## Greater Paraburdoo Iron Ore Hub Proposal – Assessment No. 2189

## Revised Significant Residual Impact Offset Summary

Rio Tinto on behalf of Hamersley Iron Pty Limited (the Proponent) has revised the proposed environmental offset contributions based on changes to the Greater Paraburdoo Iron Ore Hub Proposal (the Proposal) since the publishing of the Environmental Review Document in May 2020. The proposed offset rates are aligned with specified rates for the Pilbara Bioregion outlined in the EPA's guidance for each significant residual impact or specified rates provided by the Department of Agriculture, Water and the Environment (DAWE) for Matters of National Environmental Significance (MNES) species. Since the Proposal also straddles the Gascoyne Bioregion where offset rates are not specified, the Proponent has proposed an offset program based on the significant values identified and to utilise the Pilbara Environmental Offset Fund (PEOF) for MNES species. The Proponent acknowledges the Commonwealth may use a different approach to the State Government for offsetting the significant residual impacts of the Proposal to MNES, with the details of any difference to be defined under the offset conditions of any approval decision and via the Impact Reconciliation Procedure (IRP).

Areas requiring offsets outlined below are *conservative estimates* based upon the most current mine planning information at the time of writing. The actual quantum of impact and offsets required will be determined through the procedure outlined in the Greater Paraburdoo Iron Ore Hub IRP.

The hierarchy of offset payments (based on the greater amount as provided in the IRP) is as follows:

- Clearing of high value habitat in the form of Breakaways and Gorge/Gully habitat for Northern Quoll, Ghost Bat, Pilbara Leaf-nosed Bat and Pilbara Olive Python - $3,306
- Clearing of high value Pilbara Olive Python habitat – Riverine habitat - $3,306
- Clearing of Riparian vegetation - $1,679 (Pilbara bioregion)
- Clearing of *Aluta quadrata* - $1,679 (Pilbara bioregion)
- Clearing of moderate value Northern Quoll habitat in the form of Riverine, Drainage Line and Rocky Hill habitat within 1km of a previous Northern Quoll record - $1,653
- Clearing of moderate value Ghost Bat habitat in the form of Riverine, Drainage Line and Rocky Hill habitat within 5km of a Ghost Bat cave - $1,653
- Clearing of moderate value Pilbara Leaf-nosed Bat habitat in the form of Riverine, Alluvial Plain, Drainage Line and Rocky Hill habitat within 10km of a Pilbara Leaf-nosed Bat cave - $1,653
- Clearing of Good – Excellent condition vegetation - $840 (Pilbara bioregion)

*Table 1 - Significant Residual Impact Offset Summary*

| Environmental factor | Environmental aspect | Status (State/ Commonwealth) | Indicative area to be offset | Calculation notes | Residual area to be offset | Proposed offset rate | Indicative offset contribution |
|---|---|---|---|---|---|---|---|
| **Pilbara Bioregion** | | | | | | | |
| **Flora and vegetation** | Clearing of Good – Excellent condition vegetation<br>(Figure 1g) | N/A | 1,448 ha | Total clearing area (4,300 ha less MNES habitat, riparian vegetation and *Aluta quadrata* offset areas): **386 ha**<br>(Figure 1g) | 386 ha | $840 | $324,240 |
| | Clearing of riparian vegetation (that is not MNES habitat but may also be native vegetation in Good to Excellent condition) | N/A | 1 ha | Clearing of 1 ha of Good to Excellent condition Riparian vegetation in the Pilbara bioregion. | 1 ha | $1,679 | $1,679 |
| | ***Aluta quadrata*** | | | | | | |
| | Clearing of 678 individuals of threatened flora species, *Aluta quadrata* within 4.74 ha area (2.97 ha of which co-occurs with MNES habitat so is already included in the offset numbers below).<br>This impact is reduced from 5,179 individuals predicted to be directly impacted from the Original Proposal due to the reduction in size of the mine pits (and sterilisation of ore) to further protect the species, which has enabled the Mining Exclusion Zones (MEZ) to be expanded in order to protect the majority (greater than 96% of the recorded | Threatened under BC Act | 4.74 ha[1] | 2.97 ha of the *Aluta quadrata* area co-occurs with MNES habitat, resulting in **1.77 ha** net offset total.<br>Greater than 96% of the population within the Development Envelope is now protected via the change in mine pits and the newly configured MEZ (Figure 1b) | 1.77 ha | $1,679 | $2,972 |

[1] *Aluta quadrata* records within conceptual disturbance footprint buffered by 20m

| Environmental factor | Environmental aspect | Status (State/ Commonwealth) | Indicative area to be offset | Calculation notes | Residual area to be offset | Proposed offset rate | Indicative offset contribution |
|---|---|---|---|---|---|---|---|
| | Western Range populations in the Development Envelope). | | | | | | |
| **Terrestrial fauna** | Clearing of *high value* habitat in the form of Breakaways and Gorge/Gully habitat for Northern Quoll, Ghost Bat, Pilbara Leaf-nosed Bat and Pilbara Olive Python | Endangered (Northern Quoll) and Vulnerable (Ghost Bat, Pilbara Leaf-nosed Bat, Pilbara Olive Python) under the EPBC Act; Endangered (Northern Quoll) under Schedule 2 of the WA BC Act and Vulnerable (Ghost Bat, Pilbara Leaf-nosed Bat, Pilbara Olive Python) under Schedule 3 of the WA BC Act | 288 ha | The highest rate is applied to residual impacts to critical MNES fauna habitat comprising **Breakaways** and **Gorge / Gully habitat** that may be directly affected, in good to excellent condition. | 288 ha | $3,306 | $952,128 |
| | Clearing of *high value* Pilbara Olive Python habitat | Vulnerable under the EPBC Act and Vulnerable under Schedule 3 of the BC Act | 7 ha | The highest rate is applied to residual impacts to critical Pilbara Olive Python habitat comprising **Riverine habitat** that may be directly affected. | 7 ha | $3,306 | $23,142 |
| | Clearing of *moderate value* Northern Quoll habitat in the form of Riverine, Drainage Line and Rocky Hill habitat **within 1km** of a previous Northern Quoll record. | Endangered under the EPBC Act and under Schedule 2 of the WA BC Act. | 1,012 ha | 698 ha of moderate value Northern Quoll habitat co-occurs with high value Pilbara Olive Python habitat, resulting in **314 ha** net offset total. | 314 ha | $1,653 | $519,042 |
| | Clearing of *moderate value* Ghost Bat habitat in the form of Riverine, Drainage Line and Rocky Hill | Vulnerable under the EPBC Act; Vulnerable under | 2,790 ha | 2,343 ha of moderate value Ghost Bat habitat co-occurs with high value Pilbara Olive Python habitat, or moderate value Northern Quoll habitat, | 447 ha | $1,653 | $738,891 |

