



# Plan

## Quoya zonalis Infrastructure Plan

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### North Star Magnetite Project

8 December 2023

662NS-5530-PL-EN-0001

Rev: 4



## TABLE OF CONTENTS

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<b>1</b>	<b>CONTEXT, SCOPE AND RATIONALE</b> .....	<b>3</b>
<b>1.1</b>	<b>The Proposal</b> .....	<b>3</b>
1.1.1	Stage 1 .....	3
1.1.2	Stage 2 .....	3
1.1.3	Associated infrastructure .....	4
<b>1.2</b>	<b>Condition requirements</b> .....	<b>5</b>
<b>2</b>	<b>RATIONALE AND APPROACH</b> .....	<b>6</b>
<b>2.1</b>	<b>Survey and study findings</b> .....	<b>6</b>
2.1.1	Key population assumptions .....	8
2.1.2	Design approach .....	8
<b>3</b>	<b>REFERENCES</b> .....	<b>11</b>
<b>FIGURE 1</b>	<b>REGIONAL LOCATION MAP</b> .....	<b>13</b>
<b>FIGURE 2</b>	<b><i>QUOYA ZONALIS</i> RECORDS FROM WITHIN THE MINE DEVELOPMENT</b>	
<b>ENVELOPE</b>	<b>14</b>	
<b>APPENDIX A</b>	<b>SPATIAL DATA</b> .....	<b>15</b>
<b>APPENDIX B</b>	<b>SUPERSEDED POPULATIONS</b> .....	<b>16</b>

## LIST OF TABLES

---

Table 1: Condition requirements .....	5
Table 2: Approximate number of known individuals to be disturbed within MDE (including 10 m buffer) .....	10



# 1 CONTEXT, SCOPE AND RATIONALE

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This *Quoya zonalis* (*Quoya zonalis*) Infrastructure Plan (the Plan) has been prepared by IB Operations Pty Ltd (IBO) to demonstrate that the mine and associated infrastructure within the Mine Development Envelope (MDE) has been located to avoid or minimise the direct loss of *Quoya zonalis* for the Iron Bridge Magnetite Project (the Project).

This Plan has been prepared to ensure compliance with Conditions 6-1 and 6-2 of Ministerial Statement (MS) 993.

## 1.1 The Proposal

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IBO is a joint venture company between FMG Iron Bridge (Aust) Pty Ltd and Formosa Steel IB Pty Ltd. IBO proposes to develop and manage the Project which is located approximately 110 km south of Port Hedland in the Pilbara Region of Western Australia (WA) (Figure 1).

The Project will mine magnetite ore, which will be processed on site and transported to Port Hedland for export. The ore will be crushed and further processed onsite to produce a magnetite product, dry process rejects and wet tailings. All tailings will be sent to a dedicated tailing storage facility (TSF) and mine waste will be sent to a waste rock dump (WRD). Magnetite concentrate will be delivered to Port Hedland via a slurry pipeline and exported through the Port Hedland Inner Harbour. The Project has received Ministerial approval (MS 993) under Part IV of the *Environmental Protection Act 1985 (WA) (EP Act)* and was approved under the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act, EPBC 2012/6689)*.

The Project has been implemented in two stages, Stage 1 and Stage 2.

### 1.1.1 Stage 1

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Stage 1 (Hematite) was referred to the Environmental Protection Authority (EPA) as a discrete proposal under the *EP Act* on 2 July 2012. On 6 August 2012, the EPA determined that the Stage 1 proposal did not require formal environmental impact assessment (EPA ref: A520691). Stage 1 is fully constructed.

### 1.1.2 Stage 2

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Stage 2 of the Project (Magnetite) was assessed by the EPA under a Public Environmental Review (PER). The assessment considered the potential for the Project to impact on the then Priority 1 species *Pityrodia* sp. Marble Bar (G. Woodman & D. Coultas GWDC Opp 4) (*Pityrodia* sp. MB, now known as *Quoya zonalis*), which subsequent to the EPA's assessment, was re-classified to Threatened Flora<sup>1</sup>. EPA stated in its Report and Recommendations that Stage 2 of the Project could be managed to meet the EPA's

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<sup>1</sup> Under the Wildlife Conservation (Rare Flora) Notice 2017



objective for flora and vegetation subject to a number of conditions. Stage 2 of the Project received Ministerial approval on 5 January 2015 under MS 993.

