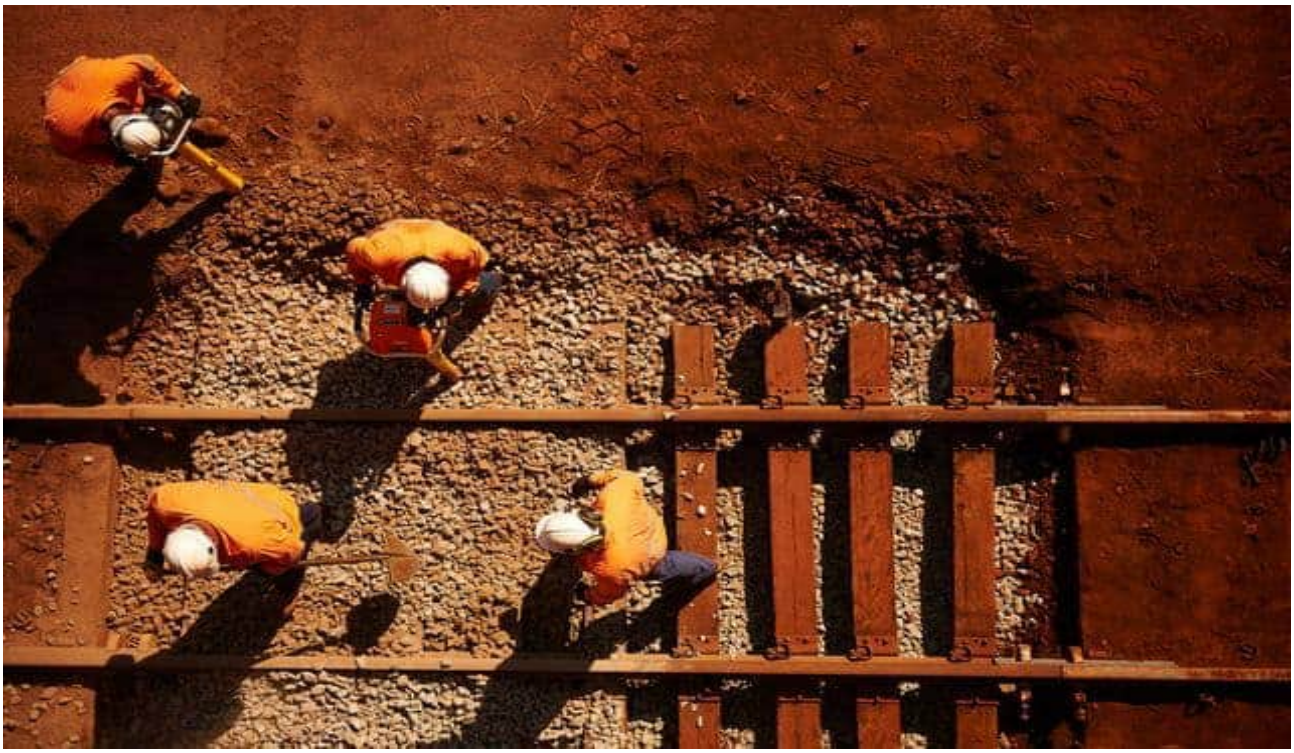
BHP Pilbara Strategic Assessment

Validation Notice- Mooka Rail Works

14 June 2023



Document Version

Rev	Description of Amendment	Organisation	Date Validation Notice Finalised	Date Validation Notice Effective From	Date of Validation Notice Expiry
Rev 0	Draft for public consultation	BHP Iron Ore Pty Ltd	19 April 2023	-	
Rev1	Final report	BHP Iron Ore Pty Ltd	14 June 2023	4 July 2023	4 July 2027

Glossary and Abbreviations

Term	Meaning
Activity or Activities	The Activity includes Newman mining expansions at Western Ridge and associated infrastructure (Section 2).
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
Agreement, the	The agreement dated 18 September 2012 (including the Variation to the Agreement dated 21 October 2015) between the Commonwealth Minister for the Environment and BHP for the strategic assessment of the impacts of the Proposal on Matters of National Environmental Significance (MNES).
AW Act	*Animal Welfare Act* 2002
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 [11 May 2018].
BC Act	*Biodiversity Conservation Act 2016*
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.
CPT	Cone penetration testing
controlling provision	As defined in Part 7 Division 1 section 67 of the EPBC Act.
DCCEEW	Department of Climate Change, Energy, the Environment and Water (formerly DAWE)
DAWE	Department of Agriculture, Water and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions (formerly DPaW)
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.
Disturbance footprint	The area where the clearing of native vegetation and/or moving of earth as a result of activities is planned to occur.

Term	Meaning
DMIRS	Department of Mines, Industry Regulation and Safety
DoEE	Department of the Environment and Energy
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
EP Act	*Environmental Protection Act 1986* (Western Australia).
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth).
Impact or impacts	As defined in section 527E of the EPBC Act.
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 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.
Minister	Minister responsible for administering the EPBC Act and includes a delegate of the Minister.
MOCRS	Mooka Ore Car Repair Shop
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. 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.
NVCP	Native Vegetation Clearing Permit

Term	Meaning
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 [11 May 2018].
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.
PEAHR	Project Environmental and Aboriginal Heritage Review - The PEAHR system manages the implementation of environmental, Aboriginal heritage, land tenure and legal commitments prior to and during land disturbance. All ground disturbance activities will meet the requirements of the PEAHR. All personnel carrying out works associated with clearing activities are required to comply with the Sustainable Development Policy, environmental approvals, the PEAHR requirements and conditions and any other relevant legislative and licensing requirements.
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*), and Pilbara Olive Python (*Liasis olivaceus barroni*).
Protected Matters	Matters protected by a provision of Part 3 of the EPBC Act.
Strategic Assessment Area (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.
Validation Notice	This Validation Notice under Part C of the endorsed Program.
WA	Western Australia
WC Act	*Wildlife Conservation Act 1950* (WA)

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 NJV hub, Mining Area C – Northern and Southern Flanks, Jimblebar hub, Eastern Ridge hub and the Yandi mine 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 geotechnical works and a number of upgrades to infrastructure and ancillary facilities on a section of the Newman Railway known as 'Mooka'. This Validation Notice has been prepared to document the validation process for the Mooka Rail works 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). Key commitments of the endorsed Program and conditions of approval include 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.

The original versions of the Assurance Plan (BHP 2018a) and Offset Plan (BHP 2018b) have been revised and collated into one document '*the Pilbara Strategic Assessment Assurance Plan and Offsets Plan*' (the APOP) (BHP 2023), which was approved on the 16th April 2023. For this reason, this Validation Notice has been drafted in accordance with the APOP, 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 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 prompt the requirement for a Validation Notice.

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

In accordance with Part C of the Program, BHP has undertaken a validation process for the Mooka Rail Works, (hereafter referred to as 'the Activity'), to ensure that the Program Matter Outcomes 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, Assurance Plan and Offsets Plan Requirements	Sections which address these Requirements
1	Decision whether a Validation Notice is required for the Activity	1.7
2	BHP authorisation and date the Validation Notice will take effect	Foreword
3	Program Matters and triggers relevant to the Validation Notice	1.7, 4.3 to 4.9
4	Project description including Activity location and timeframes for the duration of activities	2
5	Map illustrating the boundary of the action and area of direct disturbance;	Figure 1.2
6	Stakeholder engagement and public consultation	3
7	Review of baseline and contemporary data with a description of the direct and indirect impacts	4
8	Estimates of disturbance and residual impacts	2.1, 4.3 to 4.9, 5.1
9	Application of the mitigation hierarchy	4.3 to 4.9
10	Demonstration that the Program Matters Outcomes can be met through application of the mitigation hierarchy including details of offsets proposed	4 , 5 and 6
11	Outline the objective/s of the offset project/s, consistent with the scope of actions to offset impacts stated in the Program and APOP	5
12	Outline how the offset project/s will support the long-term persistence and viability of the relevant Program Matters	5
12	Commitment to measurable offset project milestones	5

1.4 Activity

The Activity is located approximately 22 km south of the Town of Port Hedland, in the Pilbara region of Western Australia (Figure 1.1). BHP has prepared this Validation Notice for the upgrades to Mooka Rail including:

- construction of five new rail sidings (low-speed track sections) totalling approximately 5 km in length
- re-alignments of an existing rail siding including tie ins
- construction of level crossings, access roads, derailers, signalling infrastructure and on-tracking points to facilitate the operational use of the rail infrastructure
- construction and relocation of supporting infrastructure and underground services

- geotechnical works
- decommissioning and closure.

The Activity includes the infrastructure and processes outlined in Section 2.

1.5 Activity Area and Existing Disturbance

The Activity Area, i.e. the area where the Activity will be undertaken, is located immediately adjacent to the Newman Main Rail Line (Figure 1.2a, b and c). The Activity Area encompasses an area of 176 ha, of which 144 ha (82 %) is existing disturbance, undertaken prior to the SEA implementation (i.e. 19 June 2017), and is considered excluded from the scope of this Validation Notice (BHP 2023). This existing disturbance was associated with the construction of the following historical projects:

- Newman Main Rail Line - located within Crown Lease I154279 which is held pursuant to *Iron Ore (Mount Newman) Agreement Act 1964* (WA) and commenced on 7 April 1967. Various historical clearing permits have been issued prior to the SEA implementation for the purposes of railway construction, maintenance and associated activities, including CPS 2629, 4112, 4711, 4473 and 7009/1.
- Quarry 1 - located within Crown Lease I150310 which is held pursuant to *Iron Ore (Mount Newman) Agreement Act 1964* (WA) and commenced on 1 November 1973.
- Mooka Rail Project – covered by Native Vegetation Clearing Purpose Permit (CPS 4711/1) issued under the *Environmental Protection Act 1986* (WA) in February 2012 and Mining Proposal L45/194 in 2012 and amended in 2013.

Located within the Activity Area, the indicative footprint covers an area of 109 ha, of which 86 ha (79%) is existing disturbance undertaken prior to the SEA implementation and is considered excluded from the scope of this Validation Notice.

1.6 Timeframes

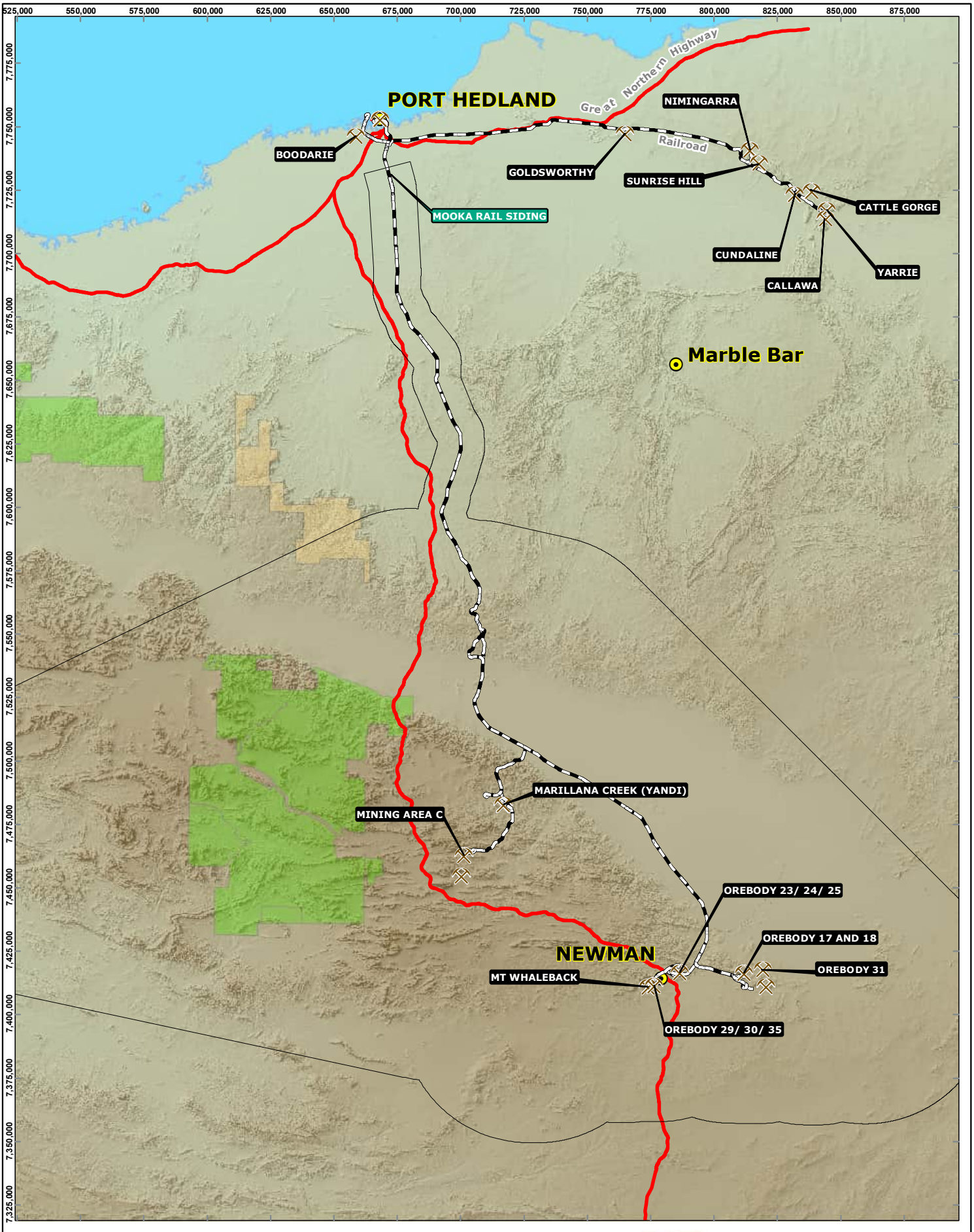
This Validation Notice takes effect 20 business days from the date the Validation Notice is effective from (see Document Version table). If the Notifiable Action has not substantially commenced within a period of five-years from that authorisation, BHP or a subsequent Approval Holder must not implement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

- The Department authorises commencement of the action by BHP or the Approval Holder or
- BHP issues a new Validation Notice for the action in accordance with this Program. This process extends the commencement timeframe for another five years.

The Activity, including construction and operation ais forecast to be completed within approximately 50 years from the date of this notice.

1.7 Decision for a Validation Notice

A Validation Notice is required for actions that are Notifiable, 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 Notifiable Action Triggers of for the Northern Quoll (*Dasyurus hallucatus*). The Validation Notice will demonstrate how the implementation and operation of the Activity will meet each of the Program Matter Outcomes for the Northern Quoll by undertaking an impact assessment, applying the mitigation hierarchy and assessing residual impacts. The Activity does not fulfil the Notifiable Action Triggers for the Greater Bilby (*Macrotis lagotis*), Pilbara Olive Python (*Liasis olivaceus barroni*), Grey Falcon (*Falco hypoleucos*) and Night Parrot (*Pezoporus occidentalis*), Ghost Bat (*Macroderma gigas*) and Pilbara Leaf Nosed Bat (*Rhinonicteris aurantia*), (Table 1.2). Sections 4.4 to 4.9 outline the findings in relation to these species to support this decision of a Notifiable Action Trigger not being met.



Pilbara Town
BHP Billiton Operation
BHP Rail
Strategic Assessment Area (SAA)

N

0 20 40 60 80 100
KILOMETRES

GDA 1994 MGA ZONE 50

BHP

MOOKA RAIL WORKS
REGIONAL LOCATION

PLANNING & STANDARDS - IRON ORE

SCALE @ A3:	1:1,950,000	FIGURE:	1.1
DATE:	15/02/2023	REQUESTOR:	
		NO:	A1136-01

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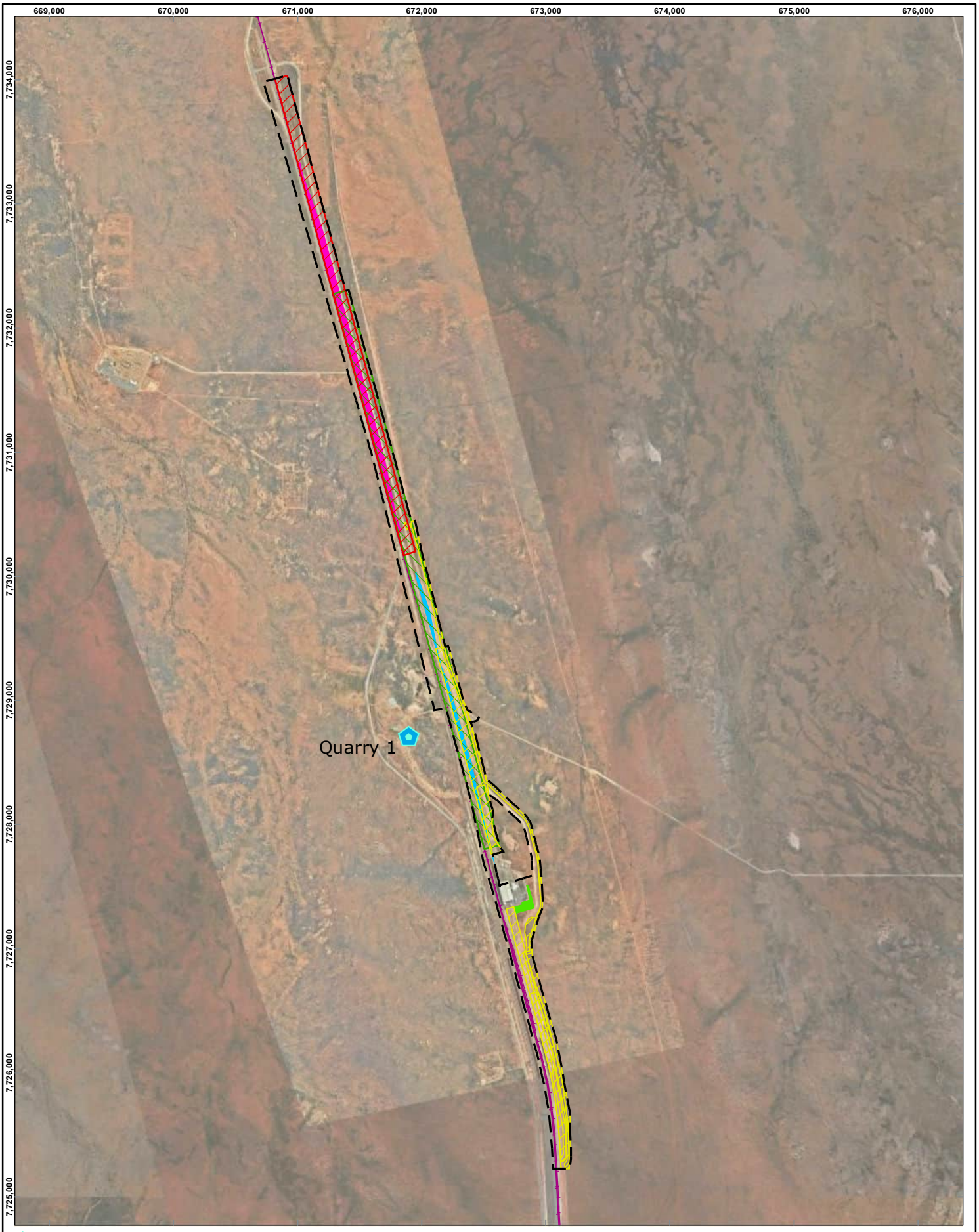

Quarry1
BHP Rail - Newman Mainline
Activity Area
Underground Services Corrirdor
Geotechnical works
Laydown, runaround Spur, borrow road and offices
Mooka Knock Road
Sidings
Storage and Parking

N

0 0.4 0.8 1.2 1.6 2
KILOMETRES

GDA 1994 MGA ZONE 50

BHP

MOOKA RAIL SIDING
ACTIVITY AREA AND INDICATIVE FOOTPRINT

PLANNING & STANDARDS - IRON ORE

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DATE: 20/03/2023
FIGURE: 1.2a
NO: A1136-02F

Document Path: Y:\Jobs\A1001_A1500\A1136\3Project\A1136_002_E_VN_ActivityArea_RevF.mxd

BHP Rail - Newman Mainline
Activity Area
Underground Services Corrirdor
Geotechnical works
Laydown, runaround Spur, borrow road and offices
Mooka Knock Road

N

0 0.15 0.3 0.45 0.6 0.75
KILOMETRES
GDA 1994 MGA ZONE 50

BHP

MOOKA RAIL SIDING
ACTIVITY AREA AND INDICATIVE FOOTPRINT
(Northern Section)

PLANNING & STANDARDS - IRON ORE

SCALE @ A3:	1:16,300	PREPARED:	R.Lofthouse	FIGURE:	1.2b
DATE:	6/06/2023	REQUESTOR:	A. Edgar	NO:	A1136-02_G1

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Quarry1
BHP Rail - Newman Mainline
Activity Area
Underground Services Corrirdor
Laydown, runaround Spur, borrow road and offices
Sidings
Storage and Parking

N

0 0.2 0.4 0.6 0.8 1
KILOMETRES

GDA 1994 MGA ZONE 50

BHP

MOOKA RAIL SIDING
ACTIVITY AREA AND INDICATIVE FOOTPRINT
(Southern Section)

PLANNING & STANDARDS - IRON ORE

SCALE @ A3:	1:21,000	PREPARED:	R.Lofthouse	FIGURE:	1.2c
DATE:	6/06/2023	REQUESTOR:	A. Edgar	NO:	A1136-02_G2

Document Path: Y:\Jobs\A1001_A1500\A1136\3Project\A1136_002_E_VN_ActivityArea_RevG2.mxd

Table 1.2: Notifiable Action Triggers for the Activity

Program Matter	Notifiable Action Trigger	Activity Area Program Matter data[1]	Applicable trigger?
Northern Quoll (*Dasyurus hallucatus*)	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is: Presence of Northern Quoll critical habitat and or supporting habitat **AND** Presence or sign/s of Northern Quoll colony or residing individuals	Northern Quoll naturally occurring critical habitats (i.e. denning and foraging habitats) such as Gorge/Gully or Breakaways and Ridges (BHP 2023) are not present within the Activity Area. Rockpiles/Boulders associated with existing disturbance at Quarry1, which support resident Northern Quoll, are a critical habitat (Biologic 2011, ecologia Environment (ecologia) 2008a, 2008b, 2009a, 2009b and 2010), and occur within the Activity Area but not within the Indicative Footprint. Granite Outcrops/Domes, located within 70 m of the Activity Area, are also a critical habitat which may be used by Northern Quoll (Biologic 2011). The Sand Plain habitat present within and adjacent to the Activity Area may be used for foraging or dispersal by Northern Quoll and is considered a supporting habitat (BHP 2023, Biologic 2011). Multiple records of Northern Quoll have been recorded historically within and adjacent to the Activity Area. A Northern Quoll Colony has been recorded at Quarry 1, located 50 to 100 m from the Activity Area and the existing rail line (Biologic 2011, ecologia 2008a, 2008b, 2009a, 2009b and 2010). Northern Quoll have also been recorded in Granite Outcrops/Domes located 100 m from the Activity Area.	Yes
	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is: Presence of Northern Quoll critical habitat and or supporting habitat; **AND**	Critical and supporting habitat - see above There are records of Northern Quoll transient, infrequent or dispersing individuals within the Activity Area – see above.	Yes

1 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.

