KNAC for comment on 5 July 2024. No comments received.

Section	DCCEEW comment	BHP response
4.2 Surveys and studies	4.2.1 The department acknowledges that requested surveys/reports have been published on the BHP website (aside from the Acid and metalliferous drainage risk assessment) with the updated draft validation notice (Version 1).	Noted.
5.1 Fauna habitats 5.1 Fauna habitats	5.1.1 *Fauna habitats* (p.28) – the department notes this section states there is an unmapped area (Approved Proposal area for MS1126) '*associated with the existing Jimblebar mine, which began operating in 1989 prior to BHP ownership and the introduction of survey requirements and prior to the introduction to the EPBC Act in 1999*'. Table 5-1 *Fauna habitats present in the Activity Area and Indicative Footprint* (pp. 29-31) indicates this unmapped area is 346 ha and is not included in the indicative footprint. Where is this area located? If it is it designated on any of the figures, please refer to that figure? We note that Figure 4-1 *Contemporary Vertebrate Fauna Surveys undertaken in the Activity area* appears to indicate the entire Activity Area has been surveyed. Please elaborate.	Fauna habitat map updated to more clearly depict unmapped areas.The
	5.1.2 Table 5-1 *Fauna habitats present in the Activity Area and Indicative Footprint* (pp. 29-31) - the Activity Area encompasses 6225 ha of cleared habitat stated as being cleared under State legislation, the Jimblebar Optimisation Project Validation Notice (2020) and the Jimblebar Optimisation Project Revised Validation Notice (2023). If any of this cleared habitat was not included in the two validation notices, please provide responses to the following: • When did this disturbance occur, by who and for what purpose (describe the action)? • Was this action referred and/or approved under parts 7-9 of the EPBC Act or decision report under the endorsed program?	The disturbance was undertaken by BHP to implement the current operational mines under the relevant authorisations as described in the Jimblebar Significant Amendment Validation Notice. The disturbance has occurred over a large timeframe, noting that mining at Orebody 18 commenced prior to commenced before implementation of the EPBC Act in 1999 and continues to present day. Orebody 31 was not referred under the EPBC Act as no MNES were recorded and no significant impact were predicted. This mine was operational prior to the Strategic Program taking effect in 2017 and meets the definition of

Section	DCCEEW comment	BHP response
	• Was this action exempt from referral assessment and approval under the EPBC Act (include reason for exemption i.e. section 43A or 43B of the Act)? • If action commenced prior to commencement of the EPBC Act, has the action been varied or extended since then? Was the previous action determined by BHP as not requiring referral under the EPBC Act following a self-assessment of likely significant impact (and was this supported by habitat and fauna surveys prior to clearing)? • What is the distinction between the 'Degraded/Cleared' habitat (800.8 ha within the Activity Area and 154.1 ha within the Indicative Footprint) and 'Cleared areas'?	'Previously Approved.' This activity has not expanded since the original approval. The Jimblebar Optimisation Project Validation Notice took effect in June 2020 and authorises the activities identified within that scope. See also response to the 'General comment' in relation to previously approved activities. Cleared areas have been cleared of vegetation. Degraded/cleared areas comprise a combination of clearing and degradation.
	5.1.3 Table 5-1 *Fauna habitats present in the Activity Area and Indicative Footprint* (pp. 29-31) states that of the 6225 ha of cleared areas within the Activity Area, 1256 ha is within the extent of the 'Indicative Footprint to be cleared' (as well as 154.1 ha of 'Degraded/Cleared' habitat). Additional clarification on the age of clearing and/or current vegetative condition of the cleared/disturbed areas is recommended e.g., depending on the age of clearing some level of natural rehabilitation may have occurred and be providing ecological value to program matters (dispersal, foraging etc.), as evidenced in surveys.	As noted above, clearing has occurred over a large timeframe since commencement of mining prior to implementation of the EPBC Act. Clearing within the Indicative Footprint for the Jimblebar Significant Amendment relates to existing operations at Jimblebar authorised under the Jimblebar Optimisation Project Validation Notice and revised Jimblebar Optimisation Project Validation Notice and activities (which align to MS1029) which pre-date this as authorised under state Ministerial Statements. The initial proposal was implemented pursuant to State Agreement in 1972 and was referred to the EPA by another proponent in 1987. BHP acquired Jimblebar mine in 1992 and referred an expansion proposal to the EPA in 1994. This was approved under state Ministerial Statement 385. Subsequent revisions were approved as non-substantial change to the MS385 including additional components, increased life span and to mine additional ore. Further revisions were approved under MS683, 809, 857, all of which were in place prior to the Strategic Program taking effect. See response to 'General Comment' above.