Stage 2 of the Project was also granted approval under the *EPBC Act* on 6 February 2015 and conditions were placed on the Project as outlined in EPBC 2012/6689. None of the conditions specifically relate to *Quoya zonalis*, which at the time of assessment was not listed as a threatened species. It was subsequently listed as Endangered under the *EPBC Act* on 11 March 2018<sup>2</sup>.

Substantial commencement of Stage 2 was provided to Department of Water and Environmental Regulation (DWER) on 5 August 2019, which included construction of:

- An aerodrome and associated access road
- Expansion of the North Star accommodation village
- Construction of the water pipeline
- Development/ widening of the existing site access road.

A significant amendment, North Star Extension (NSE), for the Project in 2022 included extension of the Mine Development Envelope (MDE), ancillary infrastructure and an additional 606.9 hectares of clearing.

### 1.1.3 Associated infrastructure

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Condition 6-2 (1) refers to “associated infrastructure”. Associated infrastructure is to be developed to support mining operations, which may include the following:

- Gas fired power station;
- Concentrate handling facilities;
- Roads and pipelines;
- Water processing, ponds and reticulation;
- Bulk fuel storage;
- Workshops and maintenance facilities;
- Laydown and storage facilities;
- Explosives and chemical storage;
- Camp and administration buildings; and
- Aerodrome and associated roads.

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<sup>2</sup> Under *Quoya zonalis* (G. Woodman & D. Coultas GWDC Opp 4) Conservation Advice



## 1.2 Condition requirements

Table 1 details the requirements of Condition 6 of MS 993 and references the section of this Plan where those requirements are addressed.

**Table 1: Condition requirements**

MS 993 Condition number	Details	Relevant section/s of this Plan
6-1	Prior to the disturbance of any individuals of <i>Pityrodia</i> sp. Marble Bar <sup>3</sup> within the Mine Development Envelope (MDE), the proponent shall prepare and submit a <i>Pityrodia</i> sp. Marble Bar <sup>3</sup> Mine Infrastructure Plan to the CEO.	The development and submission of this Plan addresses this requirement
6-2	The <i>Pityrodia</i> sp. Marble Bar <sup>3</sup> Mine Infrastructure Plan required by condition 6-1 shall: (i) demonstrate that mine and associated infrastructure within the MDE will be located to avoid or minimise the direct loss of <i>Pityrodia</i> sp. Marble Bar <sup>3</sup> as far as practicable; and (ii) include spatially accurate, rectified and geographically referenced data and maps showing the location of the mine and associated infrastructure within the MDE.	Section 2.1.2 Figure 2  Appendix A

<sup>3</sup> Now known as *Quoya zonalis*



## 2 RATIONALE AND APPROACH

### 2.1 Survey and study findings

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Baseline surveys have informed the management approach presented to address Condition 6 of MS 993. The following baseline surveys have been conducted and were deemed to be relevant to this Plan:

- A two-phase flora and vegetation survey was undertaken for the Project Mine Development Envelope (MDE) between April and September 2011 (ecologia Environment (ecologia) 2012a).
- A targeted *Quoya zonalis* flora survey was carried out in April 2012 (ecologia 2012b).
- A regional survey was conducted in September 2015 (ecologia 2016) in accordance with the *Pityrodia* sp. MB Regional Survey Plan (ecologia 2014), which was submitted as per Conditions 7-2 to 7-4 of MS 993 and approved by DWER in March 2015.
- A detailed (two phase) flora and vegetation survey was conducted by Ecoscape in 2018 (Ecoscape 2018) over the Glacier Valley area, to build on previous data. The Glacier Valley area lies to the south-east of the MDE. As part of this survey, all *Quoya zonalis* populations already known from the previous studies above were reconfirmed and additional targeted searches were conducted in areas of potential habitat.
- Ecoscape undertook a flora and vegetation assessment consolidation and supplementary survey of the North Star Extension in 2020 including targeted searches for conservation significant flora (Ecoscape 2020).
- Spectrum Ecology conducted targeted surveys in 2020 and 2021 to ensure compliance with MS993 and Threatened Flora Licence (TFL) 12B-2021 and 12B-2022 conditions and support exploration activities (Spectrum Ecology 2020, 2021a & b).
- A consolidation of data was undertaken by Spectrum Ecology in 2022 to determine the abundance estimate for *Quoya zonalis* in Western Australia by reviewing all *Quoya zonalis* records within the Fortescue database, those held by the Department of Biodiversity Conservation and Attractions (DBCA) within the Threatened and Priority Flora (TPFL) and Western Australian Herbarium (WAH) databases, and any in-publication reports to produce an updated consolidated census of *Quoya zonalis* locations and populations.
- Targeted searches were conducted in 2022 by Spectrum Ecology (2022) and ecologia (2022) to provide supporting information for Programme of Work and Native Vegetation Clearing Permit applications associated with exploration activities with the Shooting Star and West Star areas surrounding the MDE.
- A targeted flora assessment of the North Star Extension (NSE), parts of the MDE and the Western Addition (area west of NSE) was conducted by ecologia in April and May 2023 (ecologia 2023).
- Seed collection activities have been undertaken by Ecoscape annually since 2020 to support restoration research as detailed in the *Pityrodia* sp. *Marble Bar*