Program Matter	Notifiable Action Trigger	Activity Area Program Matter data[1]	Applicable trigger?
	Presence or sign of Northern Quoll transient, infrequent or dispersing individual/s.		
Greater Bilby (*Macrotis lagotis*)	Within the Activity Area and or within a 500m 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	Sand Plain, a critical habitat for the Greater Bilby, has been recorded within the Activity Area and within a 500 m buffer of the Activity Area (BHP 2023, Spectrum 2023, Biologic 2013, Biologic 2011). Given the lack of records in the area to suggest the area is being used for denning or foraging, Sand Plain located within the Activity Area is considered a supporting habitat for the Greater Bilby (Spectrum 2023). There are no records of Greater Bilby within and adjacent to the Activity to suggest resident individuals occcur (Spectrum 2023, Biologic 2013 and 2011). A recent survey of the Activity Area confirmed no sign of Greater Bilby (Spectrum 2023). The nearest records are 6 km to the west and north-west of the Activity Area.	No
	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	Supporting habitat – see above There have been no records or sign of transient, infrequent or dispersing Greater Bilby within the Activity Area – see above.	No
Pilbara Olive Python (*Liasis olivaceus barroni*)	Within the Activity Area and or within a 500m buffer of the Activity boundary, there is: Presence of Pilbara Olive Python critical habitat and or supporting habitat AND	Pilbara Olive Python critical breeding/foraging habitats, such as Gorge/Gully, and Breakaways/Cliffs, are not present within the Activity Area or surrounds (BHP 2023, Biologic 2013 and 2011). The Granite Outcrops/Domes located 50 to 100 m outside of the Activity Area and rockpiles associated with existing disturbed areas within the Activity Area (but outside of the Indicative Footprint), potentially could support Pilbara	No

Program Matter	Notifiable Action Trigger	Activity Area Program Matter data[1]	Applicable trigger?
	Presence or sign/s of a Pilbara Olive Python population or residing individuals	Olive Python (Bush and Maryan, Biologic 2013 and 2011). Given the lack of records in the area, these are considered supporting habitat for the species (BHP 2023). Other supporting foraging habitat for Pilbara Olive Python, such as Major Drainage Line habitat and Minor Drainage Line habitat, have not been recorded within the Activity Area or within a 500 m buffer of the Activity Area (BHP 2023, Biologic 2013 and 2011). No records of Pilbara Olive Python exist within the Activity Area or within a 500 m buffer of the Activity Area (Biologic 2013 and 2011). This species was also not encountered during targeted searches for other species undertaken in the Activity Area in May 2023 (Spectrum 2023). Outside the Activity Area, the nearest record of the species is located approximately 20 km southwest (2012).	No
	Within the Activity Area there is: 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	Critical and supporting habitat - see above There have been no records or sign of transient, infrequent or dispersing individuals within the Activity Area -see above.	No
Grey Falcon (*Falco hypoleucos*)	Within the Activity Area and or within a 500m 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	Grey Falcon critical nesting habitats have not been recorded in the Activity Area or within a 500 m buffer of the Activity Area (Spectrum 2023, BHP 2023, Biologic 2013 and 2011). Spectrum (2023) identified that the Sand Plain habitat present within the Activity Area was suitable for foraging by Grey Falcon (i.e. supporting habitat) but the lack of trees and watercourses make it unsuitable as nesting or critical habitat for Grey Falcon. There have been no records or sign of resident Grey Falcon within the Activity Area or within a 500 m buffer of the Activity Area (Spectrum 2023, Biologic 2013 and 2011).	No

Program Matter	Notifiable Action Trigger	Activity Area Program Matter data[1]	Applicable trigger?
	Within the Activity Area there is: Presence of Grey Falcon critical habitat and or supporting habitat AND Presence or sign/s of Grey Falcon transient, infrequent or dispersing individual/s	Critical and supporting habitat - see above There have been no records or sign of transient, infrequent or dispersing Grey Falcon individuals within the Activity Area -see above.	No
Night Parrott (*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	Night Parrot critical breeding/foraging habitats or supporting habitats have not been recorded in the Activity Area or within a 500 m buffer of the Activity Area (Spectrum 2023, BHP 2023, Biologic 2013 and 2011). The Sand Plain habitat within the Activity Area was identified by Spectrum (2023) as not being conducive to the occurrence of Night Parrot and unsuitable for foraging and nesting. In addition, large and old growth *Triodia* hummocks were absent, thus resulting in an extremely low likelihood of supporting Night Parrot. There have been no records or sign of resident Night Parrot within the Activity Area or within a 500 m buffer of the Activity Area (Spectrum 2023, Biologic 2013 and 2011).	No
	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	Critical and supporting habitat - see above There have been no records or sign of transient, infrequent or dispersing Night Parrot individuals within the Activity Area or within a 500 m buffer of the Activity Area- see above.	No

Program Matter	Notifiable Action Trigger	Activity Area Program Matter data[1]	Applicable trigger?
Ghost Bat (*Macrodermas gigas*)	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	Ghost Bat critical roosting habitats, namely Gorge/Gully or Breakaway/Cliffs, are absent from the Activity Area and surrounds (BHP 2023, Biologic 2013 and 2011). There are no Ghost Bat roosts located within the Activity Area or within 500 m of the boundary. The Sand Plain habitat found within and adjacent to the Activity Area is unsuitable supporting habitat for Ghost Bat foraging as it lacks mature woodland typically associated with productive plains used by Ghost Bats in foraging an instead only shrublands and grasslands (BHP 2023, Spectrum 2023). There is no evidence of a Ghost Bat colony or residing individuals within the Activity Area and or within a 500m buffer of the Activity boundary (Biologic 2013 and 2011). Outside the Activity Area, the nearest record of the species is located approximately 16 km south (2015) and 18 km north-east (2015).	
	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	Critical and supporting habitats – see above There is no evidence of a Ghost Bat transient, infrequent or dispersing individual/s within the Activity Area and or within a 500m buffer of the Activity boundary – see above.	

Program Matter	Notifiable Action Trigger	Activity Area Program Matter data[1]	Applicable trigger?
Pilbara Leaf-Nosed Bat (*Rhinonicteris aurantia*)	Within the Activity Area and or within a 500m 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	No critical roosting or foraging habitats for Pilbara Leaf-Nosed Bat have been recorded within or adjacent to the Activity Area or within a 500 m buffer of the Activity Area (Biologic 2013 and 2011). There are no water natural permanent water features which may be used by Pilbara Leaf-nosed Bat to forage, within or adjacent to the Activity Area. The Sand Plain habitat is not suitable for foraging by Pilbara Leaf-nosed Bat (Biologic 2013 and 2011). There have been no records or sign of residing Pilbara Leaf Nosed Bat or colonies within the Activity Area (Biologic 2013and 2011). Outside the Activity Area, the nearest record of the species is located approximately 30 km southwest.	No
	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	Critical and supporting habitat - see above There have been no records or sign of transient, infrequent or dispersing Pilbara Leaf-nosed Bat individuals within the Activity Area -see above.	No

2 Project Disturbance and Description

The following subsections provide detail on the project disturbance and project components included in the Activity to which this Validation Notice pertains.

2.1 Proposed Disturbance

New disturbance of up to 23 ha will be required for the Activity (excluding 86 ha already previously disturbed), from the SAA allocation upper disturbance limit of 110,000 ha (limit as outlined within Section 2.4 of the Program and Condition 7 of Annexure 2 of the Approval). The disturbance allocated to the SAA upper disturbance limit to date including this Validation Notice (18,168 ha) is detailed in Table 2.1.

Table 2.1: SEA 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
OB30 Creek Diversion	SEA Exclusion	April 2021	40 (not included in SEA)	NA
OB31 Stage 1 Clearing	Not a Notifiable Action	December 2022	5	91,855
Mooka Rail Works	Validation Notice	June 2023	23	91,832

2.2 Project components

The proposed works will include construction of five new rail sidings[2] on the arrival and departure ends of Mooka Ore Car Repair Shop (MOCRS)[3] including realigning an existing rail siding (Figure 1.2a, b and c). The works will optimise the layout of the MOCRS, by improving efficiency and improve rail supply chain capacity. The location of the proposed rail upgrades was constrained by the location of the existing MOCRS (built in 2013) which required the upgrades.

[2] 'Sidings' are small stretches of rail track that are used to enable trains to pass through on the same line.

[3] The 'Mooka Ore Car Repair Shop' was constructed in 2013 and handles the BHP's rail system's ore car maintenance requirements.

2.2.1 New Sidings

Construction of five new sidings including tie-ins[4] are required (see Figure 1.2a):

- Sidings 3, 5 and 6 – all constructed on the eastern side of the existing track
- Siding 4 – will be constructed on the western side of the existing track
- Siding 7 – will be constructed on the western side of the existing track running in to and out of the workshop. Siding 7 will require modifications to the existing track whereby two turnouts[5] will be removed at the port end of the siding and replaced with plain line track. A new turnout will be installed at the mine end of the siding to connect the siding to the existing track coming out of the workshop.

2.2.2 Re-alignments

Siding 1 is an existing siding that will require realignment to provide direct access into the MOCRS. This will require the construction of a new turnout and the removal of an existing turnout. The construction of the proposed track configuration will require the removal of approximately 110 m of existing track. Siding 1 will provide additional storage capacity within the workshop limits for ore cars awaiting maintenance. As part of construction of Siding 7, the existing track will also require re-alignment, which will allow appropriate track transition between the Sidings and the existing track. The re-alignment will slightly skew the existing track to the east by approximately 300 m in length.

2.2.3 Supporting Infrastructure

Derailers, signalling infrastructure and on-tracking points will need to be installed or modified to accommodate the new configuration for MOCRS. New level crossings will be installed and some existing level crossings will need to upgraded or relocated to provide sufficient road access to effectively operate within the yard. Existing access roads may require realignment and new access roads may require construction. A knock road[6] will be constructed north of MOCRS on the east side of mainline (Figure 1.2a, band c).

Other supporting infrastructure will include:

- a laydown area for the temporary storage of equipment and supplies
- a run around spur[7]
- storage and parking

Some existing services may require relocation, modification or removal including water, power, communications lighting and drainage infrastructure. Water for construction purposes will be sourced from existing on-site potable and recycled water supplies.

2.2.4 Geotechnical Works

The following geotechnical works will require disturbance within the Activity Area:

- cone penetration testing (CPT) to 9 m and test pit excavation to depth 3 m or prior refusal at spacing 300 – 450 m between chainage 24.1 and 26.9 km extending a maximum of 100 m east of the mainline

[4] 'Tie-ins' are the point at which the siding connects back up with the existing rail line. (i.e. a dual track section links back to a single-track section).

[5] A 'turnout' is a rail switch that enables trains to move from one track to another.

[6] A Knock-road' is a siding or section of track where 'knocks' are undertaken to confirm the integrity of a train before it departs.

[7] The Run-around Spur enables trains to get back on to the main line without experiencing the delays associated with the shunting moves from the workshop.

- test pits will be required near the MOCRS (approx. 3000 sqm) at chainage 26.85 km with test pit width and length to allow safe access & egress should personnel be required to access (expected 5 m in width if battered both sides).

2.3 Closure and Decommissioning

The demolition of infrastructure and rehabilitation of the MOCRS will be undertaken in accordance with the Mooka Siding and Ore Car Repair Shop L45/194 Closure Plan and its revisions.

The Native Vegetation Clearing Permit CPS 7009/3 granted under Part of V the EP Act also includes conditions relating to decommissioning and rehabilitation which covers the Activity Area.

All topsoil and vegetation will be removed ahead of all operations and being stockpiled for later respreading or immediately respread as rehabilitation progresses.

The conditions of L45/194 require BHP to yield up the land clean, free from rubbish, remove all buildings or structures from site or demolished and buried to the satisfaction of Department of Mines, Industry Regulation and Safety.

3 Stakeholder Engagement

BHP's commitment to community engagement is articulated in the company'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 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 Department of Climate Change, Energy, the Environment and Water (DCCEEW) (formerly the Department of Agriculture, Water and the Environment (DAWE)), 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 has made the draft Validation Notice publicly available on its website for a minimum period of 28 days. The public consultation period commenced on the 19 April, 2023. Registered stakeholders were notified by email outlining when the public consultation timing commenced and how to make a submission.

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	BHP response and outcome
DCCEEW (previously DAWE)	1 June 2023	Email: Streamlining of payments of offsets with the PEOF	Impact Reconciliation Processes are embedded into the revised BHP Assurance and Offset Plan and activity-specific requirements are outlined in Section 5. No requirement for IRP.
	8 May 2023	DCCEEW provided key points of feedback arising from the review of the validation notice (EPBC Ref: SA017)(See Appendix 1).	BHP has included responses to DCCEEW feedback where relevant in this Validation Notice and in Appendix 1.
	19 April 2023	Email: Notification of public comment period commencing for draft Mooka Rail Works Validation Notice.	NA
	13 Feb 2023	Email: Requesting the DCCEEW Offset Rates for the Greater Bilby and Northern Quoll critical and supporting habitat for Financial Contributions to the Pilbara Environmental Offset Fund.	BHP has applied the Offset rates provided by the DCCEEW in the Section 5 Offset Proposal.
	17 August 2022 to the 19 August 2022	BHP and the DCCEEW Assurance Plan and Offset Plan workshop • Discussion on offset pathways available and examples of where each type of pathway may be applicable.	BHP has proposed contributions to the Pilbara Environmental Offset Fund (PEOF) as the most suitable offset pathway for the Mook Rail Works Activity – see Section 5.
	1 July 2022	• Mooka Rail Sidings project overview and Validation Notice, including: o Key MNES findings and preliminary assessment of impacts o Key management to include development of a Northern Quoll Management Plan and recommencement of monitoring program o The size of the Activity Area has been established to minimise clearing required o Requirements for additional survey for small impact areas, where Northern Quoll populations are known to occur and have been previously monitored • Stakeholder Consultation process.	BHP has included all Northern Quoll management and monitoring activities discussed into Section 4.3

Stakeholder	Date	Topics/issues discussed	BHP response and outcome
Department of Biodiversity, Conservation and Attractions (DBCA)	19 April 2023	Email: Notification of public comment period commencing for draft Mooka Rail Works Validation Notice.	• NA
	7 November 2022	• DBCA's Regional Northern Quoll monitoring program was discussed including: o how BHP could get involved and contribute monitoring data o monitoring methods used o how BHP can compare their data with that of DBCA.	• BHP will: o consider providing data from reference sites to DBCA o duplicate DBCA monitoring methods o compare data with the data released by DBCA in their Annual Report.
Kariyarra People Country	19 April 2023	Email: Notification of public comment period commencing for draft Mooka Rail Works Validation Notice.	NA
	29 Mar 2023	Email: BHP provided summary information for Mooka Rail Siding Validation Notice.	None required.
	17 Apr 2023	Meeting: Advised of Validation Notice public consult period commencement.	Invitation extended to Perth office in May to gain clarification if required.
Pilbara Environmental Offsets Fund	1 June 2023	Email: Streamlining of PEOF payments and provision of spatial data	No requirement for IRP. Spatial data to be provided to PEOF within recommended formats as per EPA's (2021) guidance *Instructions for preparing impact reconciliation procedures and impact reconciliation reports*
	19 April 2023	Email: Notification of public comment period commencing for draft Mooka Rail Works Validation Notice.	NA
	20 Mar 2023	Email: Process for providing contributions to the Fund for BHP SEA Validation Notices	Impact Reconciliation Processes are embedded into the revised BHP Assurance and Offset Plan and Activity specific requirements are outlined in Section 5. No requirement for IRP.

4 Validation Process

4.1 Guidance

The following Commonwealth guidance was considered in the preparation of this Validation Notice include:

- DCCEEW (2023). *Recovery Plan for the Greater Bilby* (*Macrotis lagotis*)
- Department of the Environment (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 following EPBC Act guidance (DotE 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 by 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 DotE (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

A number of fauna surveys which encompass or are adjacent to the Mooka Rail Siding have shown the existence of a population of Northern Quoll at Quarry 1 (Figure 4.1a, b and c). These surveys include:

- ecologia (2008a) *RGP5 Fauna Survey: Quarry 1*
- ecologia (2008b) *Rapid Growth Project 5: Targeted Northern Quoll Survey, Quarry 1, 2, 4 and East Turner River*
- ecologia (2009a). *RGP5 Fauna Survey: Northern Quoll Wider Area Survey*
- ecologia (2009b) *RGP5 Northern Quoll Monitoring*
- ecologia (2010) *RGP5 Northern Quoll Monitoring 2010. Quarries 1, 2 & 3*

- Biologic (2011) *Mooka Level One Targeted Fauna Survey*
- Biologic (2013) *Mainline Rail Expansion Vertebrate Fauna Survey*.

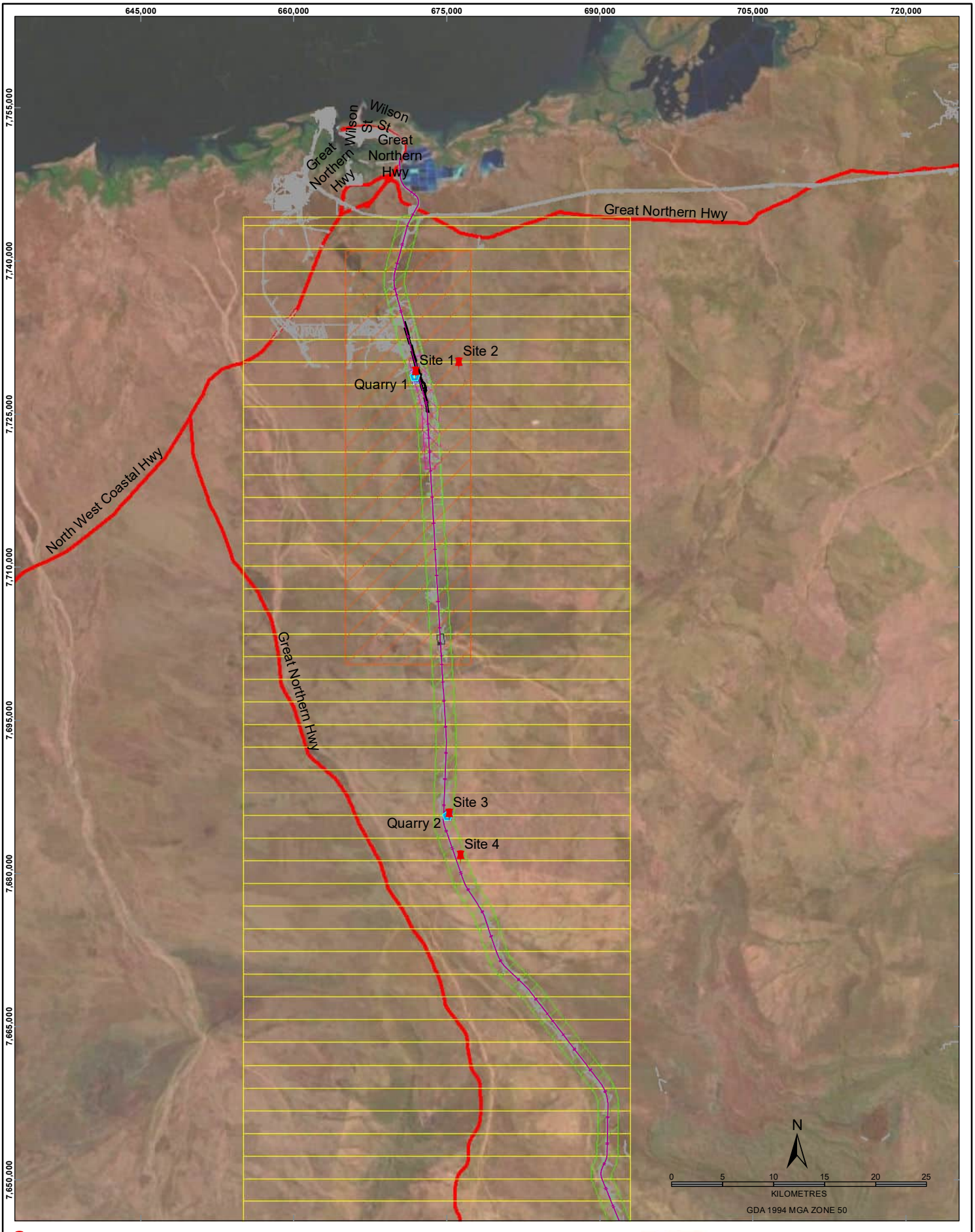
Of the two more recent fauna surveys, the Biologic (2011) targeted survey comprised two reconnaissance surveys to assess habitats and undertake targeted searches for fauna. Sampling for fauna in each habitat identified included 20 minute bird census, 20 minutes of targeted searching for conservation significant species (mammals and reptiles). Two camera traps (Bushnell Trophy Cameras) were established at twelve locations within the Survey Area. Acoustic surveys for bats were conducted at four locations over four consecutive nights during the survey.

The Mainline Rail Vertebrate Survey undertaken by Biologic (2013) consisted of a one season terrestrial vertebrate fauna survey and literature and database review of an area that extends 1 km either side of the BHPBIO's mainline rail between Yandi Junction and Port Hedland, a distance of approximately 270 km (Figure 4.1). This survey included habitat assessment, spotlighting, opportunistic searches, Sand Plain transects and Quoll trapping in the Activity Area and immediate surrounds. Sand Plain transects included three people walking on each side of the rail track, spaced approx. 300-350 m apart searching for Greater Bilby burrows.

In consultation with the DCCEEW, BHP has reinstated Northern Quoll monitoring to support the older data sets listed above and the preparation of this Validation Notice. Monitoring for Northern Quoll adjacent to the Activity Area recommenced in 2022 (Spectrum Ecology 2022) (Figure 4.1). Monitoring was undertaken for 35 days at 4 sites, including Quarry 1, utilising five baited long term motion cameras at each site. Active searches were also conducted for any secondary evidence of Northern Quolls, and included searching for tracks, remains, or scats.

At the request of DCCEEW (see Appendix 1), BHP engaged Spectrum Consulting to undertake a survey of the Activity Area and assess the suitability of the Sand Plain habitat for usage by Greater Bilby, Grey Falcon and Night Parrot (fauna known to utilise this habitat elsewhere in the Pilbara) and record any evidence or secondary sign of the species. Foot traverses were undertaken within the Activity Area following DBCA (2017) guidance, specifically targeting areas of previously undisturbed vegetation, to record any sign evidence of the Bilby (tracks, scats, diggings and/or burrows), Grey Falcon and Night Parrot. A total distance of approximately 14 km was traversed (Spectrum 2023).

No additional surveys are considered required as the Activity Area is located adjacent to the Mount Newman Railway and encompasses large areas of previous disturbance (e.g. access tracks) or degraded areas of vegetation unlikely to support the Program Matters, the exception being, the Northern Quoll which is known to reside adjacent to the Activity Area and is targeted for ongoing monitoring.



- Quoll Monitoring sites (Spectrum 2022)
- Quarry1
- BHP Rail - Newman Mainline
- Activity Area
- Indicative Footprint
- Existing Disturbed Areas
- Biologic Environmental Survey (2013)
- Biologic Environmental Survey (2010)
- Ecologia Environment (2010)
- Ecologia Environment (2008a)
- Ecologia Environment (2008b)
- Ecologia Environment (2008c)
- Ecologia Environment (2009a)
- Ecologia Environment (2009b)

BHP

MOOKA RAIL SIDING
VERTEBRATE FAUNA SURVEYS

PLANNING & STANDARDS - IRON ORE

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DATE:	8/06/2023	REQUESTOR:	A. Edgar	NO:	A1136-03F

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BHP Rail - Newman Mainline
Activity Area
Indicative Footprint
Existing Disturbed Areas
Biologic Environmental Survey (2013)
Biologic Environmental Survey (2010)
Ecologia Environment (2008c)
Ecologia Environment (2009a)

BHP

MOOKA RAIL SIDING
VERTEBRATE FAUNA SURVEYS
(Northern Section)
PLANNING & STANDARDS - IRON ORE

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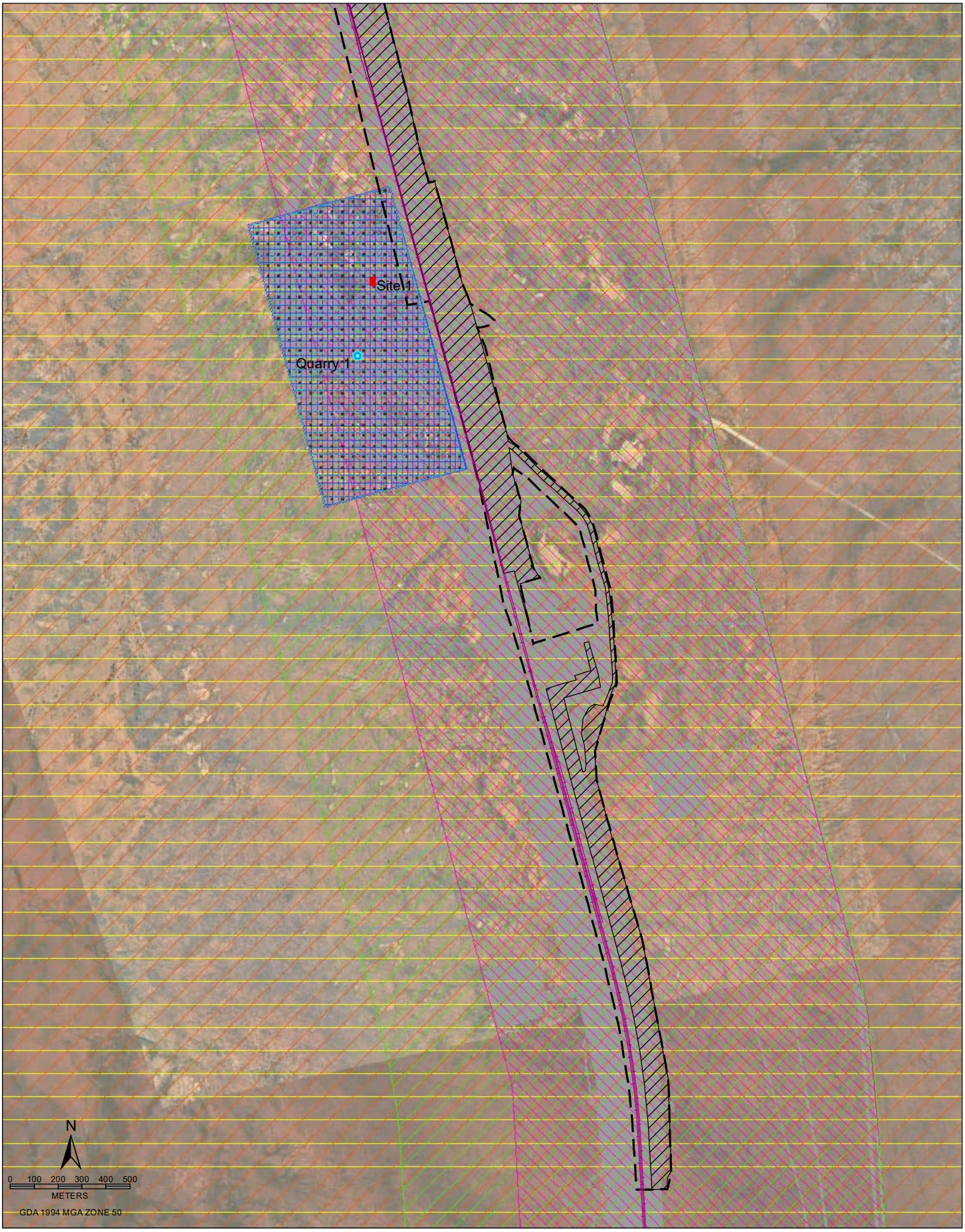

Quoll Monitoring sites (Spectrum 2022)
Quarry1
BHP Rail - Newman Mainline
Activity Area
Indicative Footprint
Existing Disturbed Areas

Biologic Environmental Survey (2013)
Biologic Environmental Survey (2010)
Ecologia Environment (2010)
Ecologia Environment (2008)
Ecologia Environment (2009)
Ecologia Environment (2008)
Ecologia Environment (2008)
Ecologia Environment (2009)

BHP

MOOKA RAIL SIDING
VERTEBRATE FAUNA SURVEYS
(Southern Section)
PLANNING & STANDARDS - IRON ORE

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4.3 Northern Quoll

The following sections provide background information to support the presence of a Northern Quoll Notifiable Action Trigger. Impacts to the Northern Quoll are discussed and the mitigation hierarchy applied to illustrate that the Program Matter Objective and Program Matter Outcomes for this species will be met.

4.3.1 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 2023a). 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).

Northern Quolls mostly favour 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 2023a). 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). Figure 4.2 illustrates the regional records and distribution of Northern Quoll.