Section	DCCEEW comment	BHP response
5.1 Fauna habitats	5.1.4 Table 5-1 *Fauna habitats present in the Activity Area and Indicative Footprint* (pp. 29-31) states the total extent of habitat to be cleared within the Indicative Footprint is 3323 ha. Of this total, 456 ha was previously assessed for the Jimblebar Optimisation Project but is not yet cleared. Does the Jimblebar Optimisation Project include the Jimblebar Optimisation Project Validation Notice (2020) and the Jimblebar Optimisation Project Revised Validation Notice (2023)?	The Jimblebar Optimisation Project is reflected in the Jimblebar Optimisation Project Validation Notice and Revised Validation Notice.
	5.1.5 Figure 5-1 *Vertebrate Fauna Habitat* – we recommend also depicting the 'previously assessed areas' (not yet cleared) on this figure.	Figure has been updated.
	5.1.5 Unintentional error: Figure 5-1 *Vertebrate Fauna Habitat* - please amend Proposed Development Envelope to Activity Area.	Updated.
5.2 Northern Quoll	5.2.1 Figure 5-2 *Northern Quoll regional records and distribution* includes Northern Quoll records after 2005. The *EPBC Act Strategic Environmental Assessment Five Year Review 9 May 2023* states that since 2017, there have been 1133 new records of Northern Quoll within the SAA (only 21 of which have been detected by BHP). Are these records reflected in the figure? If not, we suggest indicating the figure shows Northern Quoll records between 2005-2017.	Figure has been updated.
	5.2.2 *Local Habitat* - the final paragraph of this section (p. 39) states that 1108.4 ha of Northern Quoll supporting habitat is present in the Indicative Footprint and will be impacted. Table 5-4 *Northern Quoll habitat* (p. 39) shows a total of 1206.5 ha of Northern Quoll supporting habitat is within the indicative footprint, as does the residual impact calculation impact at section 5.2.7. Please amend to the correct amount.	The extents of habitat within the Indicative Footprint to be impacted have been corrected in Table 5-4 and Table 7-1. The correct amount is 1,108.4 ha.

Section	DCCEEW comment	BHP response
5.2 Northern Quoll	5.2.3 *Northern Quoll Records* (p. 39) states that '*No further evidence of Northern Quoll presence has been recorded in the Activity Area or within 500m of the Activity Area*'. Noting the survey coverage depicted in Figure 5-5 shows that in some areas survey coverage does not extend 500 m beyond the Activity Area, please clarify the statement so that it is accurate and provide an explanation i.e. surveys were commissioned and completed prior to the updated survey requirements in the revised APOP (as explained in section 4.2), or due to tenure constraints. This comment applies to all Program Matters.	Text updated to state 'No further evidence of Northern Quoll presence has been recorded in the Activity Area or within areas surveyed within 500m of the Activity Area despite targeted survey effort.' Note that surveys were commissioned and completed prior to the amendment to the APOP in 2023 which required surveys to extend 500m beyond an Activity Area boundary.
	5.2.5 Unintentional error: *Vehicle and Infrastructure Interactions* (p. 43) refers to the Ghost Bat instead of the Northern Quoll.	Corrected.
	5.2.6 *Mitigation Hierarchy* (p. 44) - please amend the subtitle 'Minimise' to 'Mitigate' to align with the application of the Mitigation Hierarchy as per 7.3 of the APOP.	Amended.
	5.2.7 *Residual Impact* (pp. 44-45) - as per our previous comment on the original draft validation notice, the consideration of the significance of residual impacts is not in accordance with the APOP, as no significance test is to be applied to consideration of residual impact under the APOP and therefore no judgement of significance is required during validation processes.	Amended.
5.3 Ghost Bat	5.3.1 Figure 5-7 Ghost Bat *Regional records and distribution* (dated 02/02/2024) includes Ghost Bat records after 2005. The *EPBC Act Strategic Environmental Assessment Five Year Review 9 May 2023* states that since 2017, there have been 1067 new records of Ghost Bat within the SAA (with	Figure updated.