*Research and Conservation Plan* (662MIC0020-5500-PL-EN-0001) required to be implemented under condition 7-10 of MS 993. During seed collection activities additional plants associated with population 47 were found that had not been previously recorded during the baseline and targeted surveys documented above.

The ecologia (2012a) study found that *Quoya zonalis* was relatively abundant, with 541 plants recorded from 14 loci (representing 14 populations separated by more than 500 m) within the study area. The targeted survey (ecologia 2012b) found a total of 688 *Quoya zonalis* plants from 10 loci.

The *Quoya zonalis* regional survey (ecologia 2016) recorded 2,114 new locations of *Quoya zonalis*, representing 7,473 previously unrecorded mature individuals, with an additional 269 juveniles and 45 seedlings recorded. Based on all known records of *Quoya zonalis*, there was an estimated 9,848 individuals recorded (including 9,534 mature individuals, 269 juveniles and 45 seedlings) (ecologia 2016) representing 67 populations separated by at least 500 m.

The Glacier Valley Extension Flora and Vegetation Survey (Ecoscape 2018) located one additional *Quoya zonalis* plant within 200 m of the single plant associated with Population 12. Six new populations (designated Populations 69 to 74) were recorded from the survey area, totalling 259 plants, plus two additional populations recorded outside of the survey area (designated Populations 75 and 76) totalling seven plants. The total number of new plants recorded from this survey was 267 (including plants outside the Glacier Valley survey area).

The North Star Extension consolidated survey located an additional 11 *Quoya zonalis* individuals and one new population, taking the total number of known populations with the NSE to three comprising a total of 17 plants.

The data consolidation (Spectrum 2023) determined a total of 17,040 individuals located within Western Australia, inclusive of the targeted searches conducted in 2021 and 2022 to support TPFL reporting associated within the MDE and those in the Shooting Star and South Star exploration areas. Targeted flora assessments conducted by Ecologia within the West Star exploration area in 2022 and across the NSE, MDE and Western Addition in 2023 (ecologia 2022 & 2023) located a total of 661 and 2,762 individuals of *Quoya zonalis* respectively, increasing the total number of known *Quoya zonalis* to 20,463 (ecologia 2023).

An additional 20 plants were also recorded within the proposed ancillary infrastructure disturbance footprint for the NSE by Ecoscape during *Quoya zonalis* seed collection activities in November 2023 (report in preparation) extending the extent of population 47 and further increasing the total number of known *Quoya zonalis* to 20,483.



These surveys identified the known individuals as required by condition 7-4(iii) of MS 993. These individuals were considered in the locating of the mine and associated infrastructure in the Mine Development Envelope (MDE) to avoid or minimise the direct loss of *Quoya zonalis*, as far as practicable.

Where recruitment, or previously unknown population/s of *Quoya zonalis* has occurred in the MDE (recently recruited individuals), these recently recruited individuals are not identified in the total number of individuals referenced in the spatially accurate referenced data and maps (shapefiles) and the tables in this Plan.

Ground disturbance in the area specified in the shapefiles will impact the known individuals specified in this Plan and any recently recruited individuals within the same area. The number of removed recently recruited individuals will be recorded in reports to the Department of Biodiversity, Conservation and Attractions required for the Management Authority to Take *Quoya zonalis*.

#### 2.1.1 Key population assumptions

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Following integration of the locations recorded during survey and studies mentioned above and reconciliation of existing datasets, the total number of known *Quoya zonalis* plants is currently understood to be 20,483 from 94 populations. *Quoya zonalis* also appeared to be strongly associated with the Capricorn Land System (ecologia, 2012b & 2023), however records are also located on the Talga and Rocklea Land Systems to the west of the NSE.