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 usually change dens every night, with females each using up to 55 dens (Oakwood 2008). Males generally die off after their first breeding season.

4.3.2 Regional Habitat and Baseline Habitat Modelling Data

The Impact Assessment Report, Eco Logical (2015) modelled the 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 and b).

The cumulative impact assessment model predicts a potential impact of 504 ha to H4 for the Northern Quoll as a result of the Full Conceptual Development Scenario (Table 4.1). The Activity Area under consideration in this Validation Notice comprises entirely of the highest potential value habitat (H4). Figure 4.3 shows the Northern Quoll modelled habitat and regional records within the Activity Area for this Notice.

Table 4.1: Northern Quoll Modelled Habitats within the SAA and Activity Area (uncleared areas)

Habitat Description	Modelled Habitat Area Pilbara Bioregion	Modelled Habitat in Strategic Assessment Area	Modelled Habitat within the Full Development Scenario	Modelled within Activity Area^	Modelled within the IF
H4	1,552,321	64,228	504	32	23
H3	4,497,928	221,103	3,104	0	0

Habitat Description	Modelled Habitat Area Pilbara Bioregion	Modelled Habitat in Strategic Assessment Area	Modelled Habitat within the Full Development Scenario	Modelled within Activity Area^	Modelled within the IF
H2	3,822,101	678,966	3,104	0	0
H1	7,920,267	4,993,780	273	0	0

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 4.2 and Figure 4.4. Of these land systems, five land systems provide a significant quantity (> 10,000 ha) of preferred Northern Quoll foraging and breeding habitat (Breakaway/Cliff habitats) through Hills/Ridges/Breakaways/Cliffs adjacent to the Activity Area.

4.3.3 Local Habitat

Survey coverage for the Northern Quoll is presented in Figure 4.5. Mapped habitat and records for the Northern Quoll are shown in Figure 4.6a, b and c. The Activity Area falls within the current distribution of the Northern Quoll, whereby the species or species habitat is likely to occur (Figure 4.2).

Traditional critical denning habitats for Northern Quoll such as Gorge/Gully and Breakaway/Cliffs do not occur within the Activity Area or surrounds. The rock piles associated with existing disturbance at Quarry 1 fall within the Activity Area but not within the IF and are on the opposite side of the existing rail which separates Quarry 1 from the Activity. These have supported Northern Quoll historically and can be considered critical habitat as the semi-permanent water source present and extensive denning habitat provide ideal conditions to support a Northern Quoll population (Spectrum 2022).

The Granite Outcrops/Domes habitat, which is located 70 m outside of the Activity Area and from the closest proposed infrastructure, and 70 m from existing infrastructure, represents critical breeding and foraging habitat for the Northern Quoll as per the APOP (BHP 2023) definitions (Table 4.3). Records of Northern Quoll have only been recorded in this habitat outside of the Activity Area (see Section 4.3.4) (Figure 4.6a, b and c)(Spectrum 2022).

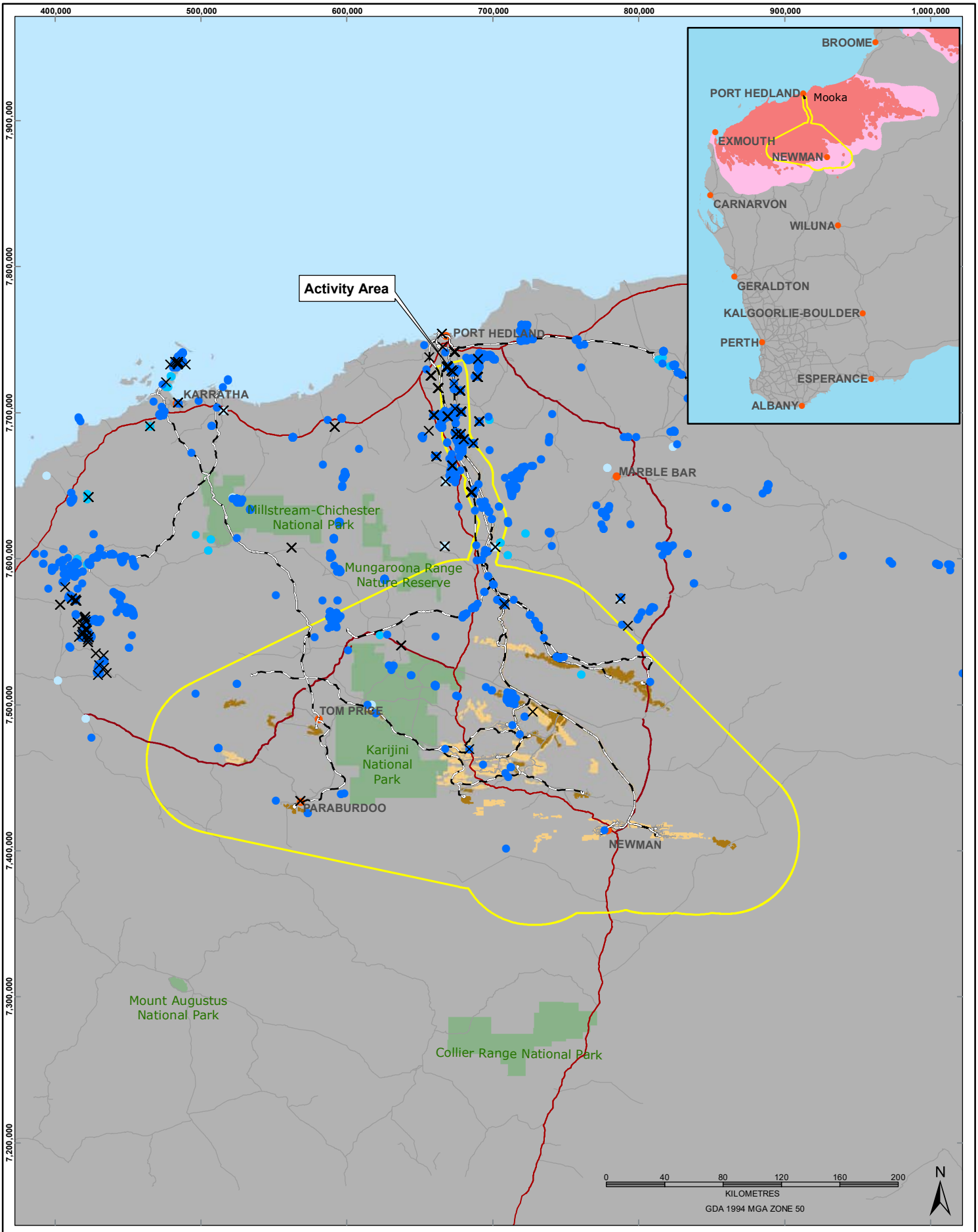
Sand Plain habitat is the only habitat present within the Activity Area (Figure 4.6a, b and c). This represents supporting dispersal habitat for the species at this location (Spectrum 2022). Foraging or dispersal habitat is recognised to be any land comprising predominantly native vegetation in the immediate area (i.e. within 1 km) of shelter habitat (DotE 2023a).

Table 4.2: Northern Quoll Surveyed Habitats in the Activity Area

Habitat Description	Existing Disturbance		Uncleared Areas	
	Within the Activity Area (ha)[1]	Within the Indicative Footprint (ha)[2]	Within the Activity Area (ha)[1]	Within the Indicative Footprint (ha)[2]
Supporting Foraging/Dispersal habitat				
Sand Plain	144	86	32	23

[1] Total Activity Area is 176 ha.

[2] **Indicative footprint is 109 ha**



- Records After 2005
- Records between 1980 - 2004
- Records Prior 1979
- Records Missing Date
- Town
- Rail Centreline
- Major Road
- Minor/Regional Road
- Activity Area
- Strategic Assessment Area
- BHP LOA Mine Plan disturbance footprint
- Third Party disturbance footprint
- Species or species habitat likely to occur
- Species or species habitat may occur

BHP

MOOKA RAIL SIDING

NORTHERN QUOLL REGIONAL RECORDS AND DISTRIBUTION

PLANNING & STANDARDS - IRON ORE

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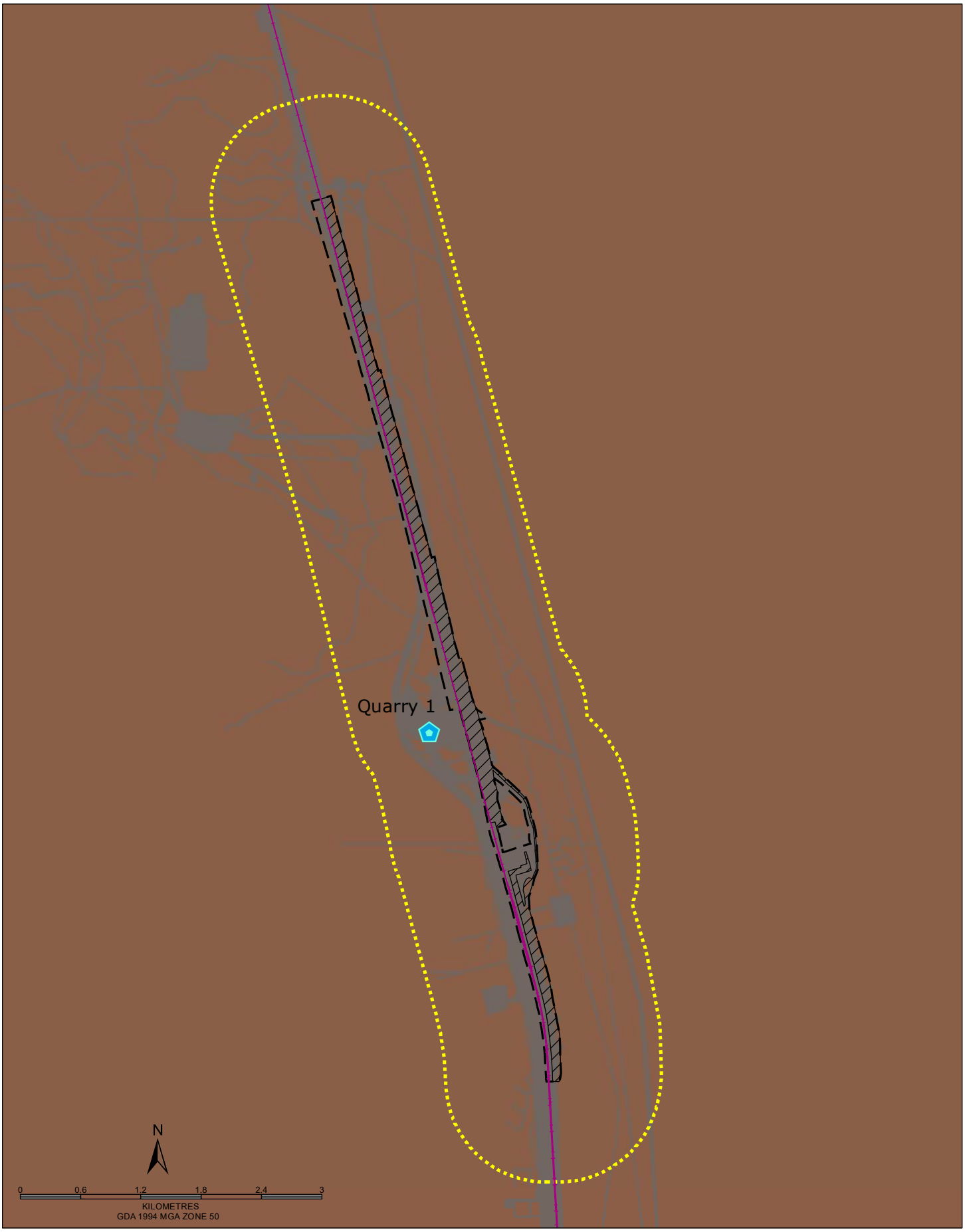

Quarry1
BHP Rail - Newman Mainline
Indicative Footprint
Activity Area
Activity Area 1km Buffer
Existing Disturbed Area

Northern Quoll Potential Habitat Modelling

1 - Lowest Potential Habitat Value
2
3
4 - Highest Potential Habitat Value

BHP

MOOKA RAIL SIDING
NORTHERN QUOLL MODELLED HABITAT

PLANNING & STANDARDS - IRON ORE

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DATE: 21/03/2023
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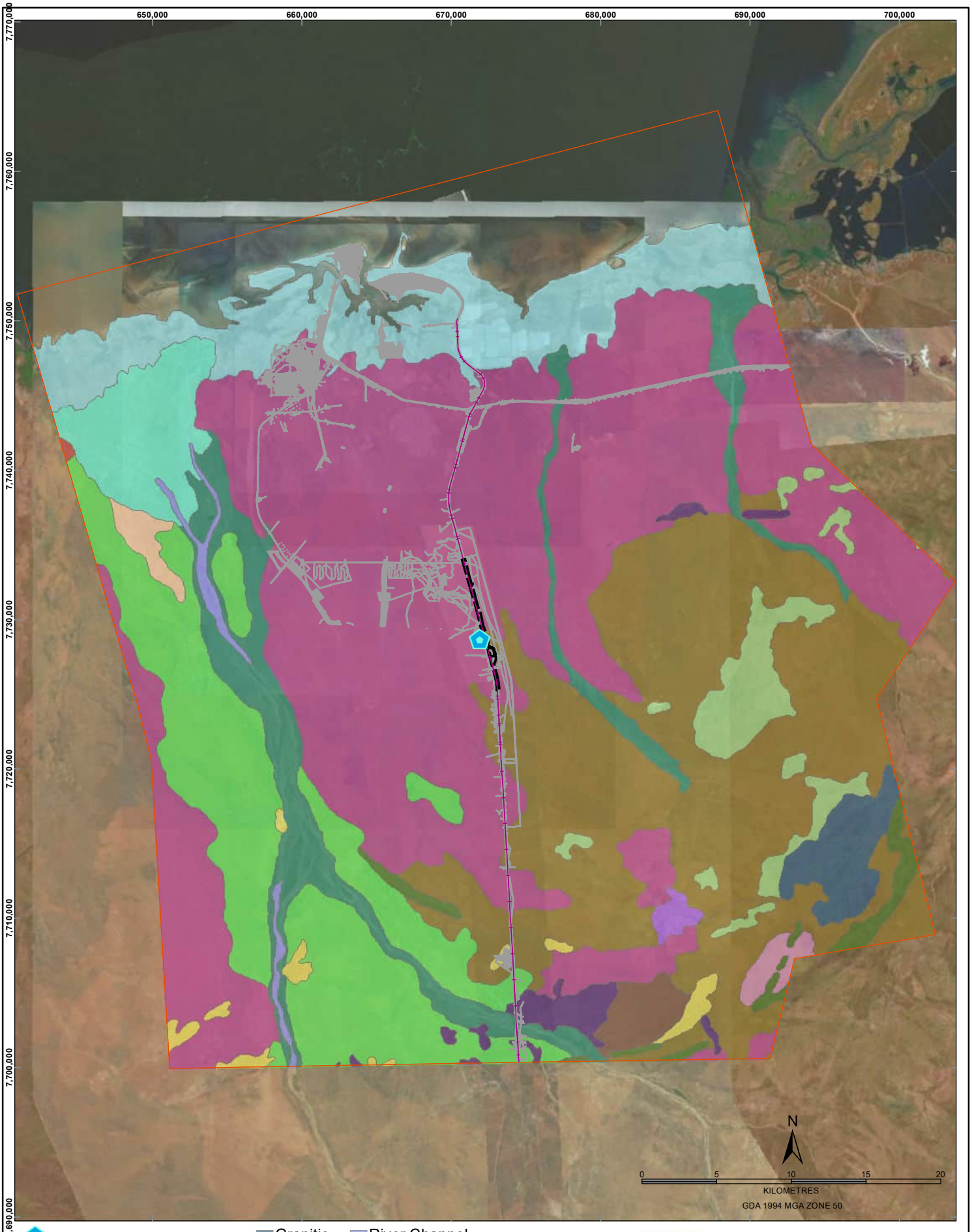
Table 4.3: Pilbara Land Systems within 25 km of the Activity Area

Land System	Description	Habitats	Area (ha)
Boolaloo	Granite hills, domes and tor fields and sandy plains with shrubby spinifex grasslands.	Hills/Ridges/Breakaways	7,154
Calcrete	Low calcrete platforms and plains supporting shrubby hard spinifex grasslands.	Stony Plain	700
Cheerawarra	Sandy coastal plains and saline clay plains supporting soft and hard spinifex grasslands and minor tussock grasslands	Coastal Sand Plain, Drainage Area/Flood Plain	86
Granitic	Rugged granitic hills supporting shrubby hard and soft spinifex grasslands	Hilll Crest/Hill Slope Breakaway/Cliff	4,087
Horseflat	Gilgaied clay plains supporting tussock grasslands and minor grassy snakewood shrublands.	Stony Plain, Hardpan Plain,	1,103
Littoral	Bare coastal mudflats with mangroves on seaward fringes, samphire flats, sandy islands, coastal dunes and beaches	Beaches, Coastal Dunes, Mangroves and Tidal Flats	22,150
Macroy	Stony plains and occasional tor fields based on granite supporting hard and soft spinifex grasslands	Stony Plain	56,099
Mallina	Sandy surfaced alluvial plains supporting soft spinifex (and occasionally hard spinifex) grasslands.	Sand Plain	31,496
Paradise	Alluvial plains supporting soft spinifex grasslands and tussock grasslands.	Drainage Area/Flood Plain, Clay Pan	1,204
River	Active flood plains, major rivers and banks supporting grassy eucalypt woodlands, tussock grasslands and soft spinifex grasslands.	Major/Minor Drainage Lines Drainage Area/Flood Plain	1,391
Robe	Low limonite mesas and buttes supporting soft spinifex (and occasionally hard spinifex) grasslands.	Hills/Ridges/Breakaways	2,702
Ruth	Hills and ridges of volcanic and other rocks supporting hard spinifex (occasionally soft spinifex) grasslands	Hills/Ridges/Breakaways	1,953
Satirist	Stony plains and low rises supporting hard spinifex grasslands, and gilgai plains supporting tussock grasslands	Stony Plains	2,110
Talga	Hills and ridges of greenstone and chert and stony plains supporting hard and soft spinifex grasslands	Hills/Ridges/Breakaways, Stony Plains	2,607
Uaroo	Broad sandy plains supporting shrubby hard and soft spinifex grasslands	Sand Plain	102,143
Yamerina	Flood plains and deltaic deposits supporting tussock grasslands, grassy woodlands and minor halophytic low shrublands	Drainage Area/Floodplain	7,821
Total			**261,903**



Quarry1
BHP Rail - Newman Mainline
Activity Area
25km radius of Activity Area
Boolaloo
Calcrete
Cheerawarra
Granitic
Horseflat
Littoral
Macroy
Mallina
Paradise
River
River Channel
Robe
Ruth
Satirist
Talga
Uaroo
Yamerina

BHP

MOOKA RAIL SIDING
REGIONAL LAND SYSTEMS

PLANNING & STANDARDS - IRON ORE

SCALE @ A3: 1:330,000
DATE: 27/03/2023
FIGURE: 4.4
NO: A1136-06D

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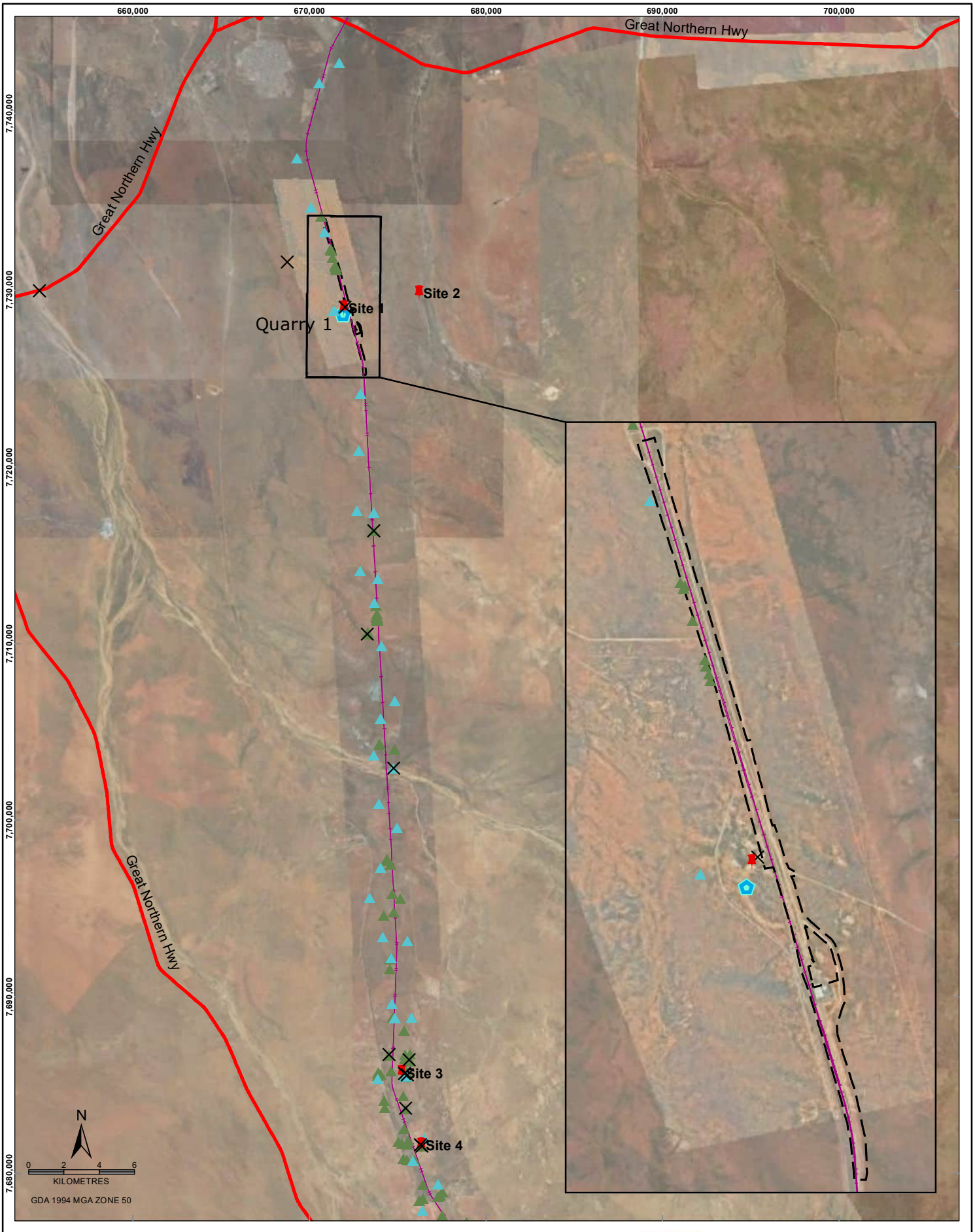


- Camera Trap Locations
- Quoll Monitoring Sites
- General Habitat
- Northern Quoll Habitat Assessment
- Quarry1
- BHP Rail - Newman Mainline
- Activity Area

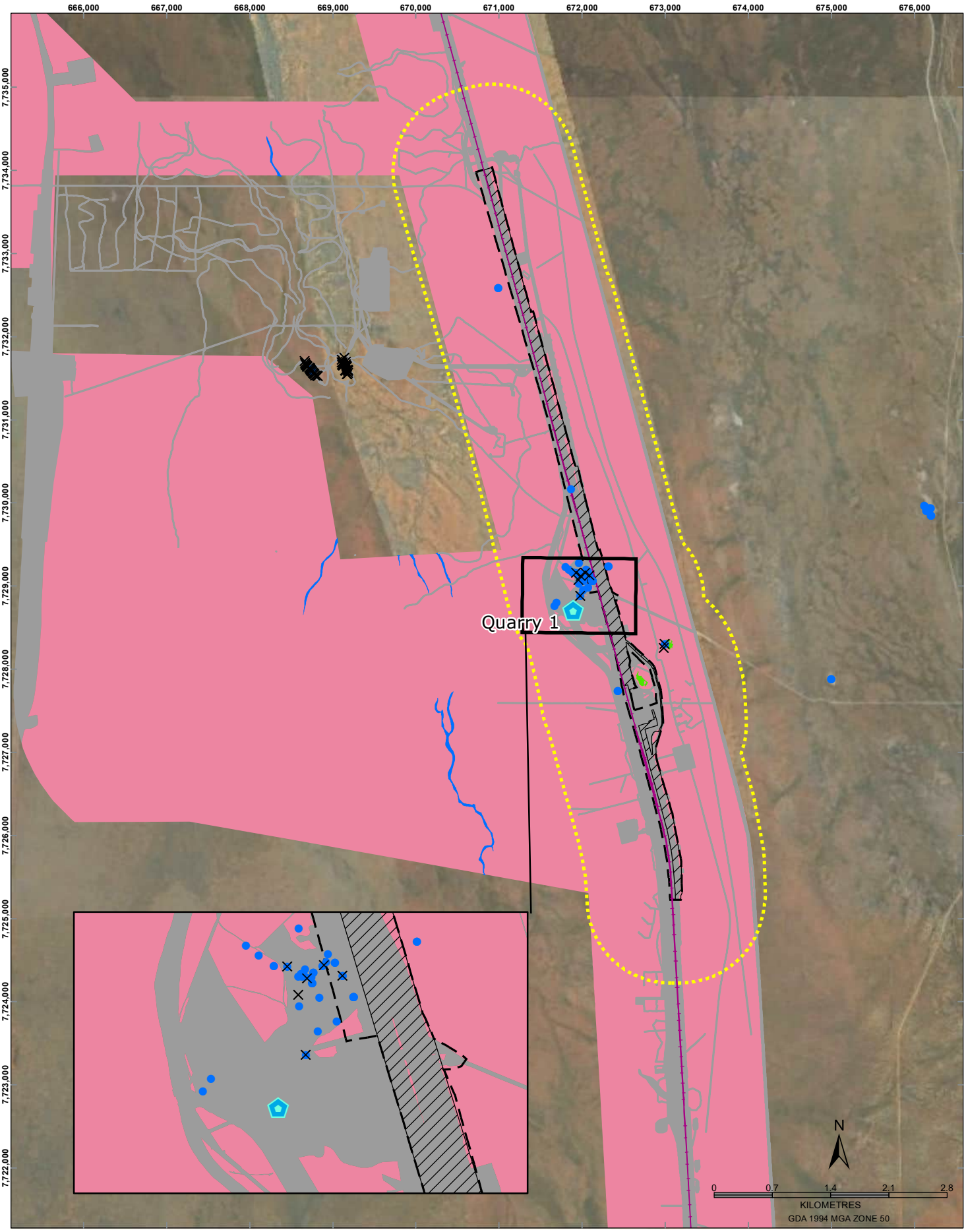
BHP

MOOKA RAIL SIDING
NORTHERN QUOLL SAMPLE SITES

PLANNING & STANDARDS - IRON ORE

SCALE @ A3:	1:280,000	FIGURE:	4.5
DATE:	23/03/2023	NO:	A1136-038D

Document Path: Y:\Jobs\A1001_A1500\A1136\3Project\A1136_038_E_VN_NQSitesNQ_RevD.mxd