Section	DCCEEW comment	BHP response
	796 having been detected by BHP). Are these records reflected in the Figure 5-7? If not, we suggest indicating the figure shows Ghost Bat records between 2005-2017.	
5.3 Ghost Bat	5.3.3.1 Inadvertent error: *Local Habitat* (p. 48) states that the Activity Area falls within the current distribution of Ghost Bat whereby the species or species habitat '*may occur*'. Figure 5-7 indicates that Ghost Bat are '*likely to occur*'. Please amend if appropriate.	Updated.
	5.3.3.2 The department acknowledges that Figure 5-9 has been amended to show cave locations, cave identifiers (ID), enlarged areas, location of ghost bat records of all recorded Ghost Bat roosts within the Activity Area and surrounding the Activity Area that includes the proposed location of the project elements of the Activity as well as the habitat types. For future validation notices please include the cave category in the figure (as per Figure 4-6 in the published Jimblebar Optimisation Project Revised Validation Notice) so the reader is not required to cross-check the cave IDs with Tables 5-6 and 5-7 to determine the cave category classification	Noted.
	5.3.3.3 Unintentional error: Figure 5-9 refers to the Proposed Development Envelope. Please amend to Activity Area.	Updated.
	5.3.3.4 We note BHP's response to the department's comments on the original draft validation notice that the Category 4 roost CJIM-22, included in the Draft Jimblebar Optimisation Project Revised Validation Notice, has been removed from this validation notice and the final Jimblebar Optimisation Project Revised Validation Notice published 24 August 2023, as a further survey determined it is a very shallow rocky overhang and is not a cave.	Noted.

Section	DCCEEW comment	BHP response
5.3 Ghost Bat	5.3.5.1 Please change significant residual impact to residual impacts (p. 57).	Updated.
	5.3.5.2 Unintentional error: *Vehicle and Infrastructure Interactions* (p. 59) refers to the Northern Quoll instead of the Ghost Bat. The impact assessment relating to the overland conveyer also seems to be specific to the Northern Quoll – stating the conveyer is above the ground level. Please consider the impact in relation to Ghost Bat collision.	Updated.
	5.3.5.3 *Hydrological Changes* (pp. 57 -58) – as per the original draft validation notice comment made by the department, Table 5-12 (p. 63) lists cave microclimate recording as a monitoring method with the monitoring parameters being temperature and humidity. The impact assessment of hydrological changes for the Ghost Bat does not discuss potential disruption to cave microclimate. This should be included even if BHP's conclusion is that there is no impact.	Additional text added to 5.3.5.3.
	5.3.5.4 *Feral Predators* (p. 58) – at least one survey undertaken for the Activity has detected feral cats. This underscores the importance of BHP implementing effective feral cat management practices. BHP's current monitoring through incidental observations (Table 8-3: *Proposed management commitments - Ghost Bat*). may not be sufficient to ensure feral cat numbers are appropriately managed for the impact of predation to be considered low. It is good that BHP are conducting research into feral cat predation on Ghost Bats at roosts, including at Jimblebar. The outcomes of this research should inform BHP's management approaches for feral cat predation on Ghost Bats.	Noted.
	5.3.6.1 Please include (as per BHP 's response to the department's comments on the original draft validation notice) in the avoidance discussion (p.60) that mining exclusion buffers to be applied to the identified caves are measured from the cave entrance.	Additional text added.

Section	DCCEEW comment	BHP response
5.3 Ghost Bat	5.3.6.2 *Mitigation Hierarchy* – please amend the subtitle 'Minimise' to 'Mitigate' to align with the application of the Mitigation Hierarchy as per 7.3 of the APOP.	Updated.
	5.3.7.1 As noted in our comments on the original draft validation notice, the residual impact (p. 62) is stated as '*the loss of up to 10.1 ha of critical foraging habitat and 820.ha of critical foraging habitat*' rather than 10.1 ha of critical habitat (as opposed to critical foraging habitat), being Gorge/Gully and Breakaway/Cliff habitat as per Table 5-8. Please amend.	Updated.
	5.3.7.2 The department notes BHP's response to the department's comments on the original draft validation notice, that the residual impact calculation of up to 10.1 ha does not include the potential direct impact to roosts CJIM-04, CJIM-08, CJIM-17 and CJIM-18 if the indicative footprint is adjusted. The department also notes the clearing of no more than 10.1 ha of critical Ghost Bat habitat, being 2.5 ha of Gorge/Gully habitat and 7.6 ha of Breakaway/Cliff habitat, is a clearing commitment as per Table 8-2.	The impact to caves is included in the offset calculations based on habitat clearing, noting that no Category 1 or Category 2 roosts will be directly impacted.
	5.3.7.3 It is unclear whether clearing of Sand Plain habitat and Stony Plain habitat is considered a residual impact for the Ghost Bat, as outlined below. Please amend the draft validation notice accordingly. • Section 5.3.3 *Local Habitat* states that although both habitats '*are within 12 km of Category 2 roosts, they do not meet the critical habitat definition, as the extents of these habitat types mapped in the Activity Area lack trees that would provide suitable perching opportunities to support nocturnal foraging. On this basis, these habitats are considered supporting habitat only*'. • The note in Table 5-8 (p. 54) states that '*Sand Plain, Stony Plain and Hillcrest/Hillslope habitat types within*	Sand Plain and Stony Plain are considered supporting habitat for Ghost Bat. Table 5-8 and Section 7 updated to include Sand Plan and Stony Plain.