The preferred habitats of *Quoya zonalis* are well documented (see Section 2.10.2 of ecologia 2023). This habitat preference when considered with the current known distribution it is highly likely that additional populations occur, particularly immediately to the west of the MDE within the Capricorn land system (Ecoscape 2018 & ecologia 2023).

#### 2.1.2 Design approach

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The mine and associated infrastructure within the Project MDE were planned and located by following the hierarchy of mitigation. As per Condition 6-2, this Plan is to include avoid or minimise the direct loss of *Quoya zonalis* populations within the MDE.

### **Mine Pits, Run of Mine (ROM) and Waste Rock Dumps (WRDs)**

The mine will include multiple pits and ROM that were designed based on geotechnical information to limit the size of the pits to as low as practicable. The mine pit at NSE will disturb approximately 3 *Quoya zonalis* from Population 47<sup>4</sup>, which represents 0.01% of the total known number of individuals.

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<sup>4</sup> Only population within the proposed disturbance of the NSE footprint.



The WRD east of the pits was located as close to the pits as possible to minimise the length of haul roads, and therefore reduce the total disturbance footprint. The WRD placement will disturb approximately 11 known *Quoya zonalis* individuals from Populations 7 and 84. This represents 0.05% of the total known number of *Quoya zonalis* (refer to Table 2 and Figure 2).

### **Tailings Storage Facility (TSF), Return Water Pond and Dry Rejects Stockpile**

The TSF and return water pond have been located and designed to take into account the topography of land within the MDE. However, due to the constraints of available low-lying area within the mine tenement boundary, and the revised embankment design, the return water pond TSF will disturb approximately 339 individuals from Population 44 and the TSF will disturb 1027 individuals from Populations 7, 44, 81, 83 and 84 representing 1.66% and 5.01% of the total known number of *Quoya zonalis* respectively (see Table 2 and Figure 2).

### **Processing Plant, Roads and Pipelines**

The linear infrastructure for the Project, such as roads and pipelines, have a higher degree of flexibility to avoid *Quoya zonalis* plants. IBO has utilised existing disturbed tracks and other areas as far as practicable for new roads and pipelines. Due to topographical constraints approximately 282 *Quoya zonalis* individuals will be disturbed from population 44 in association with the Haul Roads, which represents 1.38% of the total known number of individuals. There are 20 plants from population 47 within the proposed infrastructure disturbance footprint associated with the NSE representing 0.10% of the total known number of individuals. A fuel storage facility will disturb 10 *Quoya zonalis* individuals from Population 44 (see Table 2 and Figure 2).



**Table 2: Approximate number of known individuals to be disturbed within MDE (including 10 m buffer)**

Design element	Pop. 7	Pop. 78*	Pop. 47	Pop. 81	Pop. 83	Pop. 84	Total	Percent of known individuals
TSF	119	848	-	1	56	3	1027	5.01%
Fuel storage facility	-	10	-	-	-	-	10	0.05%
WRD	8	-	-	-	-	3	11	0.05%
Pit (NSE)	-	-	3	-	-	-	3	0.01%
Return water pond	-	339	-	-	-	-	339	1.66%
Haul road	-	282	-	-	-	-	282	1.38%
Infrastructure (NSE)			20				20	0.10%
<b>Total</b>							<b>1,692</b>	<b>8.26%</b>

\* Includes superseded populations refer to Appendix B



### 3 REFERENCES

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This report and all internal supporting documents will be managed as per Fortescue Document Governance Standards. These may be read in conjunction with this report.