Northern Quoll records

- Records After 2005
- Records Missing Date
- Quarry1
- BHP Rail - Newman Mainline
- Activity Area
- Indicative Footprint
- Activity Area 1km Buffer

Habitat Type

- Major Drainage Line
- Granite Outcrops/ Domes
- Sand Plain
- Cleared/ Disturbed

BHP

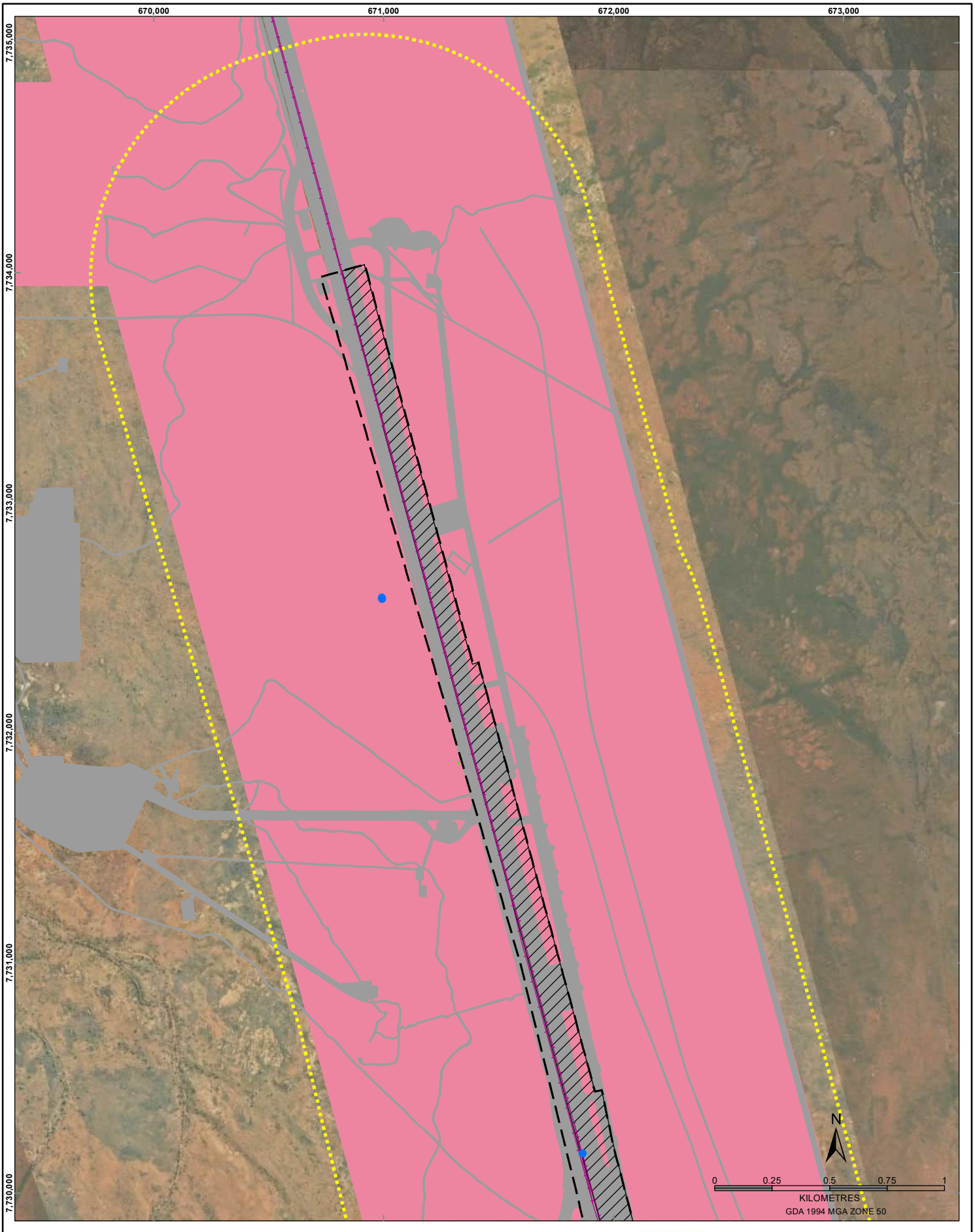
MOOKA RAIL SIDING

NORTHERN QUOLL MAPPED HABITATS AND RECORDS

PLANNING & STANDARDS - IRON ORE

SCALE @ A3:	1:60,000	FIGURE:	4.6a
DATE:	20/03/2023	NO:	A1136-08F

Document Path: Y:\Jobs\A1001_A1500\A1136\3Project\A1136_008_E_VN_NorthQuollHabitats_RevF.mxd



Northern Quoll records

- Records After 2005
- BHP Rail - Newman Mainline
- Activity Area
- Indicative Footprint
- Activity Area 1km Buffer

Habitat Type

- Granite Outcrops/ Domes
- Sand Plain
- Cleared/ Disturbed

BHP

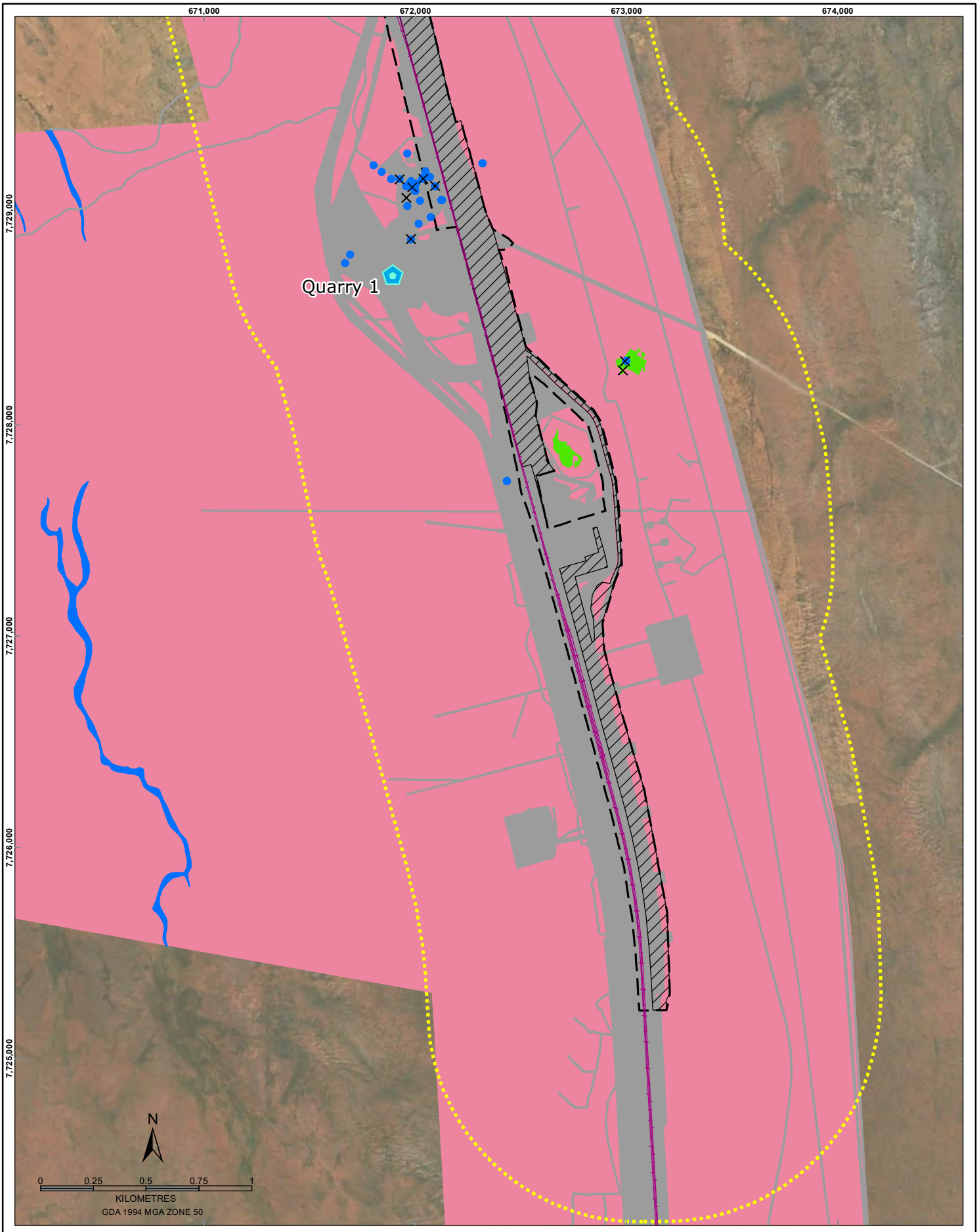
MOOKA RAIL SIDING

NORTHERN QUOLL MAPPED HABITATS AND RECORDS (Northern Section)

PLANNING & STANDARDS - IRON ORE

SCALE @ A3:	1:21,500	PREPARED:	P. Gant	FIGURE:	4.6b
DATE:	6/06/2023	REQUESTOR:	A. Edgar	NO:	A1136-08-G1

Document Path: Y:\Jobs\A1001_A1500\A1136\3Project\A1136_008_E_VN_NorthQuollHabitats_RevG1.mxd



Northern Quoll records

- Records After 2005
- Records Missing Date
- Quarry1
- BHP Rail - Newman Mainline
- Activity Area
- Indicative Footprint
- Activity Area 1km Buffer

Habitat Type

- Major Drainage Line
- Granite Outcrops/ Domes
- Sand Plain
- Cleared/ Disturbed

BHP

MOOKA RAIL SIDING

NORTHERN QUOLL MAPPED HABITATS AND RECORDS (Southern Section)

PLANNING & STANDARDS - IRON ORE

SCALE @ A3:	1:23,500	PREPARED:	P. Gant	FIGURE:	4.6C
DATE:	6/06/2023	REQUESTOR:	A. Edgar	NO:	A1136-08-G2

Document Path: Y:\Jobs\A1001_A1500\A1136\3Project\A1136_008_E_VN_NorthQuollHabitats_RevG2.mxd

4.3.4 Northern Quoll Records

Numerous records (captures, observations and scats) exist adjacent to the Activity Area and some of these are located within the Activity Area (Figure 4.6a, b and c, Table 4.4). Records are concentrated in the western side of the rail at Quarry 1, a disused quarry located 50 to 100 m from the existing rail and the proposed Activity. (Biologic 2011, 2013, ecologia 2008a, 2008b, ecologia 2009a, ecologia 2009b and ecologia 2010), but also in Granite Dome habitat on the eastern side of the rail. The ecologia (2010) survey captured one female with a slightly enlarged pouch at Quarry 1, suggesting breeding is occurring in the area. No individuals were recorded in recent monitoring undertaken at Quarry 1 (Spectrum Ecology 2022). Northern Quolls were recorded in the adjacent Granite Dome habitat. BHP will continue to monitor Northern Quolls in the area.

Table 4.4: Northern Quoll Survey Records relevant to Mooka Rail Siding

Survey	Direct record (observation/capture)
ecologia (2008a)	Two males and two females trapped at Quarry 1, scats and tracks
ecologia (2008b)	Scats and tracks
ecologia (2009a)	Three females and two males recorded from three granite outcrop sites of seven trapping sites located 3-20 km from Quarry 1.
ecologia (2009b)	One female captured at Quarry 1, scats and tracks at Quarry 1
ecologia (2010)	Four quolls at Quarry 1, one of which was a female with a slightly enlarged pouch
Biologic (2011)	Scats and tracks at Quarry 1 and Granite Dome
Biologic (2013)	< 5 records adjacent to Mooka Rail Siding
Spectrum Ecology (2022)	No records at Quarry 1. Seven records < 4 km east of Quarry1.

The Activity Area does support an important population for the long-term survival of the Northern Quoll as defined by DotE (2016.) as the population present is:

> *'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'*

The Northern Quoll population recorded in and adjacent to Mooka is considered a high-density population as defined by DoE (2016) i.e. surveys have recorded multiple individuals across multiple traps on the site (ecologia 2008a, 2009a and 2010, Spectrum Ecology 2022).

4.3.5 Impact Assessment

The potential direct and indirect impacts to the Northern Quoll from the Activity are outlined below.

Habitat Loss and Fragmentation

No critical denning habitat for the Northern Quoll, i.e. Granite Domes, or rockpiles associated with Quarry 1, will be cleared by the Activity as all are located outside of the Indicative Footprint. The Granite Domes are also located outside of the Activity Area. The Activity will not result in infrastructure being located any closer to critical denning habitat.

Approximately 23 ha of supporting dispersal habitat (Sand Plain) will be disturbed within the Activity Area. Given this habitat is situated adjacent to existing disturbance or infrastructure, and the habitat is not critical, habitat loss, the potential impact on the Northern Quoll is considered low.

Habitat fragmentation from clearing and the construction of linear infrastructure can cause barriers to dispersal and gene flow in the Northern Quoll. Given the proposed clearing is adjacent to existing disturbed areas and an existing rail line, impacts from habitat fragmentation arising from the proposed Activity are considered negligible.

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 (Sand Plain) and adjacent Northern Quoll critical habitat within 500 m of the Activity Area (DotE 2023a). The Rockpiles associated with existing disturbance at Quarry 1 and Granite Domes within 50 m of the Activity Area are highly likely to already be infested with weeds. 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.

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. The Granite Domes/Outcrops present outside of the Activity Area but within 70 m of the Activity Area boundary, and Rockpiles associated with existing disturbance at Quarry 1, are likely to have been exposed to dust already from historic clearing in the area. As these habitats sit elevated in the landscape, any dust emissions are likely to be quickly blown away. Degradation of Sand Plain habitat value due to dust emissions is considered unlikely due to the minimal area to be cleared and the BHP standard practices to minimise dust emissions which will be implemented during clearing.

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. As the Newman Rail has been in existence since the 1970s, the construction of additional rail sidings in parallel to this will not create any additional changes to surface water drainage to what already exists. Furthermore, implementation of BHP standard practices for surface water management shall minimise any changes to surface water drainage.

Feral Predators and Cane Toads

Feral predators may compete with the Northern Quoll for food or may prey on it (DotE 2023a, DotE 2015). Cats have been recorded in the local area (Biologic 2013) so without proper management, quoll numbers could decline due to cat predation. Given standard feral cat management will be implemented, the potential impact of feral cats on the Northern Quoll is considered low.

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. Cane Toads may also be introduced to areas via vehicles or equipment (DPaW 2015). It is considered unlikely that such introduction at Mooka will occur as travel to and from high-risk areas such as the Kimberley are not forseen. Potential impacts from Cane Toads are therefore considered low.

Vehicle Collisions

Train, vehicle and machinery movements have the potential to result in fauna strike, causing injury or mortality. Northern Quoll are vulnerable to such strikes due to being a ground dwelling species and the risk of interaction with vehicles is greatest where rail or roads occur in proximity to suitable habitat for the species. The potential impact of vehicle/train collisions from the Activity is considered low. There will be no increased frequency of train movements

from MOCRS or additional trains moving to put Northern Quoll at additional risk of collisions with trains or vehicles than already has existed in the area since 2013 when the original MOCRS was built. The new sidings main aim is to make the shunting process at Mooka more efficient and safer.

Noise and Vibration

Vehicle, machinery and train movements at Mooka have the potential to disturb Northern Quoll from surrounding den sites. It is likely the adjacent population is already adapted to some level of noise and vibration form the existing rail track and MOCRS. As there will be no increased frequency of train movements from MOCRS or additional trains moving to put Northern Quoll at risk of additional noise and vibration, the risk of disturbance to Northern Quoll is considered low.

4.3.6 Mitigation Hierarchy

Avoid

The location of the proposed rail upgrades was constrained by the location of the existing MOCRS (built in 2013) which required the upgrades, so no other location could be considered in the design phase. Project planning has designed the indicative footprint to avoid the granite domes utilised by Northern Quoll and rockpiles associated with existing disturbance at Quarry 1.

Minimise

Potential impacts to the Northern Quoll from fire are to be minimised through hot work management procedures and assigning designated smoking areas.

Additional management measures will be applied following the guidance of DBCA in the event the presence of Cane Toads are detected in the local region.

Potential for predation on Northern Quoll or increased competition for prey items by feral cats is to be minimised if deemed required (e.g. sightings are recorded) through standard feral cat management practices such as appropriate waste disposal, reporting opportunistic sightings of feral cats and cage trapping in accordance with the *Animal Welfare Act* 2002 (AW Act).

4.3.7 Residual Impact

Residual impacts for the Northern Quoll include:

- 23 ha of direct disturbance to supporting dispersal habitat (Sand Plain).

4.3.8 Review of Program Matter Outcomes

Following the impact assessment (Section 4.4.5 and 4.5.7) and application of the mitigation hierarchy (Section 4.5.6) a review of the Activity against the Program Matter Outcomes was undertaken. Table 4.5 presents a review and identifies which Program Matter Outcomes are relevant for the Activity and considers further management.

Table 4.5: Review of Program Matter Outcomes (Northern Quoll)

Program Matter Outcome	Applicable Triggers	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 and or within a 500 m buffer of the Activity boundary, there is:	Critical denning habitat (granite domes) adjacent to the Activity Area will not be impacted by the Activity. Rockpiles associated with existing disturbance at Quarry 1 will also not be cleared as these are located outside of the Indicative

Program Matter Outcome	Applicable Triggers	Assessment
AND No loss (or maintain) Northern Quoll colony(s) as a result of program activities.	Presence of Northern Quoll critical habitat and or supporting habitat **AND** Presence or sign/s of Northern Quoll colony or residing individuals	Footprint and on the other side of the rail line form the proposed Activity. No loss of Northern Quoll populations will result from the activities as project planning has designed the indicative footprint to avoid the granite domes and rockpiles associated with existing disturbance at Quarry 1 which may be/are utilised by resident Northern Quoll. Monitoring of the local Northern Quoll population will continue to ensure the population persists.
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	As above.

4.3.9 Monitor

Monitoring for Northern Quoll within the vicinity of the Activity Area re-commenced in September 2022. Monitoring methods will utilise a combination of motion cameras and active searches to detect Northern Quoll. The face-down motion cameras will allow the recording of the dorsal pattern of Northern Quoll, thereby allowing the identification of individuals via their unique spot pattern. This will then enable an assessment of the Northern Quoll population density in the local region (as per the Northern Quoll referral guideline; DotE 2016). The proposed monitoring methods are detailed in Table 4.6, with the monitoring to be implemented detailed in Table 4.7. Proposed monitoring sites are shown on Figure 4.5.

Table 4.6: Northern Quoll Monitoring Methods

Method	Monitoring parameters
Motion camera footage (5 cameras at 4 sites)	Presence (sighting of individuals) Number of individuals (using spot pattern identification)
Active searches (at 4 camera sites)	Presence (sighting of individuals) Secondary signs (Footprints, scats)

4.3.10 Summary

BHP considers the Activity will meet the Program Matter Outcomes for the Northern Quoll. The mitigation hierarchy has limited the loss of supporting dispersal habitat to 23 ha in the Activity Area by focussing on already cleared areas. Monitoring in the areas adjacent to Mooka will continue to be monitored for ongoing presence of Northern Quoll to demonstrate the Program Matter Outcome is being achieved. The loss of 23 ha of supporting dispersal habitat will be offset (see Section 5.0).

Table 4.7: Northern Quoll Monitoring

Program Matter Objective	To support the long-term persistence and viability of the Northern Quoll within the SAA.		
Notifiable Trigger	Within the Activity Area and or within a 500 m buffer of the Activity boundary, there is: • Presence of Northern Quoll critical habitat and or supporting habitat **AND** • Presence or sign/s of Northern Quoll colony or residing individuals		
Program Matter Outcome	• Minimise loss of critical and supporting habitats of the Northern Quoll as a result of Program Activities within the SAA **AND** • No loss (or maintain) Northern Quoll colony(s) as a result of program activities		
Monitoring Target[8]	**Monitoring and Frequency**	**Contingency Response**	**Reporting**
Presence or evidence of Northern Quoll at one or more sites over two years of monitoring	Biannual monitoring at Sites 1, Site 1C, Site 2 and Site 2C. Monitoring to be undertaken twice a year. Techniques will include motion camera footage and targeted searches. Figure 4.5 shows the current monitoring locations.	Response actions to monitoring targets not being met may include, but are not limited to: • investigate potential cause of monitoring targets not being met; • consult with experts • compare changes to results from other Northern Quoll monitoring programs • increase the frequency of the monitoring • expand the monitoring program to other sites.	SEA AER Five-yearly Review

[8] The baseline for Northern Quoll maybe considered as 7 records of Northern Quoll within 4 km of the Activity Area recorded over 35 days of camera and targeted surveying in 2022.

4.4 Greater Bilby

The following sections provide background information to support the absence of a Greater Bilby Notifiable Action Trigger and, therefore, no requirement to undertake the Validation Process (i.e. impact assessment and application of the mitigation hierarchy). Despite no records being present, as supporting habitat is present, impacts to the Greater Bilby are discussed to illustrate that the Program Matter Objective for this species will be met.

4.4.1 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 2023, DotE 2023b) (see Figure 4.7). 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 (TSSC 2023a, 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 2023).

The Greater Bilby is a highly mobile species with home ranges varying between 1 km^2 to 3 km^2 (DCCEEW 2023). 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 (DotE 2023b). 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 (DPaW 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 (DPaW 2017, Southgate *et al*. 2018).

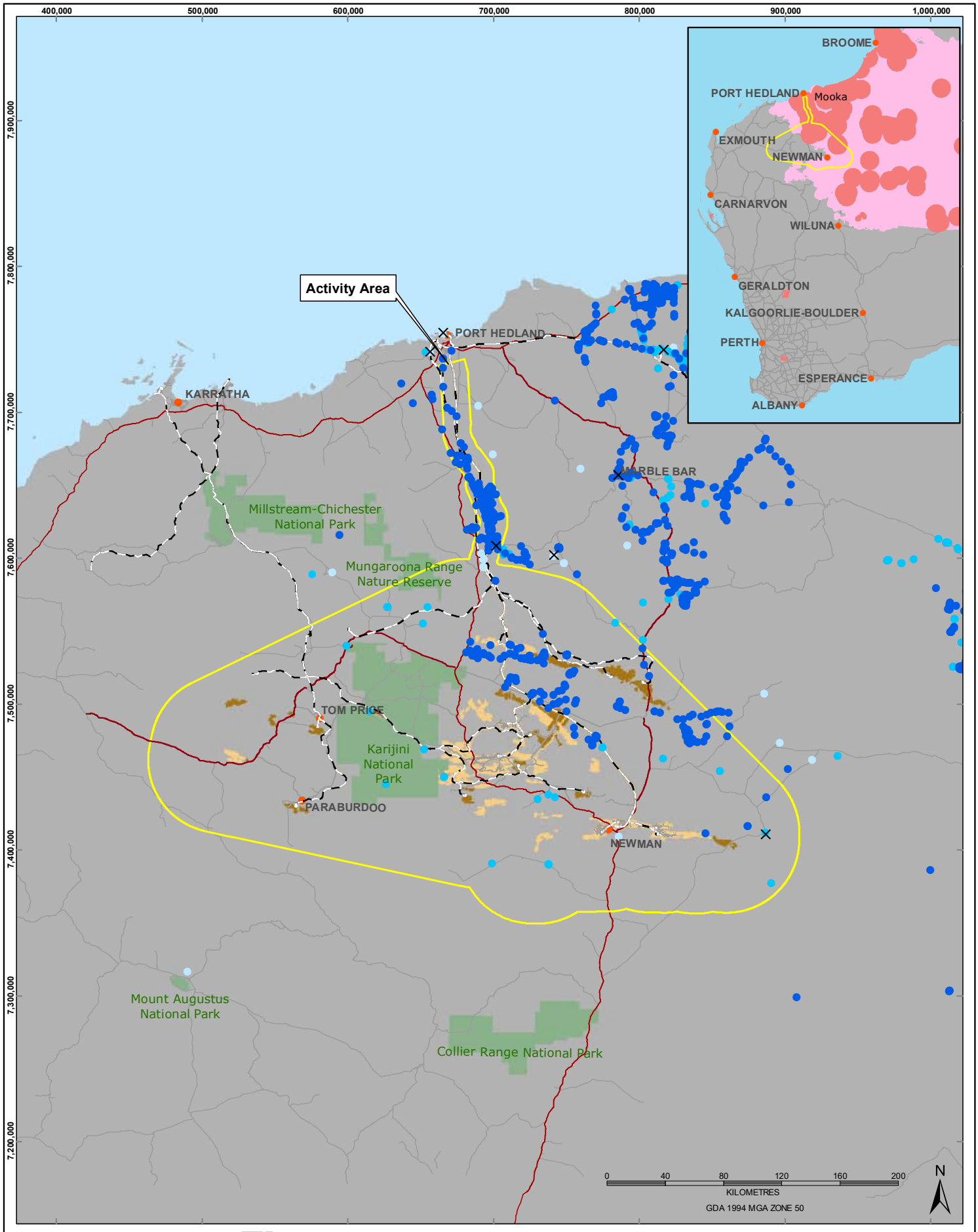
4.4.2 Local Habitat

Greater Bilby survey sites are show in Figure 4.8. The Activity Area was also recently surveyed by Spectrum (2023) (Appendix 1).The Activity Area falls within the current distribution of the Greater Bilby, whereby the species or species habitat is likely to occur.