Section	DCCEEW comment	BHP response
	the Activity Area are considered supporting foraging habitat as they lack suitable perching trees and generally provide limited foraging value'. These habitat types are not included in the residual impact calculation as directly impacted Ghost Bat supporting habitat despite being present in the Indicative Footprint. • Section 7 *Offset Proposal* (p. 93) states critical and supporting habitat for the Ghost Bat is a residual impact. However, Sand Plain and Stony Plain habitats are not included as supporting habitat (no supporting habitat is identified) in the corresponding table showing residual impacts for the Ghost Bat (Table 7-1).	
5.3 Ghost Bat	5.3.7.4 The department notes that both the Jimblebar East and Caramulla Fauna Survey (GHD 2019) and the North Jimblebar Fauna Survey (GHD 2019) state that the Ghost Bat may use the Hillcrest/Hillslope habitat present in the survey areas for foraging. Is any Hillcrest/Hillslope habitat within 12 km of any Category 2 or Category 3 critical habitat? Please consider if this habitat is Ghost Bat critical habitat as per Table 5.13 *Ghost Bat Critical and Supporting Habitats* in the APOP, as this habitat may provide vantage points for foraging aside from suitable perching trees	The East Jimblebar and Caramulla Fauna Survey (GHD 2019) states that Hillcrest/hillslope may provide foraging habitat, but further goes on to conclude the following: 'suitable foraging habitat for Ghost Bats occurs as Major Drainage Line, Minor Drainage Line and Breakaway habitats'. Similarly, the North Jimblebar Fauna Survey states that Hillcrest/hillslope may provide foraging habitat, but further goes on to conclude the following: 'Potential foraging habitat includes mulga woodland and major drainage lines supporting trees and tall shrubs.' On that basis, and noting guidance in the APOP (BHP 2023) which does not identify Hillcrest/Hillslope as suitable or critical foraging habitat, this habitat type is not considered as suitable for Ghost Bat.
	5.3.9.1 Figure 5-10 *Existing Ghost Bat monitoring locations* – the department acknowledges that this figure has been amended to include cave IDs and enlarged areas where relevant. As also previously commented, please consider also indicating the cave categorisations.	Noted.

Section	DCCEEW comment	BHP response
	5.3.9.2 This section refers to the monitoring of caves within Ghost Bat cave buffers (pp. 62, 65 –66), the department notes that Category 3 cave CJIM-21 (which has evidence of Ghost Bat use and has a 100 m buffer applied) is not included as a monitored cave. Please confirm this is correct.	CJIM-21 is unable to be monitored due access constraints related to heritage restrictions.
5.3 Ghost Bat	5.3.9.3 *Table 5-13 Ghost Bat monitoring commitments* (pp. 64-66) - please include a monitoring commitment that includes a monitoring target to demonstrate progress towards meeting the population-based Program Matter Outcome for the Ghost bat. For example, as per other validation notices (Newman Hub Western Ridge Validation Notice and Jimblebar Optimisation Project revised Validation Notice), the presence or evidence of presence of Ghost Bat at one or more Ghost Bat caves over one/two years of monitoring within the Activity Area. This should also include corresponding corrective and contingency actions, such as investigating potential cause of monitoring targets not being met, consulting with experts and/or expanding the monitoring program to other sites.	Monitoring targets updated in the Validation Notice and Terrestrial Fauna EMP.
5.4 Greater Bilby	5.4.3.1 *Greater Bilby Records (p. 68)* See comment 5.2.3.	Text updated.
	5.4.3.2 *Greater Bilby Records (p. 68)* Please explain why there is a lack of suitable habitat to support the species, given there is Sand Plain habitat within the Activity Area and records of Greater Bilby, including an inactive burrow, were detected in Sand Plain habitat extending to the East of the Activity Area boundary.	The nearest record of Greater Bilby is an inactive burrow more than 3 km east of the Activity Area. therefore, the habitats present are considered supporting habitat, rather than critical habitat, in accordance with the APOP (BHP 2023).
5.5 Pilbara Olive Python	5.5.3. *Pilbara Olive Python Records* (p. 73) See comment 5.2.3.	Text updated.
5.6 Pilbara Leaf-nosed Bat	5.6.3.1 *Pilbara Leaf-nosed Bat Record*s (p. 78) See comment 5.2.3.	Text updated.
	5.6.3.2 *Pilbara Leaf-nosed Bat Record*s Please include the nearest known record of the Pilbara Leaf-Nosed Bat.	Text updated.