- [1] ecologia (2012a). North Star Vegetation and Flora Assessment (NS-AS-EN-0001). Unpublished report prepared for Fortescue Metals Group.
- [2] ecologia (2012b). Pityrodia sp. Marble Bar Targeted Flora Survey (NS-RP-EN-0006). Unpublished report prepared for Fortescue Metals Group.
- [3] ecologia (2015a). North Star Aerodrome Flora Level 2 and Fauna Level 1 Assessment. Unpublished report prepared for Fortescue Metals Group.
- [4] ecologia (2015b). North Star Water Corridor Targeted Significant Flora and Vegetation Survey. Unpublished report prepared for Fortescue Metals Group.
- [5] ecologia (2022). *Quoya zonalis* targeted flora survey at West Star Iron Bridge (Priority 1 area). Unpublished report prepared for Fortescue Metals Group.
- [6] ecologia (2023). North Star Extension Targeted Flora Assessment. Unpublished report prepared for Fortescue Metals Group.
- [7] Ecoscape (2018). Glacier Valley Extension Flora and Vegetation Survey, North Star Project. Unpublished report prepared for Fortescue Metals Group.
- [8] Ecoscape (2020). North Star Extension Flora and Vegetation Survey. Unpublished report prepared for Fortescue Metals Group.
- [9] Spectrum Ecology (2020). Targeted Flora and Vegetation Survey, Iron Bridge. Unpublished report prepared for Iron Bridge Operations.
- [10] Spectrum Ecology (2021a). *Quoya zonalis* Targeted Flora Survey. Unpublished report prepared for Iron Bridge Operations.
- [11] Spectrum Ecology (2021b). Shooting Star & South Star *Quoya zonalis* Targeted Flora Survey, Iron Bridge. Unpublished report prepared for Iron Bridge Operations.
- [12] Spectrum Ecology (2022). Shooting Star Targeted *Quoya zonalis* Survey. Unpublished report prepared for Fortescue Metals Group.
- [13] Spectrum Ecology (2023). *Quoya zonalis* data consolidation. Unpublished report prepared for Fortescue Metals Group.



## DOCUMENT CONTROL

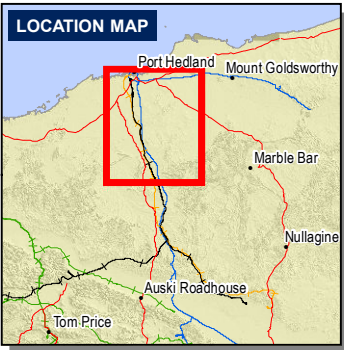
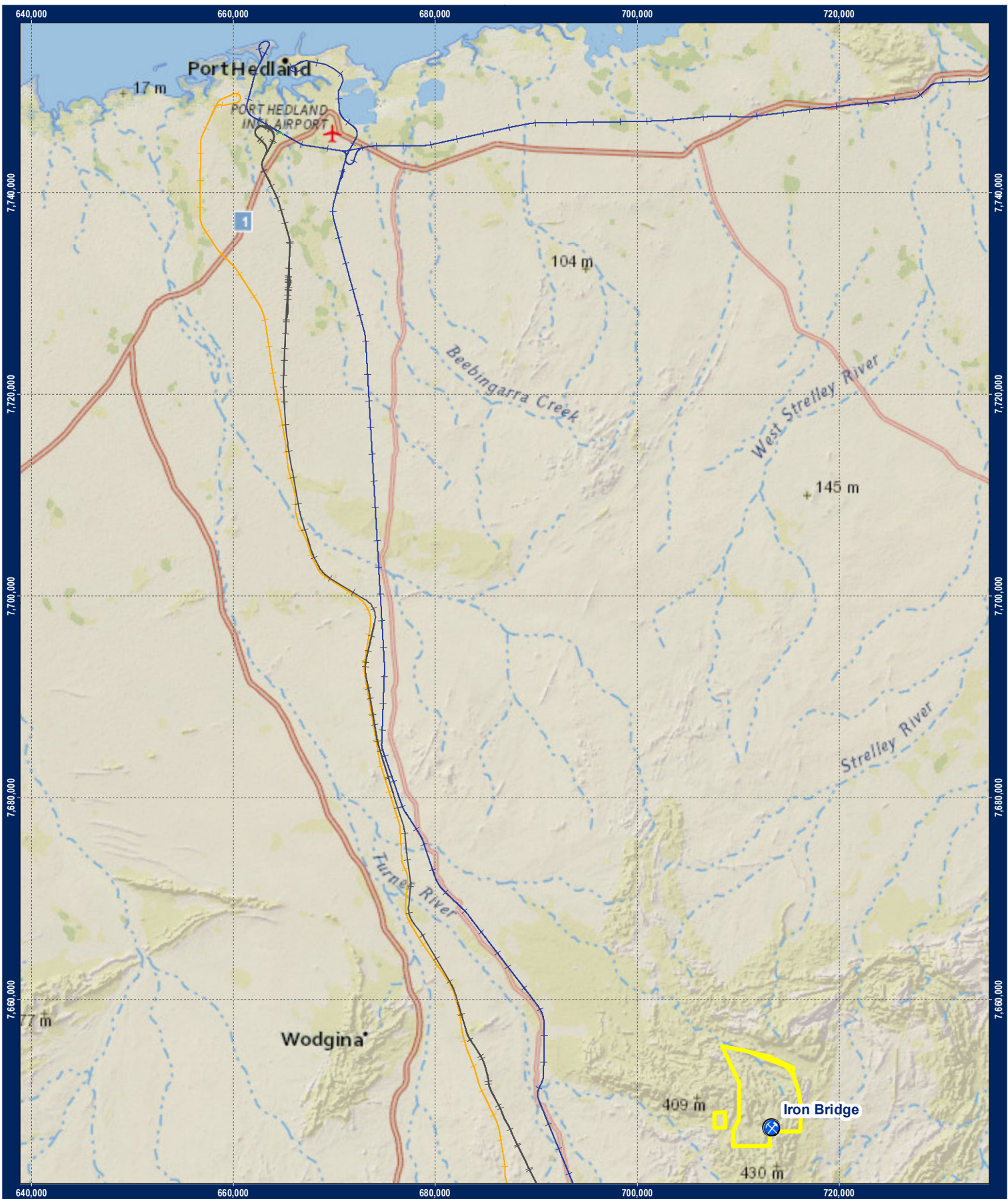
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Quoya zonalis Infrastructure Plan		
Status	IFU - Issued for Use	8-Dec-23
Summary of Changes	Updated for inclusion of NSE area	
Author	Jane Humphrey/Jared Nelson	_____ Signature
Checked or Squad Review# (if applicable)	Vladimir Dios Vera	_____ Signature
Approved	Todd Edwards	_____ Signature
Next Review Date (if applicable)	14-Dec-28	