Sand Plain habitat, a preferred and critical habitat type for Greater Bilby, is present within and adjacent to the Activity Area (Figure 4.9; Table 4.8). Habitat assessments of the Activity Area (Spectrum 2023, Biologic 2013; ecologia 2008) suggest the habitat is suitable for foraging and burrow construction by the Greater Bilby, although no records of Greater Bilby have been recorded. With the lack of usage by the Greater Bilby and the proximity to the rail the Sand Plain habitat within the Activity Area is considered supporting habitat for the species.

4.4.3 Greater Bilby Records

No records of Greater Bilby exist within or adjacent to the Activity Area (Figure 4.9). The Spectrum (2023) survey confirmed no evidence of Greater Bilby (individuals, burrows or diggings) within the Indicative Footprint. Outside the Activity Area, the nearest records of the species are located 6 km north and north-west (DBCA 2010, 2014) of the Activity Area. The absence of records of Greater Bilby in or adjacent to the Activity Area indicate there is no important population, as per the DoE (2013) definition, present.



Greater Bilby records

- Records After 2005
- Records between 1980 - 2004
- Records Prior 1979
- Records Missing Date
- Town
- Rail Centreline
- Major Road
- Minor/Regional Road

- Activity Area
- Strategic Assessment Area
- BHP LOA Mine Plan disturbance footprint
- Third Party disturbance footprint
- Species or species habitat likely to occur
- Species or species habitat may occur

BHP

MOOKA RAIL SIDING

GREATER BILBY REGIONAL RECORDS AND DISTRIBUTION

PLANNING & STANDARDS - IRON ORE

SCALE @ A3:	1:3,400,000	FIGURE:	4.7
DATE:	10/02/2023	NO:	A1136-20

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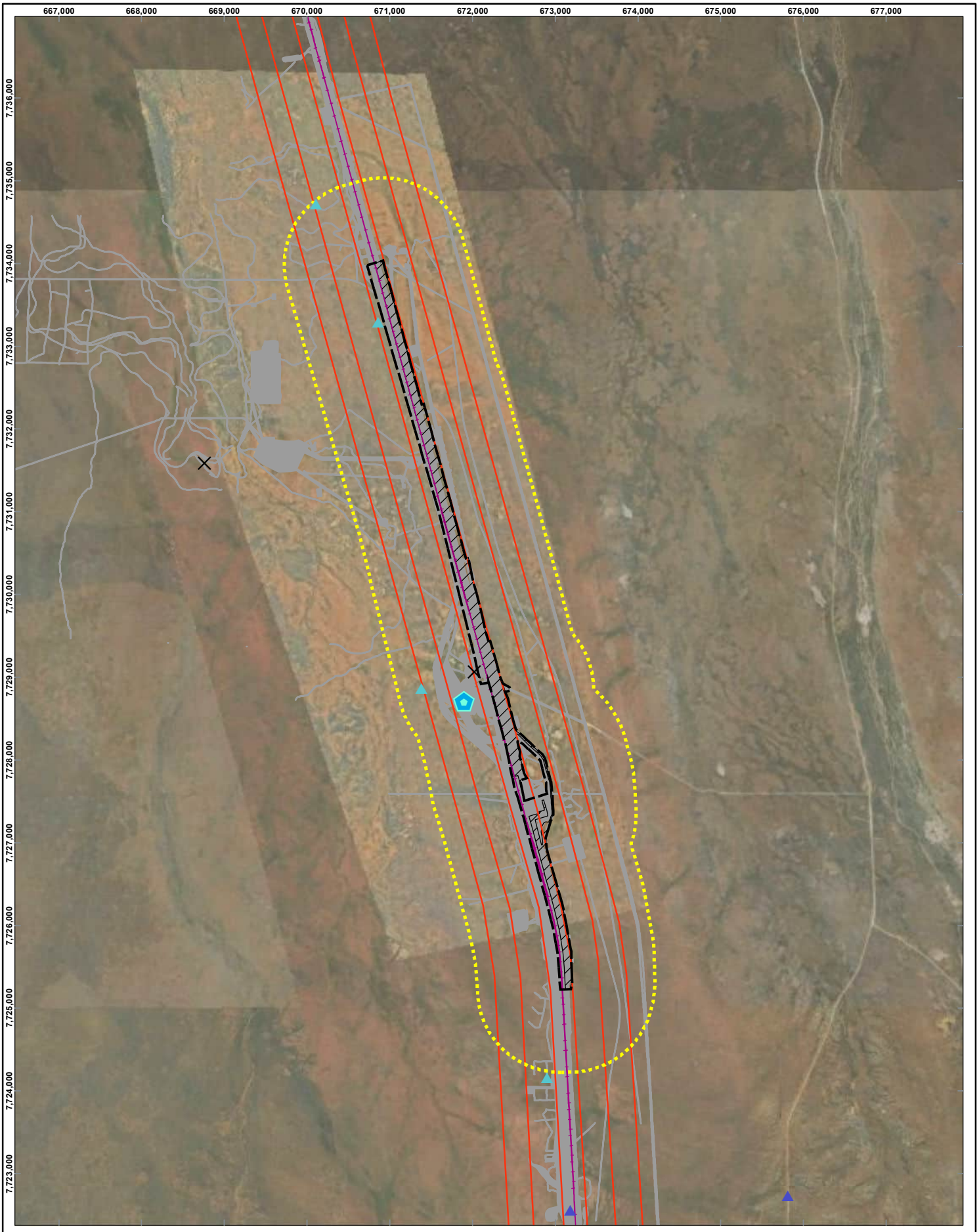


Quarry1
General Habitat Assessment
Opportunisitc Survey Sites
BHP rail
Bilby transects
Activity Area 1km Buffer
Activity Area
Indicative Footprint

N

0 0.5 1 1.5 2
KILOMETRES
GDA 1994 MGA ZONE 50

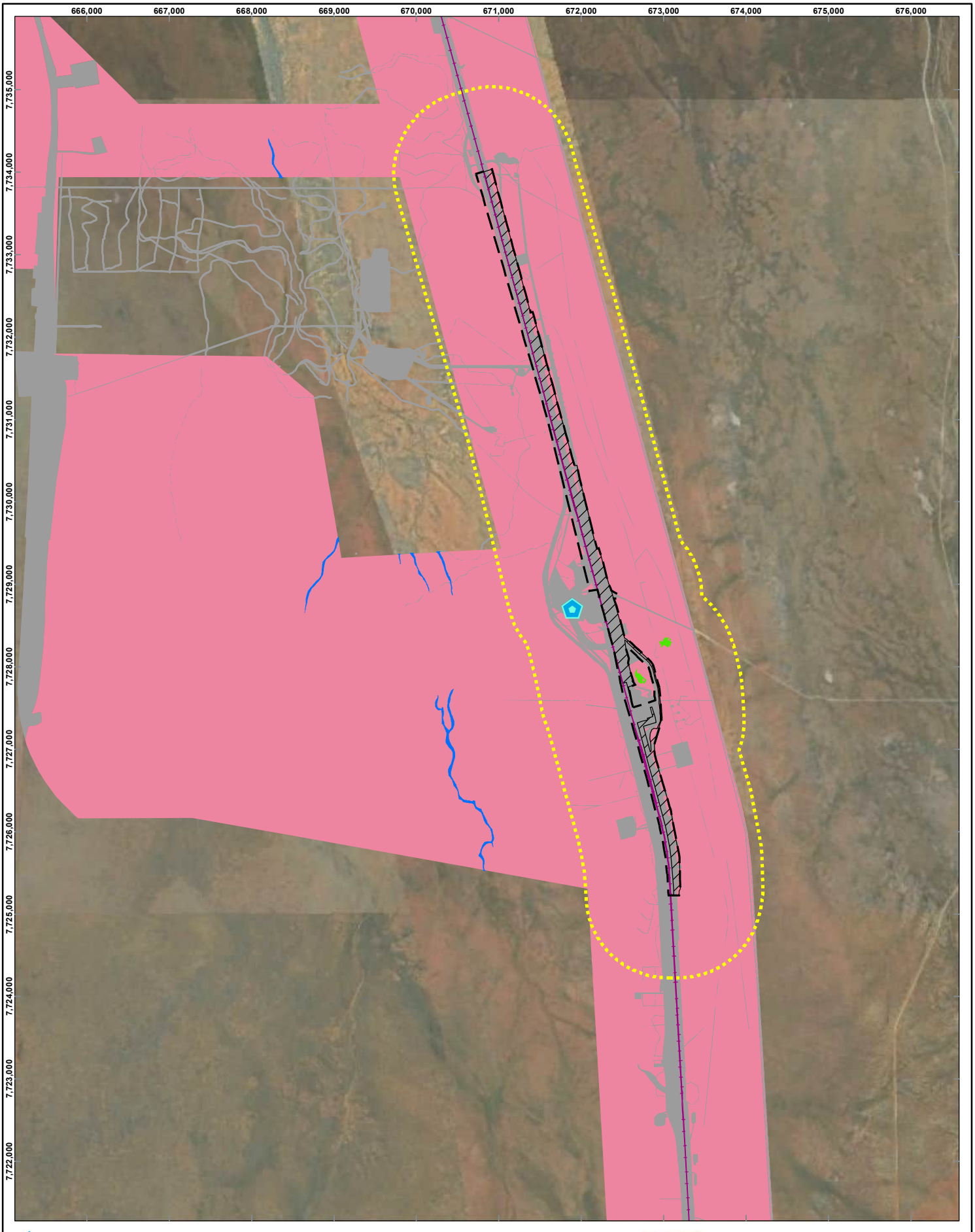
BHP

MOOKA RAIL SIDING
GREATER BILBY SAMPLE SITES

PLANNING & STANDARDS - IRON ORE

SCALE @ A3: 1:60,000
DATE: 23/03/2023
FIGURE: 4.8
NO: A1136/023H

Document Path: Y:\Jobs\A1001_A1500\A1136\3Project\A1136_023_E_VN_GBilbyHabitats_RevH.mxd



Quarry1
BHP Rail - Newman Mainline
Activity Area
Activity Area 1km Buffer
Indicative Footprint

Habitat Type
Major Drainage Line
Granite Outcrops/ Domes
Sand Plain
Cleared/ Disturbed

N

0 0.5 1 1.5 2
KILOMETRES

GDA 1994 MGA ZONE 50

BHP

MOOKA RAIL SIDING
GREATER BILBY, PILBARA OLIVE PYTHON, GREY FALCON AND NIGHT PARROT MAPPED HABITATS AND RECORDS
PLANNING & STANDARDS - IRON ORE

SCALE @ A3: 1:60,000
DATE: 20/03/2023
FIGURE: 4.9
NO: **A1136/023G**

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Table 4.8: Greater Bilby Habitat Assessment in the Activity Area

Habitat Description	Existing Disturbance		Uncleared Areas	
	Within the Activity Area (ha)[1]	Within the Indicative Footprint (ha)[2]	Within the Activity Area (ha)[1]	Within the Indicative Footprint (ha)[2]
Supporting Habitat				
Sand Plain	144	86	32	23

[1] Total Activity Area is 176 ha.
[2] Indicative footprint is 109 ha.

4.4.4 Impact Assessment

The potential direct and indirect impacts to Greater Bilby supporting habitat from the Activity are outlined below.

Habitat Loss and Fragmentation

The Activity will result in the direct loss of approximately 23 ha of Sand Plain, a habitat type traditionally used by Greater Bilby in the Pilbara (DPaW 2017). Given the area of proposed disturbance is situated adjacent to existing disturbance or infrastructure, and the lack of Greater Bilby records in the area, habitat loss will not represent a significant impact to the Greater Bilby.

Habitat fragmentation from clearing and the construction of linear infrastructure can cause barriers to dispersal and gene flow in the Greater Bilby. Given the proposed clearing is adjacent to existing disturbed areas and an existing rail line, impacts from habitat fragmentation are considered negligible.

Habitat modification

Fire and weed encroachment has 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 Sand Plain habitat within and adjacent to the Activity Area. However, given the lack of Greater Bilby records in the Activity Area, the impact of habitat modification to the Greater Bilby 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, are considered low.

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 Sand Plain habitat value due to dust emissions is considered unlikely due to the minimal area to be cleared and BHP standard practices to minimise dust emissions will be implemented during clearing.

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. As the Newman Rail has been in existence since the 1970s, the construction of additional rail sidings in parallel to this will not create any additional changes to surface water drainage to what already exists. Furthermore, implementation of BHP standard practices for surface water management shall minimize any changes to surface water drainage.

4.4.5 Summary

The Greater Bilby Notifiable Action Triggers are not applicable as no records of Greater Bilby exist within the Activity Area or within a 500 m buffer of the Activity boundary. Impacts to Greater Bilby supporting habitat within the Activity Area or critical habitat located within a 500 m buffer of the Activity Area are not considered significant.

4.5 Pilbara Olive Python

The following sections provide background information to support the absence of a Pilbara Olive Python Notifiable Action Trigger and, therefore, no requirement to undertake the Validation Process (i.e. impact assessment and application of the mitigation hierarchy). Despite no records being present, as supporting habitat is present within a 500 m buffer of the Activity Area, impacts to the Pilbara Olive Python are discussed to illustrate that the Program Matter Objective for this species will be met.

4.5.1 General Species Information

The Pilbara Olive Python is listed under the EPBC Act as 'Vulnerable'(DotE 2023c). 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 north-eastern 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 2006). 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 (DotE 2023c). In the Hamersley region, this species is most often encountered in the vicinity of permanent water features in rocky ranges or among riverine vegetation.

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 2006). Figure 4.10 illustrates the regional records of Pilbara Olive Python.

4.5.2 Local Habitat

Survey coverage for Pilbara Olive Python is shown in Figure 4.11. The Activity Area is located at the northern extent of the species current distribution, whereby the species or species habitat may occur in the Pilbara region (Figure 4.10). The Sand Plain habitat, which forms the majority of the Activity Area, is unlikely to support Pilbara Olive Python (Biologic 20122) possibly owing to the lack of refuge from excessive daytime temperatures (Figure 4.9).

The Granite Outcrops/Domes adjacent to the Activity Area and Rockpiles associated with existing disturbance in Quarry 1 within the Activity Area (but outside of the Indicative Footprint), could in theory support Pilbara Olive Python (Figure 4.9)(Biologic 2011). Bush and Maryan (2011) have reported Pilbara Olive Python occurring in granite outcrops. Given the lack of records in the area, Granite Outcrops/Domes are treated as supporting habitat (BHP 2023) for the purpose of this validation notice.

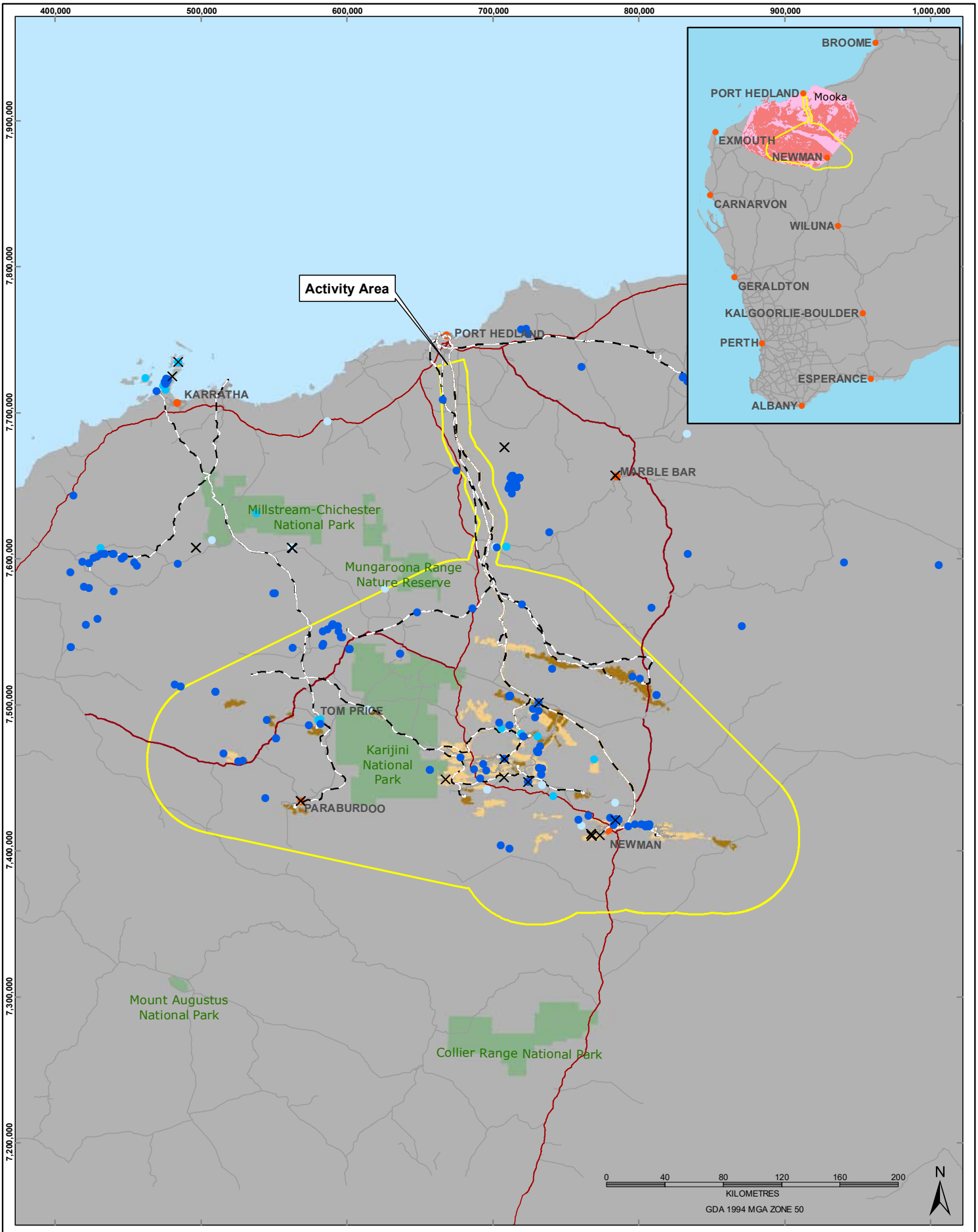
Given the closest record of Pilbara Olive Python is approximately 20 km to the southwest (2012) and the absence of gorges or gully or escarpments within or adjacent to the Activity Area, migration of the species into the area from the Pilbara is unlikely (ecologia 2008).

There are no water natural permanent water features which may be used by Pilbara Olive Python to forage, within or adjacent to the Activity Area. A small ephemeral pool exists in the western corner of Quarry 1, but given the lack of records in the area, it is not likely to support Pilbara Olive Python.

4.5.3 Pilbara Olive Python Records

No records of Pilbara Olive Python exist within the Activity Area or within a 500 m buffer of the Activity Area boundary (Figure 4.9). Outside the Activity Area, the nearest record of the species is located approximately 20 km southwest (2012).

The absence of records of Pilbara Olive Python in the Activity Area indicate there is no important population, as per the DotE (2013) definition, present.



Pilbara Olive Python records

- Records After 2005
- Records Between 1980 - 2004
- Records Prior 1979
- Records Missing Date
- Town
- Rail Centreline
- Major Road
- Minor/Regional Road

- Activity Area
- Strategic Assessment Area
- BHP LOA Mine Plan disturbance footprint
- Third Party disturbance footprint
- Species or species habitat likely to occur
- Species or species habitat may occur

BHP

MOOKA RAIL SIDING

PILBARA OLIVE PYTHON REGIONAL RECORDS AND DISTRIBUTION

PLANNING & STANDARDS - IRON ORE

SCALE @ A3:	1:3,400,000	FIGURE:	4.10
DATE:	16/02/2023	NO:	A1136-12

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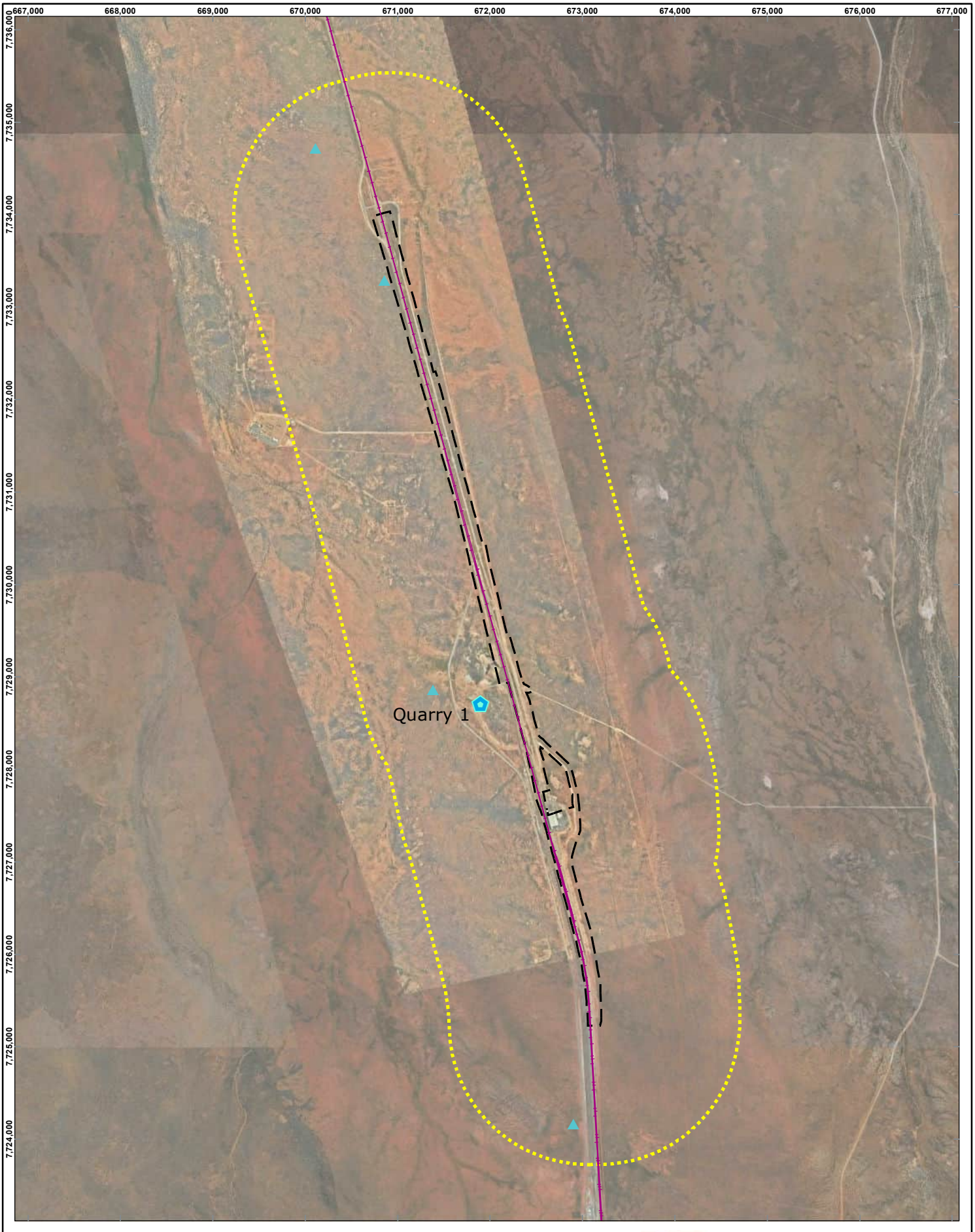


General Habitat Assessment
Quarry1
BHP Rail - Newman Mainline
Activity Area
Activity Area 1.5km Buffer

N

0 0.5 1 1.5 2
KILOMETRES
GDA 1994 MGA ZONE 50

BHP

MOOKA RAIL SIDING
PILBARA OLIVE PYTHON, GREY FALCON AND NIGHT PARROT SURVEY SITES

PLANNING & STANDARDS - IRON ORE

SCALE @ A3: 1:53,528
DATE: 23/03/2023
FIGURE NO: 4.11
A1136-37D

Document Path: Y:\Jobs\A1001_A1500\A1136\3Project\A1136_037_E_VN_SampleSitesPython_RevD.mxd

4.5.4 Impact Assessment

No direct impacts to the Granite Outcrops/Domes are proposed as part of the Activity as they are located outside of the Indicative Footprint and Activity Area. No direct impacts to the rockpiles associated with the existing disturbance at Quarry 1 will occur as this area is outside of the Indicative Footprint and on the other side of the existing rail from the proposed Activity. The potential indirect impacts to Pilbara Olive Python supporting habitat from the Activity are outlined below.

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 Olive Python supporting habitat within and adjacent to the Activity Area. The Rockpiles associated with existing disturbance at Quarry 1 and Granite Domes within 50 m of the Activity Area are highly likely to already be infested with weeds. 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.

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. As the Newman Rail has been in existence since the 1970s, the construction of additional rail sidings in parallel to this will not create any additional changes to surface water drainage to what already exists. Furthermore, implementation of BHP standard practices for surface water management shall 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. The Granite Domes/Outcrops adjacent to the Activity Area and rockpiles associated with existing disturbance at Quarry1 are likely to have been exposed to dust already from historic clearing in the area. As these habitats sit elevated in the landscape, any dust emissions are likely to be quickly blown away. Degradation of habitat value due to dust emissions is considered unlikely due to the minimal area to be cleared and BHP standard practices to minimise dust emissions will be implemented during clearing.

4.5.5 Summary

The Pilbara Olive Python Notifiable Action Triggers are not applicable as no records exist within the Activity Area or within a 500 m buffer of the Activity boundary. As no critical habitats are present within the Activity Area or within a 500 m buffer of the Activity Area, and indirect impacts to supporting habitat are considered unlikely, the Program Matter Objective for the Pilbara Olive Python is not at risk from the Activity.