Section	DCCEEW comment	BHP response
5.7 Grey Falcon	5.7.3 *Grey Falcon Records* (p. 83) See comment 5.2.3	Text updated.
5.8 Night Parrot	*5.8.3 Night Parrot Records* (p.87) See comment 5.2.3	Text updated.
7 Offset Proposal	7.1 *Residual Impacts* (p. 93) - as per comment 5.3.7.3 - critical and supporting habitat for the Ghost Bat are stated as a residual impact but Sand Plain and Stony Plain habitats (no supporting habitat is identified) are not included in the corresponding table (Table 7-1). Please clarify/amend.	Table 7-1 updated to include Ghost Bat supporting habitat.
	7.2 *Residual Impacts* (p. 93) - as per comment 5.3.7.4 - if any Hillcrest/Hillslope habitat is within 12 km of any Category 2 or Category 3 critical habitat, please consider if this habitat is Ghost Bat critical habitat as per Table 5.13 *Ghost Bat Critical and Supporting Habitats* in the APOP.	See previous response to comment 5.3.7.4.
8.1 Monitoring commitments	8.1.1 Table 8-1 *Proposed monitoring commitments – Ghost Bat* (p. 100) - as per comment 5.3.9.3, please include a monitoring commitment to demonstrate progress towards meeting the population-based Program Matter Outcome for the Ghost Bat.	Monitoring targets updated.
	8.1.2 Table 8-1 *Proposed monitoring commitments – Ghost Bat* (p. 100) - As per comment 5.3.9.2, Category 3 cave CJIM-21 is not identified in Table 8-1 (p. 100) *Proposed monitoring commitments – Ghost Bat* as a monitoring commitment although a buffer is applied. Please confirm if this is correct.	Cave CJIM-21 cannot be accessed for monitoring due to heritage restrictions.
	8.1.3 As per the department's comments on other validation notices, please consider monitoring commitments for the Ghost Bat for noise, vibration, light and dust impacts.	Noted.
8.2 Clearing commitment	8.2.1 Please explain why Category 3 cave CJIM-21 (which has evidence of Ghost Bat use) is not identified in Table 8-2 (p. 101) *Proposed clearing commitments – Ghost Bat*, as a clearing commitment.	Repeat comment. Cave CJIM-21 cannot be accessed for monitoring due to heritage restrictions.

Section	DCCEEW comment	BHP response
	8.2.2 Please consider including the additional action in the first row of Table 8-2 (p. 101) that exclusion buffers be flagged on the ground to clearly identify boundaries.	Noted. As described in Table 8-2, electronic spatial layers inform ground disturbance and connect to digital systems within earthworks machinery so that the boundaries are detectable at all times during ground disturbance.
	8.2.3 The department suggests the monitoring and frequency column of the first row of Table 8-2 (p.101) should also include the inspection of the habitat retained within the exclusion buffers to ensure disturbance within the exclusion area has not occurred.	Text updated
8.3 Management commitments	8.3.1 Table 8-3 *Proposed management commitments* (p. 102) – as already commented per the original draft validation notice, please include fire management to align with the commitments in the Jimblebar Optimisation Project Revised Validation Notice.	Table 8-3 updated to include fire management.
	8.3.2 Table 8-3 *Proposed management commitments* (p. 102) as discussed at comment 5.3.5.4, reliance on sightings to instigate feral cat control measures may not be sufficient to ensure feral cat numbers are appropriately managed for this Activity and reduce the risk to local Ghost Bats. We encourage BHP to undertake regular feral cat monitoring, such as via motion cameras at key locations, to assist in early identification and ongoing control of feral cats in the area.	Noted. BHP is investigating options to implement ongoing feral cat monitoring to inform and enhance detection and control measures.