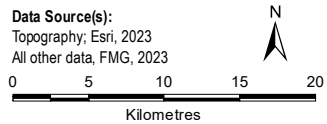


## FIGURE 1 REGIONAL LOCATION MAP

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- LEGEND**
- Mining Area Development Envelope
  - Towns
  - ⊗ Iron Bridge Project Area
  - +— FMG Rail Alignments
  - +— BHPB Rail
  - +— Rio Tinto Rail
  - +— Roy Hill Rail



**Project Location**  
**Iron Bridge**

Requested By: M. Morris	Date: 28/06/2023
Drawn By: N. Rappa	Size: A4P
Revised By: shlaw	Revision: 2
Approved By: P. Mastair	Confidentiality: 0
Scale: 1:500,000	
Coordinate System: GDA 1994 MGA Zone 50	
Document Name: 662NS_0000_MP_EN_0014.001_r2	

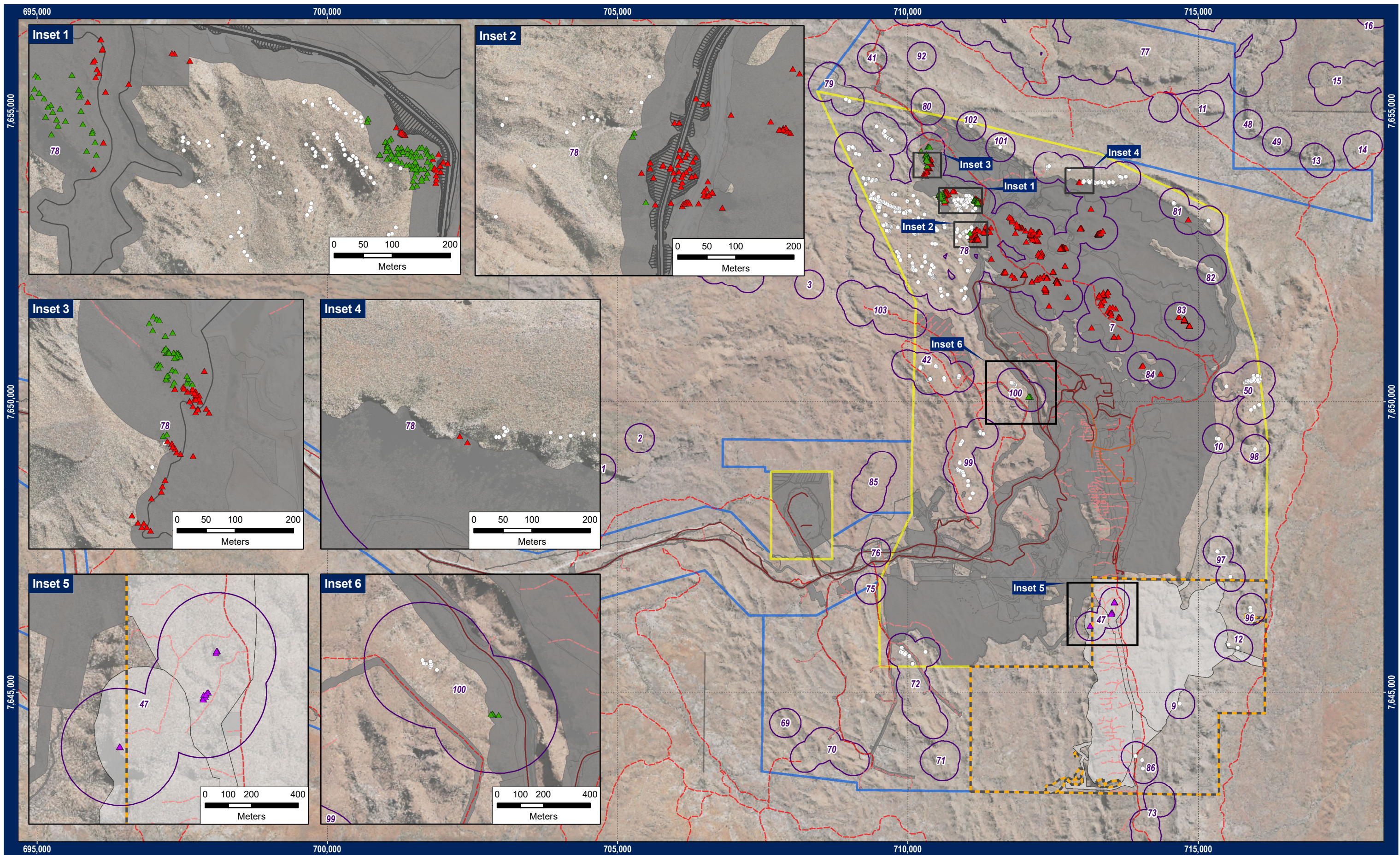
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Iron Bridge



**FIGURE 2** *QUOYA ZONALIS* RECORDS FROM WITHIN THE MINE DEVELOPMENT ENVELOPE

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**LEGEND**

**Quoya zonalis records within MDE and NSE**

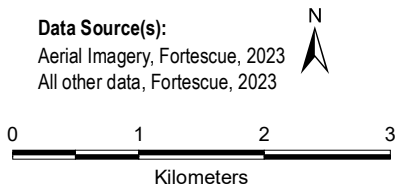
- ▲ Directly Impacted
- ▲ Directly Impacted - NSE
- ▲ Indirectly Impacted
- Outside of Impact Area

- Indicative Infrastructure Linework
- Quoya zonalis populations
- Mining Proposal Footprints
- Mining Area Development Envelope

- Other Development Envelopes
- Mining Proposal Footprints

- Proposed Amendment - NSE