4.6 Grey Falcon

The following sections provide background information to support the absence of a Grey Falcon Notifiable Action Trigger and, therefore, no requirement to undertake the Validation Process (i.e. impact assessment and application of the mitigation hierarchy). Despite no records being present, as supporting habitat is present, impacts to the Grey Falcon are discussed to illustrate that the Program Matter Objective for this species will be met.

4.6.1 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). Figure 4.12 illustrates the regional records of Grey Falcon.

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.

4.6.2 Local Habitat

The areas surveyed for Grey Falcon are shown in Figure 4.11. The Activity Area was also recently surveyed for Grey Falcon by Spectrum (2023) (Appendix 1).

Major Drainage Line is considered a critical breeding habitat for the Grey Falcon as nests are frequently found in the tall trees which frequent major drainage lines, such as River Red Gun and Coolibah (Marchant and Higgins 1993; Schoenjahn 2013, 2018; Falkenberg 2011). This habitat is located beyond the 500 m buffer of the Activity Area, and thus the Notifiable Action Trigger is not met (Figure 4.9).

Spectrum (2023) identified that the Sand Plain habitat present within the Activity Area (Figure 4.9, Table 4.9) was suitable for foraging by Grey Falcon (i.e. supporting habitat) but the lack of trees and watercourses make it unsuitable as nesting or critical habitat for Grey Falcon.

As there have been no records or sign of resident Grey Falcon within the Activity Area (Spectrum 2023) it is unlikely supporting habitat present for Grey Falcon is used on a regular basis by the species.

Table 4.9: Grey Falcon Habitat Assessment in the Activity Area

Habitat Description	Existing Disturbance		Uncleared Areas	
	Within the Activity Area (ha)[1]	Within the Indicative Footprint (ha)[2]	Within the Activity Area (ha)[1]	Within the Indicative Footprint (ha)[2]
Supporting Habitat				
Sand Plain	144	86	32	23

[1] Total Activity area is 176 ha.

[2] Indicative footprint is 109 ha.

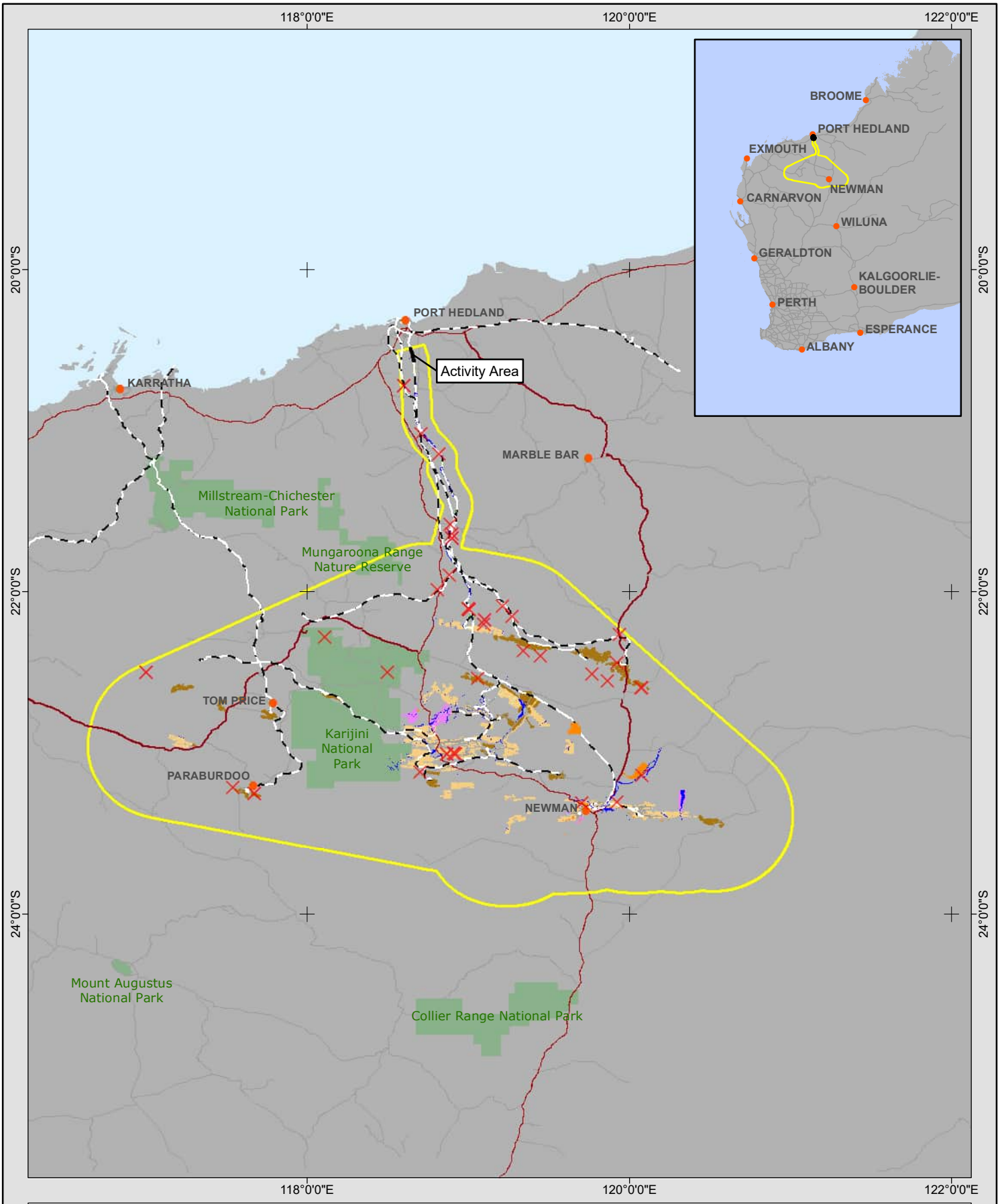
4.6.3 Grey Falcon Records

No records of Grey Falcon exist within or adjacent to the Activity Area (Figure 4.9). Spectrum (2023) did not record any evidence of Grey Falcon when surveying the Activity Area. Outside the Activity Area, the nearest record of the species is located approximately 20 km southwest. The absence of records of Grey Falcon in the Activity Area indicate there is no important population, as per the DotE (2013) definition, present.

4.6.4 Impact Assessment

Habitat loss

Land clearing of the semi-arid zone and overgrazing of arid zone rangelands have been identified as possible threats to the availability of nesting trees (Garnett and Crowley 2000; Garnett *et al.* 2011; Schoenjahn 2013, 2018). The Activity will result in the direct loss of up to 23 ha of supporting foraging habitat (Sand Plain) for Grey Falcon. Given the lack of sightings or nests of Grey Falcon in the area, suggesting no usage of habitat, habitat loss associated with the Activity is not considered to be a significant impact.



BHP

Spatial Data - Studies Planning & Access
BHP IRON ORE

MOOKA RAIL SIDING
Grey Falcon regional records and distribution

Scale @ A4:	1:3,500,000	Prepared: SPATIAL DATA	Project No: A1136/041 Rev A
Date:	12/06/2023	Checked:	Figure: 4.12
Revision:	REV A	Reviewed: ENVIRO. A&I	

- Falco hypoleucos (Grey Falcon)
- Town
- Activity Area
- Minor/Regional Road
- Major Road
- Rail Centreline

HabitatType

- Major Drainage Line
- Medium Drainage Line
- Minor Drainage Line
- Mulga Woodland
- Waterhole
- Drainage Area/ Floodplain
- Strategic Assessment Area
- BHP LOA Mine Plan disturbance footprint
- Third Party disturbance footprint

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0 25 50 75
Kilometres

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Habitat fragmentation

Linear infrastructure such as rail and roads has the potential to fragment habitats and restrict the movement of fauna species such as the Grey Falcon. As the Newman Rail has been in existence since the 1970s, the construction of additional rail sidings in parallel to this will not create any additional habitat fragmentation to what already exists.

Habitat modification

Fire and weed encroachment has the potential to degrade Grey Falcon supporting habitat. 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 Sand Plain habitat within and adjacent to the Activity Area. However, given the lack of Grey Falcon r records in the Activity Area, the impact of habitat modification to the Grey Falcon 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, are considered low.

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 Sand Plain habitat value due to dust emissions is considered unlikely due to the minimal area to be cleared and BHP standard practices to minimise dust emissions will be implemented during clearing.

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. As the Newman Rail has been in existence since the 1970s, the construction of additional rail sidings in parallel to this will not create any additional changes to surface water drainage to what already exists. Furthermore, implementation of BHP standard practices for surface water management shall minimize any changes to surface water drainage.

4.6.5 Summary

The Grey Falcon Notifiable Action Triggers are not applicable as no records exist within the Activity Area or within a 500 m buffer of the Activity boundary. Impacts to Grey Falcon supporting habitat are not considered significant.

4.7 Night Parrot

The following sections provide background information to support the absence of a Night Parrot Notifiable Action Trigger. As no records, critical or supporting habitats exist within the Activity Area or within 500 m, impacts to the Night Parrot are not considered as the Program Matter Objective for this species is not at risk from the Activity.

4.7.1 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 WA (TSSC 2016b).

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. These are unlikely to be the only records in the SAA, based on the reported increase in Night Parrot discoveries in Australia. 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 2016b).

4.7.2 Local Habitat

Survey coverage for the Night Parrot is shown in Figure 4.11. The Activity Area was also recently surveyed for Night Parrot by Spectrum (2023) (Appendix 1).

The Sand Plain habitat within the Activity Area was identified by Spectrum (2023) as not being conducive to the occurrence of Night Parrot and unsuitable for foraging and nesting (Figure 4.9). In addition, large and old growth *Triodia* hummocks were absent, thus resulting in an extremely low likelihood of supporting Night Parrot. Therefore, the Sand Plain habitat present within the Activity Area is neither a critical or supporting habitat for the Night Parrot.

4.7.3 Night Parrot Records

No records of Night Parrot exist within the Activity Area or within a 500 m buffer of the Activity Area boundary (Figure 4.9). Spectrum (2023) did not record any evidence of Night Parrot when surveying the Activity Area.

The absence of records of Night Parrot in the Activity Area indicate there is no important population, as per the DotE (2013) definition, present.

4.7.4 Summary

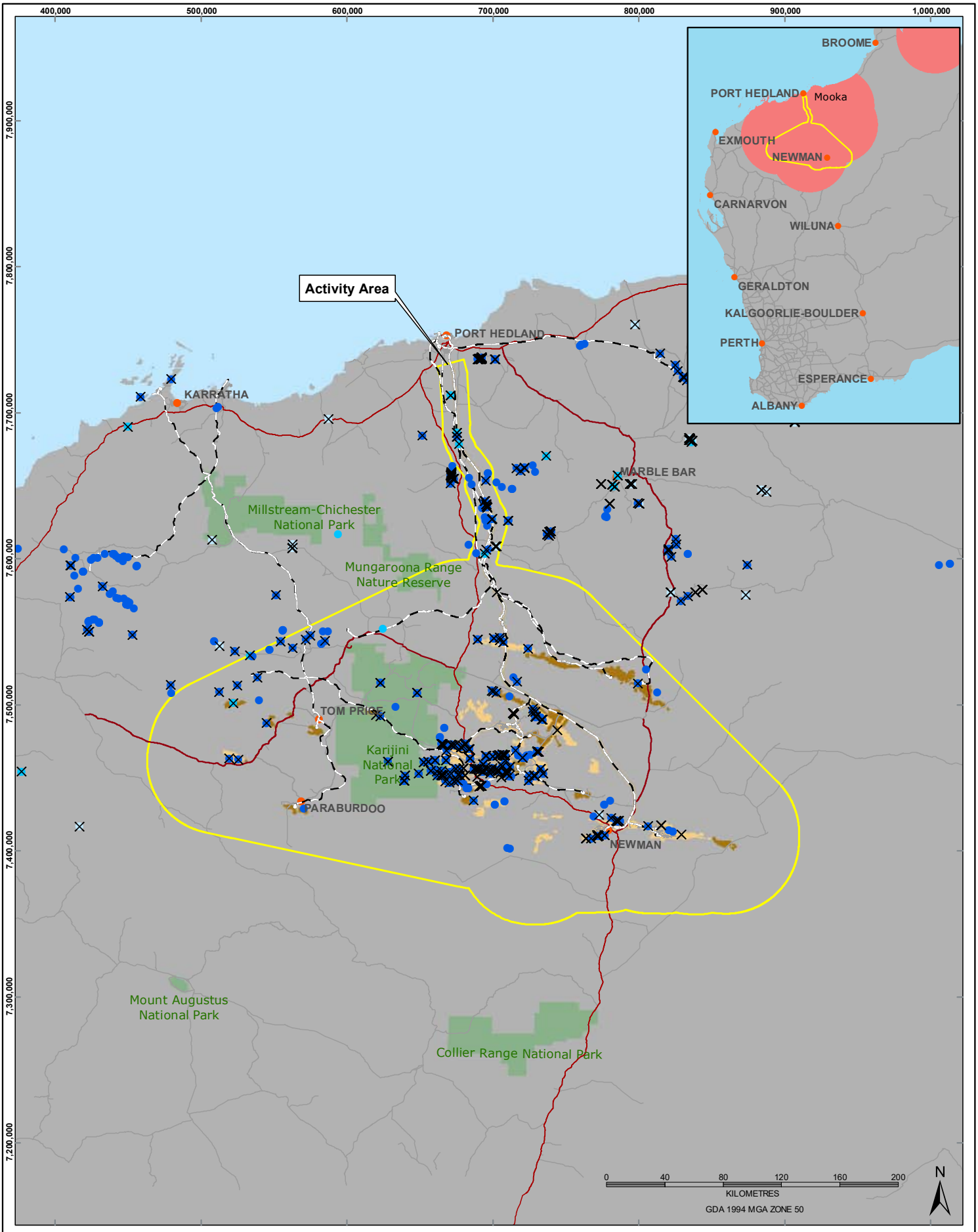
The Night Parrot Notifiable Action Triggers are not applicable as no records exist within the Activity Area or within a 500m buffer of the Activity boundary.

4.8 Ghost Bat

The following sections provide background information to support the absence of a Ghost Bat Notifiable Action Trigger and, therefore, no requirement to undertake the Validation Process (i.e. impact assessment and application of the mitigation hierarchy). As no Ghost Bat records, critical or supporting habitats exist within the Activity Area or within 500 m, impacts to the Ghost Bat are not considered as the Program Matter Objective for this species is not at risk from the Activity.

4.8.1 General Species Information

The Ghost Bat is listed under the EPBC Act as ‘Vulnerable’. In the Pilbara region, the species occurs in all four sub-regions, and was recorded in 21 of the 24 areas surveyed by the 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, DotE 2023f). 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 suggest that they likely depend on a number of roosts within their range (Bat Call WA 2021a). Figure 4.13 illustrates the regional records of Ghost Bat.



Ghost Bat records

- Records After 2005
- Records Between 1980 - 2004
- Records Prior 1979
- Records Missing Date
- Town
- Rail Centreline
- Major Road
- Minor/Regional Road

- Strategic Assessment Area
- BHP LOA Mine Plan disturbance footprint
- Third Party disturbance footprint
- Species or species habitat likely to occur
- Species or species habitat may occur

BHP

MOOKA RAIL SIDING
GHOST BAT REGIONAL RECORDS AND DISTRIBUTION

PLANNING & STANDARDS - IRON ORE

SCALE @ A3: 1:3,400,000
FIGURE: 4.13
DATE: 10/02/2023
NO: A1136-09

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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 (Bat Call WA 2021a, TSCC 2016c).

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 2018, Bullen 2021), and occasion even up to 17 km from a roost during foraging bouts (Bullen *et al*. 2023).

4.8.2 Local Habitat

Survey sites for the Ghost Bat are shown in Figure 4.14.

Sand Plain habitat may be suitable to Ghost Bat foraging when it exists with mature woodlands over patchy or clumped tussock or hummock grass (*Triodia* spp.) (Bat Call WA 2021a). The Sand Plain habitat found within and adjacent to the Activity Area is unsuitable supporting habitat for Ghost Bat foraging as it lacks mature woodland, with a recent survey (Biologic 2023) citing only shrublands and grasslands being present. Furthermore, the Sand Plain habitat is unlikely to be a foraging ground for the Ghost Bat as no records exist for Ghost Bat for over 16 km from the Activity Area, suggesting it is out of their foraging range (Figure 4.15).

Major Drainage Line habitat, is a usually a typical foraging habitat for Ghost Bat due to this species being an ambush predator and often using tree found in such areas as sites to ambush prey from. This habitat is located beyond the 500 m buffer of the Activity Area, and thus the Notifiable Action Trigger is not met.

The Granite Outcrops/Domes present adjacent to the Activity Area are not suitable roosting habitats for Ghost Bat as they are not prone to forming important habitat features such as overhangs and caves.

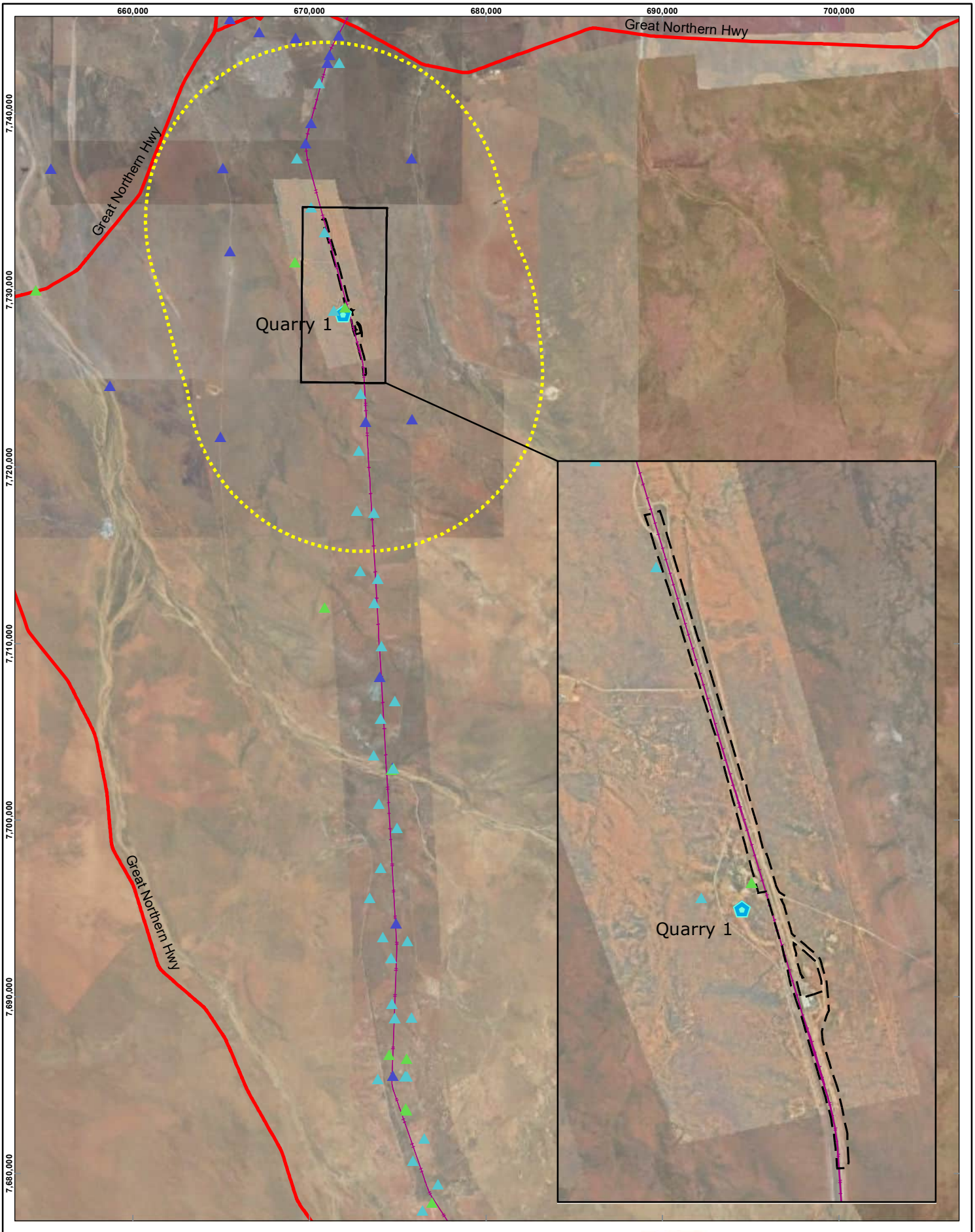
4.8.3 Ghost Bat Records

No records of Ghost Bat exist within or adjacent to the Activity Area (Figure 4.15). Outside the Activity Area, the nearest record of the species is located approximately 16 km south (2015) and 18 km north-east (2015).

The absence of records of Ghost Bat in the Activity Area, or preferred roosting habitat, indicate there is no important population, as per the DoE (2013) definition, of Ghost Bat present.

4.8.4 Summary

The Ghost Bat Notifiable Action Triggers are not applicable as no records exist within the Activity Area or within a 500 m buffer of the Activity boundary. As no critical or supporting habitats are present within the Activity Area or within a 500 m buffer of the Activity Area, the Program Matter Objective for the Ghost Bat is not at risk from the Activity.



- General Habitat Assessment
- Bat Recorder Locations
- Opportunisitc Survey Sites
- Quarry1
- BHP Rail - Newman Mainline
- Activity Area
- Activity Area 10km Buffer

N

0 2 4 6

KILOMETRES

GDA 1994 MGA ZONE 50

BHP

MOOKA RAIL SIDING

GHOST BAT AND PILBARA LEAF-NOSED BAT SURVEY SITES

PLANNING & STANDARDS - IRON ORE

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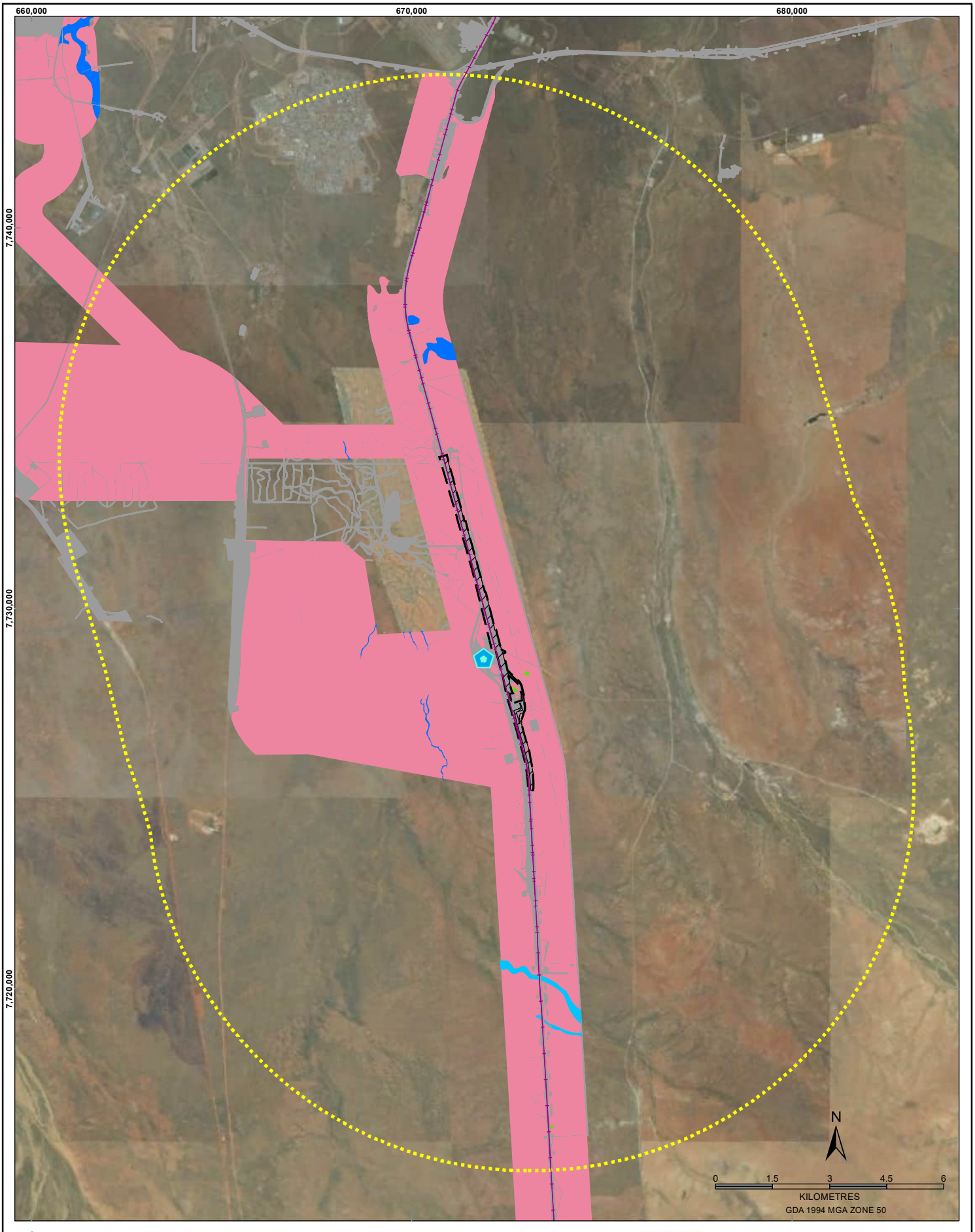

Quarry1
BHP Rail - Newman Mainline
Activity Area
Indicative Footprint
Activity Area 10km Buffer

Habitat Type
Major Drainage Line
Granite Outcrops/ Domes
Medium Drainage Line
Sand Plain
Cleared/ Disturbed

BHP

MOOKA RAIL SIDING
GHOST BAT AND PILBARA LEAF-NOSED BAT MAPPED HABITATS AND RECORDS

PLANNING & STANDARDS - IRON ORE

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FIGURE: 4.15
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4.9 Pilbara Leaf-Nosed Bat

The following sections provide background information to support the absence of a Pilbara Leaf-nosed Bat Notifiable Action Trigger and, therefore, no requirement to undertake the Validation Process (i.e. impact assessment and application of the mitigation hierarchy). As no records, critical or supporting habitats exist within the Activity Area or within 500 m, impacts to the Pilbara Leaf-nosed Bat are not considered as the Program Matter Objective for this species is not at risk from the Activity.

4.9.1 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 (DotE 2023g, TSSC, 2016b). Individual colonies vary in size from 10 individuals to 20,000 individuals, although the latter is exceptional (Armstrong 2001; ecologia Environment 2005, 2006). The total number of Pilbara Leaf-Nosed Bats is currently unknown (TSSC 2106d).

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. Figure 4.16 illustrates the regional records and distribution of Pilbara Leaf-Nosed Bat. Area of occupancy (AOO) 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 (Baudinette *et a*l. 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 2016d). Pilbara Leaf-nosed Bats are predicted to travel up to 20 km from roost caves during nightly foraging (Cramer *et al.* 2016b); 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).

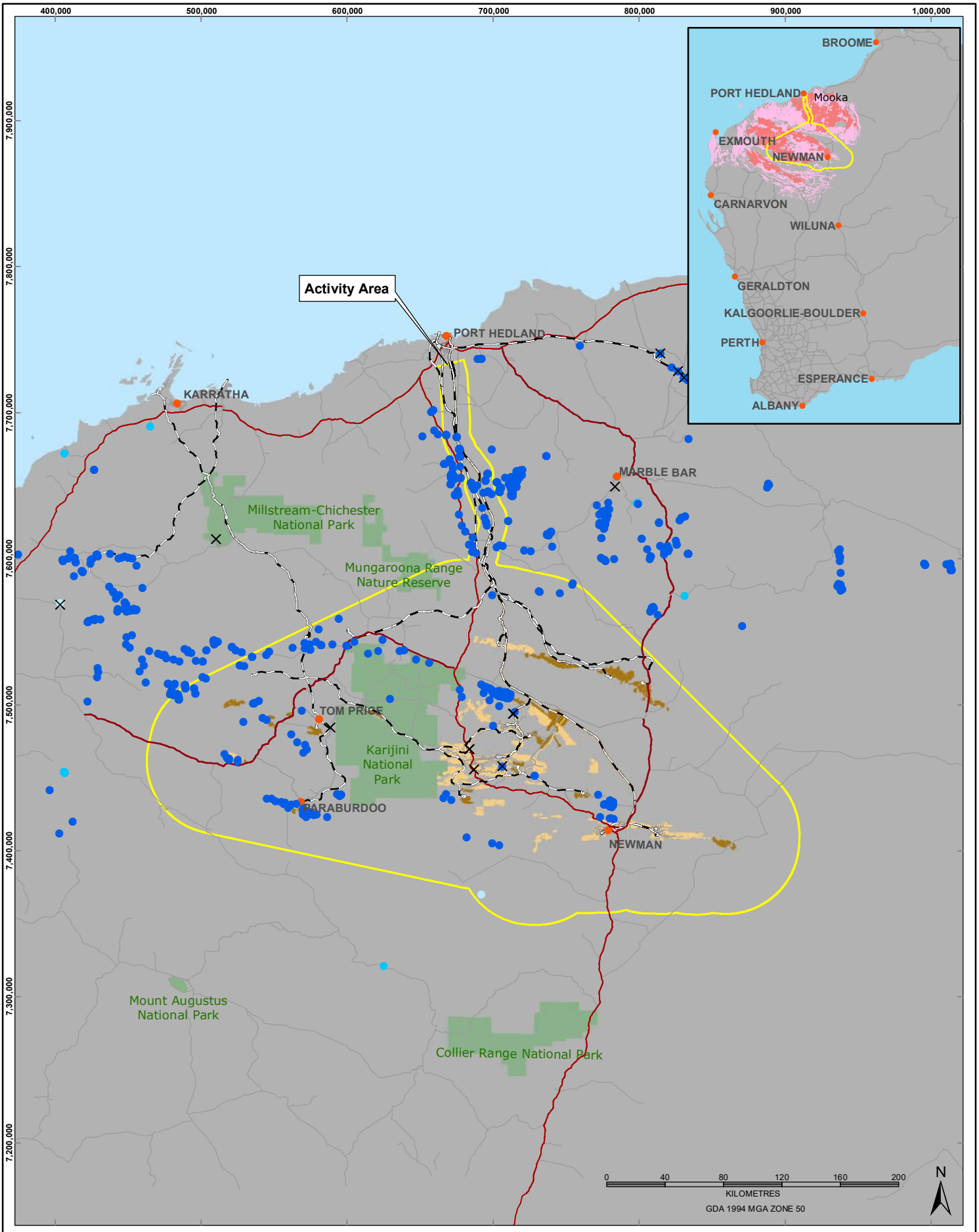
4.9.2 Local Habitat

Survey coverage for Pilbara Leaf-nosed Bat is shown in Figure 4.14. The Activity Area is located at the northern extent of the species current distribution, whereby the species or species habitat is likely to occur.

No critical roosting or foraging habitats for Pilbara Leaf-Nosed Bat as defined by TSCC (2016d) have been recorded within or adjacent to the Activity Area (Biologic 2011, 2013) (Figure 4.15).

Although Major Drainage Line habitat is present adjacent to the Activity Area, it is surrounded by disturbed areas, is not considered a critical foraging habitat for Pilbara Leaf-nosed Bat. Given the closest record is over 30 km southwest of the activity area, the Pilbara Leaf-nosed Bat is unlikely to forage in the Activity Area.

There are no water natural permanent water features which may be used by Pilbara Leaf-nosed Bat to forage, within or adjacent to the Activity Area. A small ephemeral pool exists in the western corner of Quarry 1, but given the lack of records in the area, it is not likely to support Pilbara Leaf-nosed Bat.



Pilbara Leaf-nosed Bat records

- Records After 2005
- Records between 1980 - 2004
- Records Prior 1979
- Records Missing Date
- Town
- Rail Centreline
- Major Road
- Minor/Regional Road

- Activity Area
- Strategic Assessment Area
- BHP LOA Mine Plan disturbance footprint
- Third Party disturbance footprint
- Species or species habitat likely to occur
- Species or species habitat may occur

BHP

MOOKA RAIL SIDING

PILBARA LEAF-NOSED BAT REGIONAL RECORDS AND DISTRIBUTION

PLANNING & STANDARDS - IRON ORE

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4.9.3 Pilbara Leaf Nosed Bat Records

No records of Pilbara Leaf-nosed Bat exist within or adjacent to the Activity Area (Figure 4.15). Outside the Activity Area, the nearest record of the species is located approximately 30 km southwest.

The absence of records of Pilbara Leaf-nosed Bat in the Activity Area indicate there is no important population, as per the DoE (2013) definition, present.

4.9.4 Summary.

The Pilbara Leaf-nosed Bat Notifiable Action Triggers are not applicable as no records exist within the Activity Area or within a 500 m buffer of the Activity boundary. As no critical or supporting habitats are present within the Activity Area or within a 500 m buffer of the Activity Area, the Program Matter Objective for the Pilbara Leaf-nosed Bat is not at risk from the Activity.

4.10 Validation Reporting

BHP will track compliance of this Validation Notice against the Program at an Activity scale to ensure that the Program Matters Outcomes are being achieved.

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 Program Matter Outcome
- 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 Outcomes
- Summary of any exceedances of the Program Matter Outcomes 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.

5 Offset Proposal

In consultation with the DCCEEW, BHP shall compensate for any residual impacts from the Mooka Rail Works which remain after avoidance and mitigation measures through the application of offsets. The Offset Proposal for the Mooka Rail Works has been developed and implemented in accordance with the APOP (BHP 2023). The Offsets Proposal has been included in this Validation Notice and is detailed in the following sections.

5.1 Residual Impacts

The Mooka Rail Works Validation Notice has determined that the Activity will result in residual impacts to supporting habitat for Northern Quoll (see Section 4.3) through the disturbance of 23 ha of Sand Plain habitat (Table 5.1). This residual impact will require offsetting and is illustrated in Figure 5.1a, b and c.

5.2 Offset Requirement

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 Northern Quoll within the strategic assessment area'.*

Offsets applied by BHP for the loss of 23 ha of supporting habitat for the Northern Quoll are required to achieve this Program Matter Objective. Furthermore, the Program Matter Outcomes relevant to the significant residual impact must also be achieved, which in this case, are:

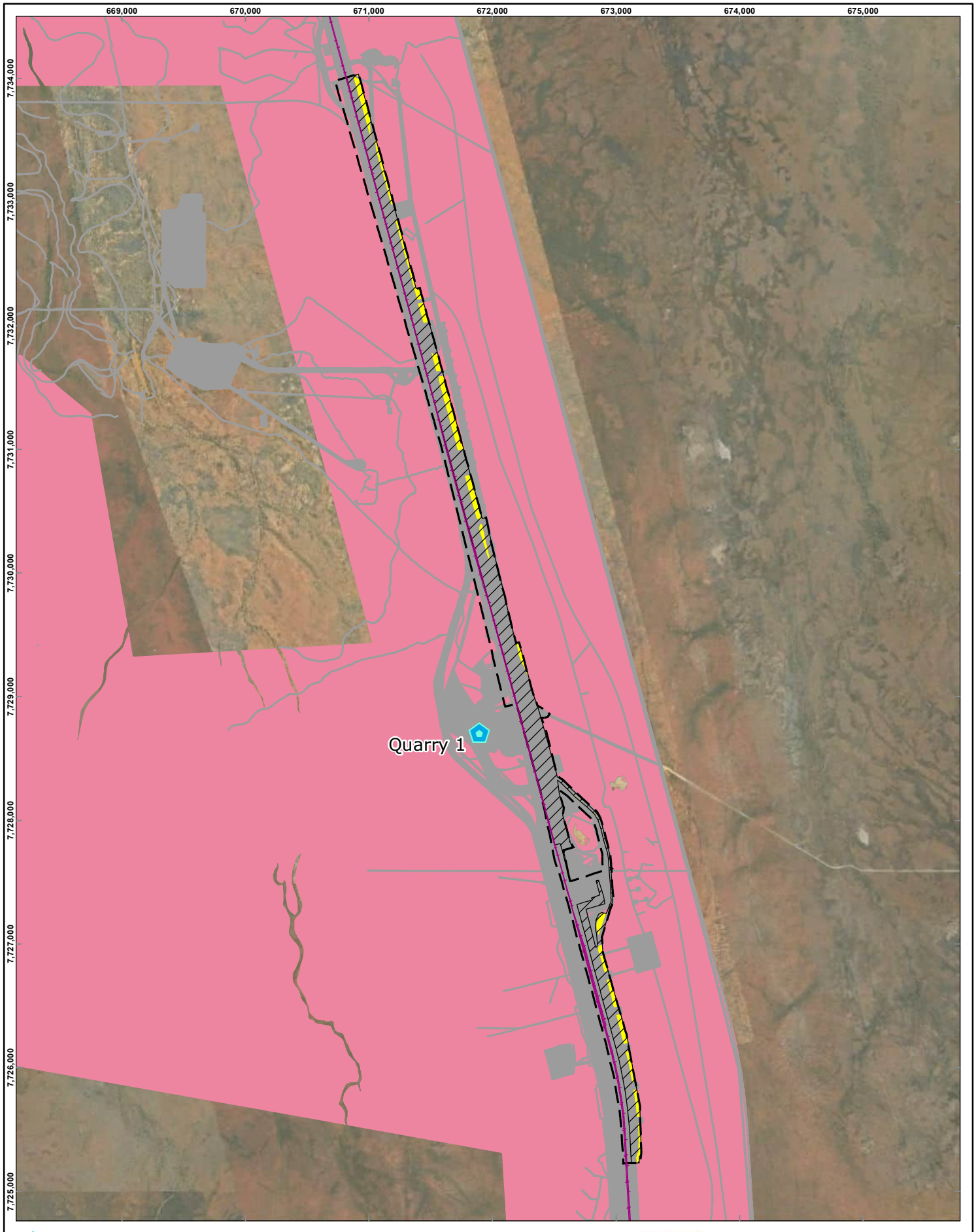
'Minimise loss of critical and supporting habitats of the Northern Quoll as a result of Program Activities within the SAA

AND

No loss (or maintain) Northern Quoll colony(s) as a result of program activities'

Table 5.1: Significant Residual Impacts for Mooka Rail Siding requiring offsetting under the SEA

Significant residual impact	Habitat types to be offset within the IF	Total area to be offset (ha)	Habitat rating	Offset rate ($/ha)	Total financial offset ($)
Direct impacts to native vegetation which supports Northern Quoll dispersal habitat	23 ha of Sand Plain	23 ha	Supporting habitat	1,653	1,653
Total Amount to be offset					**$38,019**



Quarry1

BHP Rail - Newman Mainline

Activity Area

Indicative Footprint

Proposed Offset Sand Plain Habitat

Habitat Type

Sand Plain

Cleared/ Disturbed

N

0 0.5 1 1.5 2

KILOMETRES

GDA 1994 MGA ZONE 50

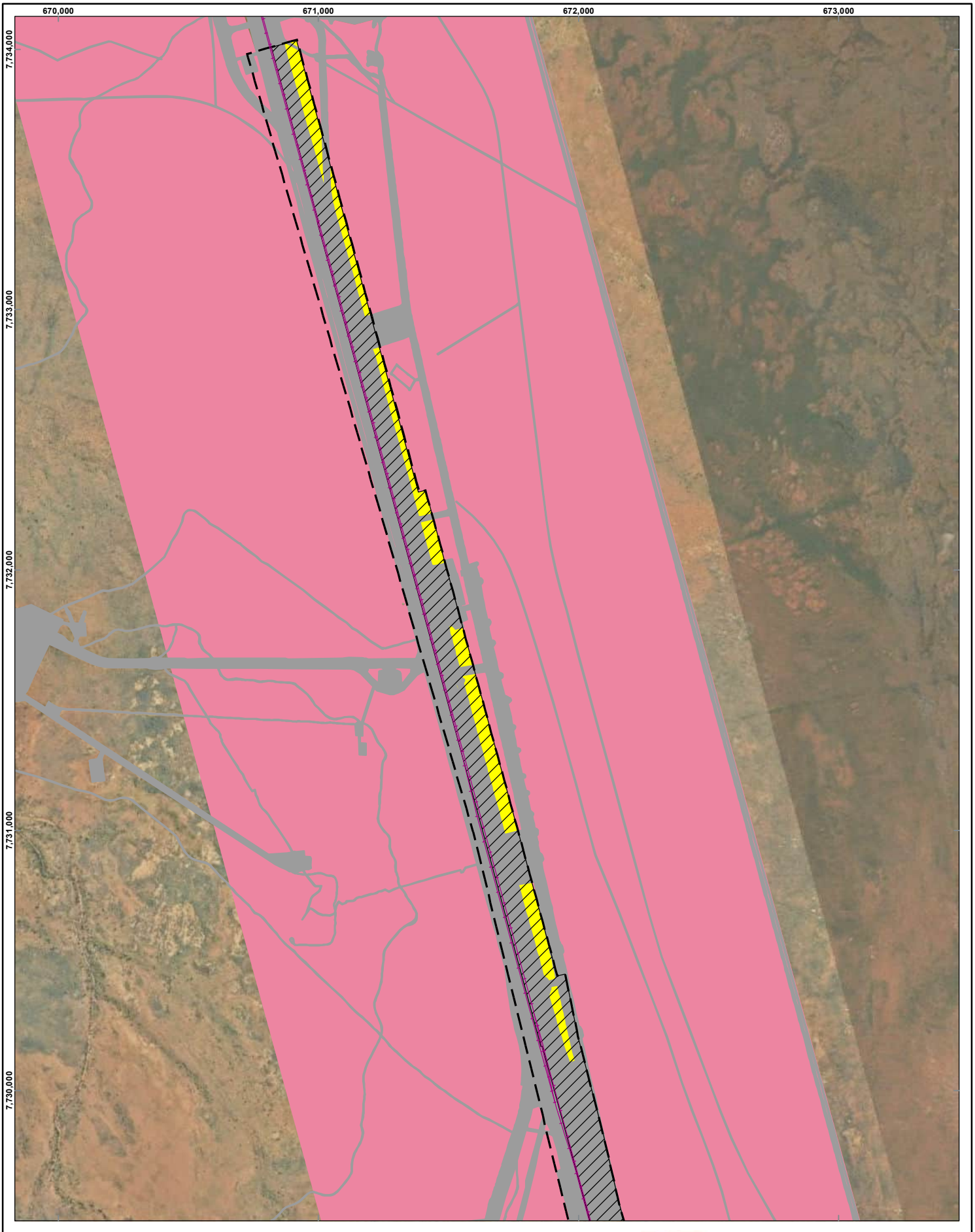
BHP

MOOKA RAIL SIDING
PROPOSED OFFSET AREAS

PLANNING & STANDARDS - IRON ORE

SCALE @ A3:	1:40,000	PREPARED:	Spatial Data	FIGURE:	5.1a
DATE:	7/06/2023	REQUESTOR:	Env Approvals	NO:	A1136-040A

Document Path: Y:\Jobs\A1001_A1500\A1136\3Project\A1136_040_E_VN_ProposedOffsetAreas_RevA.mxd



BHP Rail - Newman Mainline
Activity Area
Indicative Footprint
Proposed Offset Sand Plain Habitat

Habitat Type

Sand Plain
Cleared/ Disturbed

N

0 0.2 0.4 0.6 0.8 1

KILOMETRES

GDA 1994 MGA ZONE 50

BHP

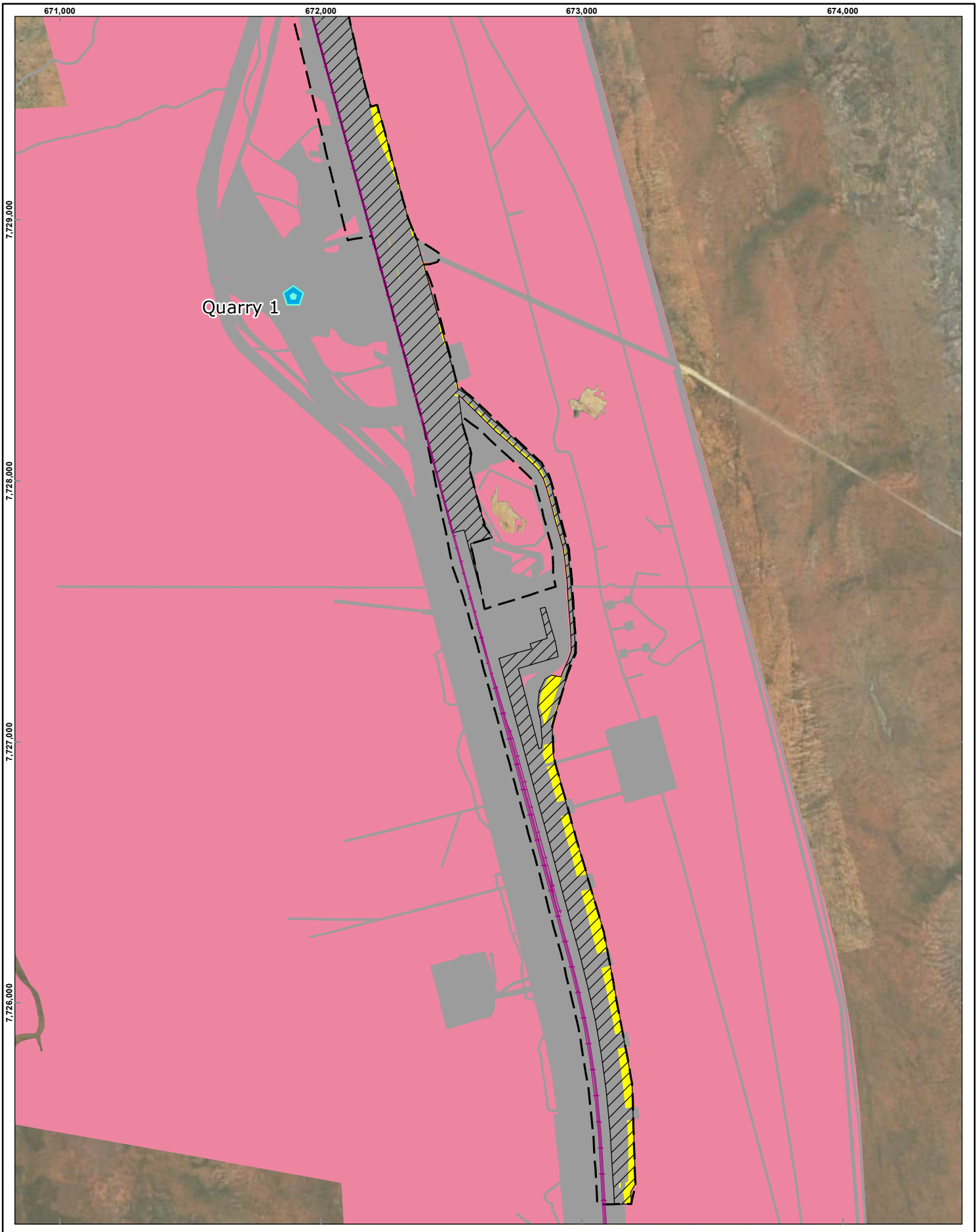
MOOKA RAIL SIDING

PROPOSED OFFSET AREAS (Northern Section)

PLANNING & STANDARDS - IRON ORE

SCALE @ A3:	1:19,000	PREPARED:	Spatial Data	FIGURE:	5.1b
DATE:	7/06/2023	REQUESTOR:	Env.Approvals	NO:	A1136-040-B1

Document Path: Y:\Jobs\A1001_A1500\A1136\3Project\A1136_040_E_VN_ProposedOffsetAreas_RevB1.mxd



Quarry1

BHP Rail - Newman Mainline

Activity Area

Indicative Footprint

Proposed Offset Sand Plain Habitat

Habitat Type

Sand Plain

Cleared/ Disturbed

N

0 0.2 0.4 0.6 0.8 1

KILOMETRES

GDA 1994 MGA ZONE 50

BHP

MOOKA RAIL SIDING

PROPOSED OFFSET AREAS (Southern Section)

PLANNING & STANDARDS - IRON ORE

SCALE @ A3:	1:19,000	PREPARED:	Spatial Data	FIGURE:	5.1 C
DATE:	7/06/2023	REQUESTOR:	Env Approvals	NO:	A1136-040-B2

Document Path: Y:\Jobs\A1001_A1500\A1136\3Project\A1136_040_E_VN_ProposedOffsetAreas_RevB2.mxd

5.3 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 23 ha of supporting habitat for the Northern Quoll (refer to Section 5.4 for calculation) is therefore proposed to be offset by a financial contribution to the PEOF.

The offset package will include:

- An advance payment of 100% of the estimated total contribution to be paid into the PEOF, within one month of the Validation Notice becoming effective

Financial contributions to the PEOF will achieve the Program Matter Objective and relevant Program Matter Outcome in Section 5.2 through investment into one or more conservation projects relevant to the Northern Quoll conducted at various scales by the PEOF:

- 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 the financial contribution to the PEOF will be included in the AER and five-yearly review of the APOP (see Section 5.7).

5.4 Offset Calculation

5.4.1 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. For the Mooka Rail Works Activity, the 23 ha of Sand Plain habitat proposed to be disturbed is Northern Quoll supporting habitat.

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

- Mooka Rail Works Activity Area and Indicative Footprint
- Existing Disturbance Areas
- Fauna Habitat mapping and records.

5.4.2 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 ground9; 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 IRP, 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.

5.5 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 $1,653 per ha of Northern Quoll supporting habitat.

5.6 Proposed Schedule

Key anticipated steps for BHP for the advanced and biannual payments to the PEOF are outlined in Table 5.2 and 5.3.

Table 5.2: Offsets Reporting period.

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

9 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 5.3: PEOF Contributions Schedule

Validation Process Stage	Action	Timing
Consultation	Provision of the Validation Notice and spatial data (Section for Contributions to the PEOF	14/06/2023
Authorisation	Validation Notice becomes effective	04/07/2024
Implementation Advanced Payment	Payment (100% of the estimated total contribution)	03/08/2024
	BHP to report payment of Advanced Payment in the AER	1 October 2023
Implementation Period 1	First annual reporting period	1 July 2023 to 30 June 2024
	Aerial survey/ground truthing	30 June 2024
	EPBC Impact Reconciliation Report submitted to DWER	30 September 2024
	BHP to report payment of Offset Payment in the AER	1 October 2023
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 2023

5.7 Offsets Reporting

5.7.1 Payment of Financial Contributions

EPBC Impact Reconciliation Reports (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
- where applicable, information regarding part-year reconciliations required due to a Validation Notice and SEA Offsets Proposal being superseded
- a forward estimate of clearing.

5.7.2 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.

6 Commitments

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

6.1 Monitoring Commitments

The monitoring commitments which form part of this Validation Notice are presented in Table 6.1. Additional details for monitoring Northern Quoll are presented in Section 4.3.9.

6.2 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 6.2.

6.3 Management Commitments

The management commitments which form part of this Validation Notice are presented in Table 6.3.

6.4 Offset Commitments

The offset commitments which form part of this Validation Notice are presented in Table 6.4.