- Proposed Disturbance Footprint - NSE

**Data Source(s):**  
 Aerial Imagery, Fortescue, 2023  
 All other data, Fortescue, 2023



Requested By: J. Humphrey  
 Drawn By: J. Nelson  
 Revised By: rushall  
 Approved By:  
 Scale: 1:60,000  
 Coordinate System: GDA 1994 MGA Zone 50  
 Document Name: 662NS\_0000\_MP\_EN\_0329

Date: 8/12/2023  
 Size: A3L  
 Revision: 0  
 Confidentiality: No

**Avoidance of Quoya zonalis in Mining Development Envelope Iron Bridge**



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## APPENDIX A SPATIAL DATA

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## APPENDIX B SUPERSEDED POPULATIONS

Population (rev 3 of Plan)	Updated Population (rev 4 of Plan)	Comment
4	77	Population updated based on adjoining records from following survey results Spectrum (2021) Targeted Flora and Vegetation Survey, Iron Bridge.
6		
8		
45		
68		
5	78	Population updated based on adjoining records from following survey results Spectrum (2021) <i>Quoya zonalis</i> Targeted Flora Survey, Iron Bridge.
43		
46		
44		Population updated based on adjoining records from following survey results ecologia (2023) North Star Extension Targeted Flora Assessment
76	N/A	Population 76 outside MDE (including 10m buffer).