Table 6.1: Proposed Monitoring Commitments

Monitoring Commitment	Action	Monitoring and frequency	Reporting
Monitor Northern Quoll population at Mooka to ensure no population loss and allow assessment of Northern Quoll population density.	• Undertake Northern Quoll monitoring at Mooka and reference sites using techniques such as motion camera footage and targeted searches. • Assess population density as per DoE guidelines	The proposed monitoring methods are detailed in Table 4.7, with the monitoring to be implemented detailed in Table 4.8. Biannual monitoring at Sites 1 (impact), Site 1C (reference), Site 2 (impact) and Site 2C (reference). Monitoring to be undertaken twice a year. Figure 4.5 shows the current monitoring locations. Additional sites, including regional reference sites, may be added to the program in the future.	SEA AER Five-yearly review

Table 6.2: Proposed Clearing Commitments

Clearing Commitment	Action	Monitoring and frequency	Reporting
Clearing does not exceed areas specified in below: • Up to 23 ha Sand Plain	• Implement BHP's internal PEAHR process prior to all ground disturbance within the Activity Area to ensure clearing does not exceed areas specified.	Annual land disturbance reconciliation (hectares and spatial footprint) for within the Activity Area. Annual review of habitat and habitat features disturbed in relation to limits specified in this Validation Notice.	SEA AER

Table 6.3: Proposed Management Commitments

Management Commitment	Action	Monitoring and Frequency	Reporting
Implement feral cat management	• Monitor presence of feral cats through records of opportunistic sightings • Report all cat sightings to the site-environmental specialist • Cage trapping for cats if feral cats are sighted.	All personnel on site to report any opportunistic sightings of feral cats to the Site Environmental Specialist Cage trapping to be undertaken following reports of any cat sightings on site.	SEA AER
Implement fire management	• Abide by hot work management procedures • Firebreaks are maintained • Ensure designated smoking areas are available.	Continuous	SEA AER

Table 6.4: Proposed Offset Commitments

Offset Commitment	Action	Monitoring and Frequency	Reporting
Payment of financial contribution to PEOF	• Advanced payment of 100% of offset amount within one month of the Validation Notice becoming effective.	One of payment within one month of Validation Notice becoming effective. Disturbance reported annually EPBC IRR provided biannually	SEA AER Five-yearly review
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 Five-yearly review
	• Retain annual reports, evaluations or other progress reports provided by the PEOF and its delivery agents to BHP for auditing purposes.	Continuous	SEA AER Five-yearly review

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8 Appendices

Appendix 1: DCCEEW Comments from Public Consult Period

DCCEEW comments on *Mooka Rail Works Project Validation Notice* (EPBC Ref: SA017) – *draft for public comment*

Item	Comments	BHP Response
1. General and high priority comments	1.1 High priority: (discussed at 2.1 and 2.2) 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 this component. The department recommends clarifying the project scope in the final validation notice for Mooka Rail Works Project. 1.2 High priority: (discussed at 4.2.2) Survey data to determine the presence of Greater Bilby and/or map critical habitat for Greater Bilby within the indicative impact footprint is inadequate (more than 5 years old). The department strongly recommends surveying the proposed action area prior to finalising the validation notice for Mooka Rail Works Project in order to adequately demonstrate the proposed avoidance, mitigation and offset measures are appropriate to manage and compensate for the proposed impact. 1.3 General comment (all program matters): Baseline surveys within the proposed action area for all program matters (except Northern Quoll) are too old to adequately support conclusions on whether triggers will/will not be met by the planned action. 1.4 General comment (all program matters): Conclusions on the likelihood of presence/absence of program matters (no supported by survey data) should be better supported by including a clearer summary of landform, vegetation type and condition within the project area.	1.1 BHP has clarified 'existing disturbance' and provided background information to clarify why it has been excluded from SEA assessment in Section 1.5 1.2 BHP engaged Spectrum in May 2023 to undertake a targeted search of the activity area for any sign of the Greater Bilby, the Grey Falcon and Night Parrot and to assess habitat suitability. The survey found no evidence of these species although suitable habitat was located. Survey findings have been included in Sections 4.4, 4.8 and 4.9. 1.3 BHP disagrees. Surveys to date have mapped Sand Plain habitat present in the Activity Area. Based on habitat preferences for species, some can be ruled out as being likely to occur and this is further supported by survey data. The species considered most likely to use the Sand Plain habitat in addition to the Northern Quoll, namely Greater Bilby, Grey Falcon and Night Parrot, have been searched for by Spectrum (2023) with no evidence found. 1.4 BHP disagrees. Habitat mapping for the area provides an indication of if critical or supporting habitat is present in the Activity Area. Surveys undertaken in the area have provided an indication of if program matters occur or not. Furthermore, no additional records of program matters

Item	Comments	BHP Response
	1.5 General comment (all program matters): Statements on avoidance and mitigation measures need to be backed-up with supporting evidence or discussion. For example: statements that project design was chosen to minimise impacts to denning habitat for Northern quoll are not supported by any discussion on how the project design does this or alternative designs that were rejected due to greater or more likely impact. 1.6 General comment: Maps and diagrams are difficult to read. We recommend including better quality diagrams, and separating sections of the rail into separate diagrams with clearer keys or labels, to make these more accessible. For example, see diagrams included in assessment documentation provided to the WA Environment Protection Authority for the Byford Rail Extension proposal. 1.7 General recommendation for all future validation notices: we recommend undertaking contemporary surveys in preparation for all decisions on whether program matter triggers will be met (in line with the commitments at section 7.1 of the *BHP Billiton Iron Ore Pilbara Strategic Assessment Assurance and Offsets Plan (Version 2)* approved 16 April 2023 (the Assurance and Offsets Plan). 1.8 General recommendation for all future validation notices: The validation notice should include a clear rationale for any instances where survey effort for a particular program matter is not considered necessary to inform decisions on whether program matter triggers will be met. For example, the action is located in the southern part of the strategic assessment area and out-side the current known or likely range of the Great bilby.	were opportunistically recorded during the Spectrum (2023) survey 1.5 Noted. Section 4.3.6 includes discussion of why the current project design was restricted to the MOCRS. 1.6 Figures 1.2, 4.1, 4.6 and 5.1 have been split to show the northern and southern sections of the Activity Area to make these easier to read. 1.7 Noted. 1.8 Noted.

Item	Comments	BHP Response
2. Project description and impact quantification	2.1 Project scope and exclusions (including location): ▪ Proposed disturbance is proposed for 23 ha, however the indicative footprint of the project is reported as 109 ha (86 ha of which is states as previously cleared). The reason for excluding the previously cleared 86 ha from the scope of the validation notice, but not from the indicative footprint requires additional background information and justification including: • Clearer description, labelled map or diagram showing which components of the proposed action are occurring within the 86 ha of cleared area compared to the 23 ha proposed to be cleared/disturbed. This may help the reader understand why (and where) you are proposing only 23 ha of disturbance within the larger impact footprint. • Additional clarification on the age of clearing and 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.,) 2.2 Approval history: • When was the 86 ha cleared, who by and for what purpose? • Was the previous action to clear 86 ha been referred and/or approved under parts 7-9 of the EPBC Act or subject of a validation notice or decision report under the endorsed program? • Is the previous action to clear 86 ha exempt from referral and assessment approval (and what is the reason for exemption)?	2.1 Figure 1.2 illustrating the Activity Area has been split into two additional figures (Northern and Southern Section) so that existing disturbance in relation to the Activity Area and If can be see seen more clearly. Background on existing disturbance, including age, and reason for its exclusion has been provided in Section 1.5 2.2 The approval mechanisms for the existing disturbance are provided in Section 1.5. The clearing was exempt from SEA assessment as it occurred prior to SEA implementation (May 2018). Self-assessment determined no referral under Part 7-9 of the EPBC Act was required. 2.3 Section 2 includes footnotes which define project terminology 2.4 The upgrades will take place in the next two years. 2.5. Alternative locations were not considered as the project was constrained to the existing location of the Mooka Ore Car Repair Shop, which required the rail upgrades.

Item	Comments	BHP Response
	• Was the previous action to clear 86 ha determined as not requiring referral under the EPBC Act based on a self-assessment of likely significant impact (and was this supported by habitat and fauna surveys prior to clearing)? 2.3 Terminology/does project description allow understanding of impact pathways? ▪ Define or explain jargon (e.g., knock road, geotechnical works, run-around spur, borrow road etc) in enough detail to assist stakeholders to understand components of the action and consider potential direct and indirect impact pathways for program matter species. 2.4 Timing ▪ When within the 50 year timeframe are the main upgrades and works expected to occur and be finalised compared with decommissioning, or are these upgrades likely to be ongoing/recurring over this period? 2.5 Were alternative actions or locations considered? ▪ For projects close to critical breeding habitats in particular, a brief discussion on if and how alternative locations or actions were considered should be included. 2.6 Closure and decommissioning ▪ Further clarity on the purpose or end goal of rehabilitation activities would be useful. ▪ For example: it is noted that MOCRS will be rehabilitated at end of life, however, it is unclear whether this includes the 86 ha of cleared land which is currently noted as being out of scope of this	

Item	Comments	BHP Response
	validation notice (see comment 1). What areas does the L45/194 Closure Plan cover?	
3. Stakeholder Engagement	3.1 Good to see consultation with DBCA on data contribution/sharing and alignment of monitoring methods for North Quoll. If presence of Greater bilby is detected in upcoming surveys (prior to finalising the validation notice for Mooka) - is there a monitoring program or other potential avenue for sharing data from Greater Bilby monitoring at this site, or an accepted monitoring protocol? 3.2 Please refer to the interim First Nations engagement guidelines on our website for more information on the department's expectations of proponent for engaging with First Nations stakeholders throughout an environmental assessment process. Also check recently released recovery plans and conservation advices for opportunities for First Nations participation in species conservation (e.g. to inform or assist in survey or monitoring efforts). General comment for future validation notice: Note that the department is likely to increase its expectations for First Nations engagement (including demonstrating early and meaningful engagement) for future projects and once the National Environmental Standard for First Nations engagement and participation in decision-making is released (currently in development).	3.1 BHP monitoring protocols align with those suggested by DBCA. Discussions with DBCA are ongoing re data sharing for the region. 3.2. Noted.
4. Program matters		
Northern Quoll (triggered)	4.1.1. Update justification for triggers being met/not met in line with Assurance and Offset Plan (version 2.2) approved 16 April 2023. 4.1.2 Clarify the distance of project activities from critical denning habitat for Northern quoll. This should include a comparison of distance between existing and planned infrastructure.	4.1 Triggers have been updated in accordance with the APOP (2023). The Activity does trigger a notifiable action for the Northern Quoll. This is captured in Section 1.7 4.1.2 Distances to critical habitat outside of the Activity Area and Indicative Footprint are provided in relation to existing and proposed infrastructure.

Item	Comments	BHP Response
	4.1.3 Include additional discussion as to why project activities will/will not increase the risk of vehicle collision with Northern quoll individuals e.g. will the planned work lead to an increase in the number or frequency of rail movements or linear infrastructure being located closer to critical denning habitat? 4.1.4 Were other potential impact pathways considered (increased dust, noise, vibration, restricted movement/dispersal)? Include discussion of relevant avoidance and mitigation measures for all impacts. 4.1.5 Table 5.11 of the Assurance and Offset Plan notes that the validation notice will identify corrective action or alternative management that may be implemented to meet program matter outcomes. Table 4.8 of the Validation Notice does not identify any corrective measure in the event of unintended impact to Northern quoll critical habitat (only additional consultation, investigation, and monitoring). It is recommended that suitable remediation measures are identified. 4.1.6. We recommend avoidance of clearing of critical denning habitat (granite domes utilised by Norther Quoll and quarry 1) be committed to in the VN by specifying an exclusion area: • A specified exclusion area provides a more concrete measure for adherence by onsite personnel and compliance checks. • It would also address concerns that actual impact footprint may change from the 'indicated' footprint and result in impact to the granite domes or quarry 1. • Having a clearly defined exclusion area for the NQ critical habitat (perhaps quantified in ha) may also help with future reporting on achievement of the PMO 'minimise loss of critical and supporting habitats of the Northern Quoll as a result of Program Activities' within the SAA. (e.g. impact to x ha of	4.1.3 Explanation has been provided in Section 4.3.5 as to why the Activity will is not anticipated to result in an increase in the number or frequency of vehicle collisions with Northern Quoll. Clarification is provided that the proposed works do not result in infrastructure closer to Northern Quoll critical habitat. 4.1.4 Increased dust, noise and vibration and habitat fragmentation are discussed in Section 4.3.5 4.1.5 Unintended clearing of Northern Quoll critical habitat is not anticipated as BHP's internal PEAHR process will be implemented prior to all ground disturbance within the Activity Area to ensure clearing does not exceed areas specified. 4.1.6 BHP does not consider it necessary to implement exclusion zones as the critical habitat to Northern Quoll lies outside of the Indicative Footprint and/or Activity Area.

Item	Comments	BHP Response
	critical habitat were avoided in the design of Mooka Rail Upgrades Project in 2023).	
Greater Bilby (triggered)	4.2.1. Update discussion in line with Assurance and Offset Plan (version 2) approved 16 April 2023. 4.2.2. Fauna and habitat surveys supporting classification of sandplain habitat within the indicative footprint indicates the habitat is suitable for Greater Bilbies, but has no evidence of species presence (sightings, scats or burrows) – indicating supporting rather than critical habitat for the species. However, these results cannot be relied upon due as they are more than 5 years old (2013) and there is a chance Greater bilbies may have established a presence more recently. Committing to pre-clearance surveys of the species after finalisation of the validation notice is not sufficient as it does not ensure or allow time for the design of appropriate avoidance and mitigation (or offsetting) measures if these are required. 4.2.2. Please review/refer to the recently released Greater Bilby Recovery Plan 2023 which came into effect on the 12 April 2023. 4.2.3. Other potential impact pathways and threatening process to be considered/discussed include: - predation by foxes, wild dogs; - indirect impacts such as changed fire regimes from introduction or increased spread of weeds (e.g. buffel grass potentially introduced with soil or equipment); - regarding risk of fire, there is known knowledge gap in relation to the effects of different fire regimes on Bilby habitat in different regions. - Does the proposed action introduce additional barriers or openings/pathways that prevent/assist Bilby dispersal (and	4.2.1 Triggers have been updated in accordance with the APOP (2023).The Activity does not trigger a notifiable action for the Greater Bilby. 4.2.2 Spectrum (2023) undertook a survey of the Activity Area and found no evidence of sign of Bilby although suitable habitat was present for foraging and burrowing. As the Activity does not trigger a notifiable action for the Greater Bilby (no records within Activity Area or within a 500 m buffer), the validation process is not applicable to Greater Bilby. Impacts to supporting habitat are considered. 4.2.2The Greater Bilby Recovery Plan (DCCEEW 2023) has been reviewed and referenced. 4.2.3 The validation process is not applicable to Greater Bilby as no notifiable action triggers apply to the activity for Greater Bilby. Impacts to supporting habitat are considered Indirect impacts such as changed fire regimes from introduction or increased spread of weeds and habitat fragmentation are considered in Section 4.4.5.

Item	Comments	BHP Response
	potential future use of the sand plain habitat remaining around the impact footprint?	
1.1. Ghost Bat	4.3.1. Update discussion in line with Assurance and Offset Plan (version 2) approved 16 April 2023. 4.3.2. The department's expectation for evidence demonstrating that Program Triggers will not being met is the same as that for demonstration that Program Matter triggers will be met. Please ensure discussion on triggers includes pinpoint referencing (page and paragraph) to cited or supporting data provided in attached survey information.	4.3.1 Triggers have been updated in accordance with the APOP (2023).The Activity does not trigger a notifiable action for the Ghost Bat. 4.3.2 Background information has been provided to show no records of Ghost Bat exist in the area and that no critical roosting or foraging habitat exists in the Activity Area. Survey references are provided.
1.2. Pilbara Olive Python	4.4.1. Update discussion in line with Assurance and Offset Plan (version 2) approved 16 April 2023. 4.4.2. The department's expectation for evidence demonstrating that Program Triggers will not being met is the same as that for demonstration that Program Matter triggers will be met. Please ensure discussion on triggers includes pinpoint referencing (page and paragraph) to cited or supporting data provided in attached survey information.	4.4.1 Triggers have been updated in accordance with the APOP (2023).The Activity does not trigger a notifiable action for the Pilbara Olive Python. 4.4.2 Background information has been provided to show no records of Pilbara Olive Python exist in the area and that no critical denning or foraging habitat exists in the Activity Area. Survey references are provided.
1.3. Pilbara Leaf-Nosed Bat	4.5.1. Update discussion in line with Assurance and Offset Plan (version 2) approved 16 April 2023. 4.5.2. The department's expectation for evidence demonstrating that Program Triggers will not being met is the same as that for demonstration that Program Matter triggers will be met. Please ensure discussion on triggers includes pinpoint referencing (page and paragraph) to cited or supporting data provided in attached survey information.	4..5.1 Triggers have been updated in accordance with the APOP (2023).The Activity does not trigger a notifiable action for the Pilbara Leaf-nosed Bat. 4.5.2 Background information has been provided to show no records of Pilbara Leaf-nosed Bat exist in the area and that no critical roosts, critical roosting or foraging habitat exists. Survey references are provided.

Item	Comments	BHP Response
1.4. Night Parrot	4.6.1. Include justification why triggers for this Program Matter will/will not be met by the planned action.	4.6.1 Background information has been provided to show no records of Grey Falcon exist in the area. Spectrum (2023) confirmed no records existed in the Activity Area and that no critical habitat for breeding was present. The area may be used as supporting foraging habitat.
1.5. Grey Falcon	4.7.1. Include justification why triggers for this Program Matter will/will not be met by the planned action.	4.7.1 Background information has been provided to show no records of Night Parrot exist in the area. Spectrum (2023) confirmed no records existed in the Activity Area and habitat was not suitable for breeding or foraging.
5. Offset measures	5.1. Residual impact to Northern Quoll supporting habitat is calculated as 7 ha (based on home range of maximum estimated home range of 100ha around denning habitat for breeding males). This equates to a circle of 0.56 km radius from the denning habitat. Image 5.1 looks to depict these calculations correctly/to scale. In section 5.4.1 of the validation notice do 'records' of Northern Quoll refer to records of sightings, scats or denning habitat or other? 5.2. I'm finding it difficult to visually compare the area of impacted Northern Quoll habitat depicted in image 5.1 to the 7 ha stated in the text (as the footprint is so narrow and there is so much of this area 'cleared/disturbed' – are you able to demonstrate how this habitat area (and/or that for the Greater Bilby) is calculated on your mapping software (via TEAMS meeting or in person)? 5.3. Residual impact to Greater Bilby habitat (supporting or critical yet to be determined via survey prior to finalising validation notice) is initially calculated as 23 ha. However, the 7 ha of Northern Quoll habitat is deducted from this 23 ha to calculate residual impact at 16 ha of Greater Bilby habitat. Please remove the deduction of Northern Quoll habitat from the calculations for Greater Bilby habitat. Residual impact calculations must be duplicated for	5.1 Following the APOP critical and supporting habitat definitions for Northern Quoll, the habitat present in the Activity Area is supporting habitat. The home range of the Northern Quoll is only applicable to critical habitat definitions and therefore reference to home range has been removed. It is noted that the entire 23 ha of Sand Plain habitat within the Indicative Footprint is a residual impact to Northern Quoll supporting habitat. 5.2. See above. 5.3. The validation process for the Greater Bilby is not applicable as no notifiable action triggers apply due to the absence of records. 5.4 As above 5.5 Table 5.1 has been included to show clear offset calculations. 5.6. Noted. The project will be paying the full offset amount rather than 10% prepayment (within 1 month of the Validation Notice becoming effective).

Item	Comments	BHP Response
	impact to habitat where the habitat provides supporting or critical habitat for more than one Program Matter. 5.4. Residual impact to Greater Bilby habitat (supporting or critical yet to be determined via survey prior to finalising validation notice) is initially calculated as 23 ha. However, the 7 ha of Northern Quoll habitat is deducted from this 23 ha to calculate residual impact at 16 ha of Greater Bilby habitat. Please remove the deduction of Northern Quoll habitat from the calculations for Greater Bilby habitat. Residual impact calculations for impact to habitat where the habitat provides supporting or critical habitat for more than one Program Matter must account for impact to each Program Matter separately, not collectively. 5.5 Current offset rates per hectare are shown in section 5.5 as provided by DCCEEW in early 2023. Please also show working and include the minimum total amount of financial contributions for the identified offset method (paying into the Pilbara Environmental Office Fund) e.g. assuming all residual impact occurs, this would be: ($1,653 x 7 ha Northern Quoll) + ($1,653 x 23 ha Greater Bilby) = $11,571 + $38,019 = $49,590 (excl GST and not including CPI to be applied for any future year impact). Figures and rates to be confirm or adjusted following Greater Bilby surveys and confirmed classification of supporting or critical habitat. 5.6 As this project has a relatively small impact and corresponding financial contribution requirement, an acceptable alternative to the 10% upfront, future year impact reconciliation and payment schedule is to provide one payment of the total minimum financial contribution (within 1 month of the Validation Notice	5.7 The date by which payment of offsets is to be made to PEOF has been included in Table 5.3.

Item	Comments	BHP Response
	becoming effective). This may be preferrable for smaller impacts/contributions such as for this project. 5.7 In Final Validation notice, include date by which 10% payment is to be made to PEOF.	
6. Commitments		
6.1. monitoring Commitments Northern Quoll & Greater Bilby	6.1.1. Performance targets, monitoring methods and frequency is included (Table 4.8) for 'no loss of population' Program Matter Outcome for Northern Quoll. We think a baseline is also included elsewhere (7 records of NQ within 4km recorded over 35 days of camera and targeted surveying in 2022), but we're not sure if this is the baseline against which the performance target has been set? If so, please make this more explicit (e.g. by including this baseline in Table. 4.8: Northern Quoll Monitoring). • The baseline will help the reader understand whether the target is reasonable, • A baseline should also assist understanding of whether subsequent monitoring results are indicating success or not. • The description of the baseline itself, how it was collected, over how many years, may be a useful way of setting the context when reporting future monitoring results (e.g. fluctuating populations or nil presence over 18 months may not necessarily mean absence of population). 6.1.2. Table 4.8 Northern Quoll monitoring: the contingency responses here are practical, but may not be effective if something is impacting this target. We recommend expanding on the first response measure (e.g. investigate potential cause of monitoring targets not being met…if cause is identified, undertake root cause analysis, implement corrective action and report findings in SEA AER).	6.1.1 Noted. A footnote to the monitoring target including this baseline data has been included. 6.1.2 Noted and included. 6.1.4 Noted. This will be considered in the next 5-year review. 6.1.5 No-pre-clearance survey for Greater Bilby is considered necessary as recent survey work (Spectrum 2023) confirmed that the notifiable action triggers for Greater Bilby were not met as no records were present.

Item	Comments	BHP Response
	6.1.4 See below suggested example for performance reporting in future 5-year reviews. *EXAMPLE A. there has been no loss of NQ colonies as a result of BHP's iron ore mining in the Pilbara (performance result against NQ PMO)* *Historical monitoring (2008-2022) indicated the presence of a high-density population of Northern Quoll at BHP's Mooka rail facility 22km south of Port Hedland. Prior to commencing upgrades to the railway at Mooka in 2023, monitoring over 35 days captured 7 records of Northern quoll within 4km of the site [baseline?]. Six monthly monitoring (motion cameras and targeted searches) at 4 sites over the past 2 years has recorded evidence of NQ presence (and any further detail on NQ population characteristics that demonstrates meeting of the PMO no loss of NQ populations).* *Baseline: monitoring over 35 days in Dec 2022 captured 7 records of Northern quoll within 4km Mooka* *Performance target: Presence or evidence of Northern Quoll at one or more sites over two years of monitoring* *Monitoring method: Biannual monitoring at Sites 1, Site 1C, Site 2 and Site 2C. Monitoring to be undertaken twice a year. Techniques will include motion camera footage and targeted searches. Figure 4.5 shows the current monitoring locations.* *EXAMPLE B. BHP has minimised loss of critical and supporting NQ habitats as a result of program activities (result against NQ PMO)* *Between July 2023 and 20xx, when upgrading rail infrastructure on BHP's Newman Railway at Mooka, 22km south of Port Hedland, we designed the majority (86 ha) of upgrades to occur within the existing infrastructure corridor – limiting the amount of clearing of Bilby and Quoll dispersal habitat to 23 ha. We also implemented a development exclusion boundary around x ha of NQ critical*	

Item	Comments	BHP Response
	breeding and foraging habitat (granite outcrops and a disused quarry). We continue implementing our rail upgrade works program and monitoring the exclusion area to ensure development does not occur within this area and it remains available for NQ breeding and foraging. (include photo/arial imagery and coordinates or larger map). *Baseline: nil disturbance within the exclusion area (x ha).* *Performance target: 'disturbance within the exclusion area does not exceed the baseline'* *Monitoring method: ? satellite imagery check/Site personnel reports to environment team every 6 months/incident notification* *Performance report against the target: 'met' or 'not met: disturbance to 0.9 ha occurred in Month YYYY following [insert whatever actually happened e.g. accidental detonation of a unidentified unexploded ordnance]'* These examples are provided to prompt consideration of what data BHP would like to have (and therefore what monitoring targets and methods you set in the validation notice) in order to report meaningfully to DCCEEW, the Minister and the public each year and in 5, 10, 20 years' time. You could also consider whether monitoring data for other impacts/threats and management measures would be worthwhile e.g. monitoring feral cat numbers, baseline and spread of weeds around the site. 6.1.5 Monitoring commitments for Bilby to be reviewed and revised depending on outcomes from GB surveys prior to finalising the Mooka validation notice.	
6.2 Clearing commitment	6.2.1. Northern Quoll: see earlier recommendation to define an exclusion area for NQ critical habitat	6.2.1 BHP does not consider an exclusion zone is necessary as critical habitat is outside of the Activity Area

Item	Comments	BHP Response
	6.2.2. Greater Bilby: review clearing limits/avoidance commitment once surveys completed.	and the PEAHR process will only allow clearing within this area (so it is excluded by default. 6.2.2 Greater Bilby pre-clearance surveys are not required based on the absence of records by Spectrum (2023)
6.3 Management commitments	6.3.1 are firebreaks included in the clearing footprint?	6.3.1 Fire breaks are captured in existing disturbance as these were prepared prior to the SEA implementation.
6.4 Offset commitments	6.4.1. reporting on offset outcomes is expected as part of future 5-year reviews of Program implementation (in addition to Annual reporting).	6.4.1 Noted and included.

Appendix 2: Terrestrial Fauna Survey Reports