| Environmental factor | Environmental aspect | Status (State/ Commonwealth) | Indicative area to be offset | Calculation notes | Residual area to be offset | Proposed offset rate | Indicative offset contribution |
|---|---|---|---|---|---|---|---|
| | habitat **within 5km** of a Ghost Bat cave. | Schedule 3 of the WA BC Act | | or *Aluta quadrata*, resulting in **447 ha** net offset total. | | | |
| | Clearing of *moderate value* Pilbara Leaf-nosed Bat habitat in the form of Riverine, Alluvial Plain, Drainage Line and Rocky Hill habitat **within 10km** of a Pilbara Leaf-nosed Bat cave. | Vulnerable under the EPBC Act; Vulnerable under Schedule 3 of the WA BC Act | 2,035 ha | 1,969 ha of moderate value Pilbara Leaf-nosed Bat habitat co-occurs with high value Pilbara Olive Python habitat, or moderate value Northern Quoll and Ghost Bat habitat, or Riparian vegetation, resulting in **66 ha** net offset total. | 66 ha | $1,653 | $109,098 |
| **Total Pilbara Bioregion indicative financial contribution** | | | | | | | **$2,671,192** |
| **Gascoyne Bioregion** | | | | | | | |
| **Flora and vegetation** | Clearing of Good – Excellent condition vegetation | Not applicable | 1,332 ha | Total clearing area (4,300 ha less MNES habitat, riparian vegetation and *Aluta quadrata* offset areas): **1,166 ha** | 1,166 ha | N/A | Refer to Total Aluta quadrata offset Program |
| | Clearing of riparian vegetation (that is not MNES habitat but may also be native vegetation in Good to Excellent condition) | Not applicable | 2 ha | Clearing of 2 ha of Good to Excellent condition Riparian vegetation in the Gascoyne bioregion. | 2 ha | N/A | Refer to Total Aluta quadrata offset Program |
| | ***Aluta quadrata*** | | | | | | |
| | No direct clearing of individuals of threatened flora species, *Aluta quadrata* within the Gascoyne Bioregion | Threatened under BC Act | 0 ha | Three (3) *Aluta quadrata* individuals occur in the Gascoyne Bioregion which are not within the indicative disturbance footprint of the Proposal and not proposed to be cleared.<br>The remainder of the population in the Gascoyne Bioregion is protected via a Mining Exclusion Zone and | 0 ha | N/A | $0 |

| Environmental factor | Environmental aspect | Status (State/ Commonwealth) | Indicative area to be offset | Calculation notes | Residual area to be offset | Proposed offset rate | Indicative offset contribution |
|---|---|---|---|---|---|---|---|
| | | | | therefore there are no significant residual impacts requiring offsets. | | | |
| | Impact to *Aluta quadrata* population from development of the Overall Greater Paraburdoo Iron Ore Hub mining operations | Threatened under BC Act | N/A | No quantifiable area impacted.<br>However, in acknowledgement of the importance and spatial restriction of this population at Western Range and potential for indirect impacts to 174 individuals from changes to surface water catchments, a research-based offset program is proposed in partnership with Botanical Gardens and Parks Authority (BGPA) (Kings Park). | N/A | N/A | $1,700,000 |
| **Terrestrial fauna** | Clearing critical habitat in the form of Breakaways and Gorge / Gully habitat for Northern Quoll, Ghost Bat, Pilbara Leaf-nosed Bat and Pilbara Olive Python.<br>Two records of Ghost Bats, two records of Pilbara Leaf-nosed Bats and one Pilbara Olive Python has been recorded in the Gascoyne Bioregion area of the Development Envelope. | Endangered under the EPBC Act Endangered under Schedule 2 of the WA BC Act | 3.9 ha | 0.95 ha Breakaway habitat directly impacted.<br>2.87 ha Gorge/Gully habitat directly impacted. | 3.9 ha | $3,306 | $12,893 |
| | Clearing Pilbara Olive Python critical habitat (Riverine Habitat) | Vulnerable under the EPBC Act and Vulnerable under Schedule 3 of the BC Act | 0 ha | No Riverine habitat within the Gascoyne Bioregion will be directly affected by the Proposal.<br>Therefore, there are no significant residual impacts requiring offsets. | 0 ha | $3,306 | $0 |

| Environmental factor | Environmental aspect | Status (State/ Commonwealth) | Indicative area to be offset | Calculation notes | Residual area to be offset | Proposed offset rate | Indicative offset contribution |
|---|---|---|---|---|---|---|---|
| | Clearing of *moderate value* Northern Quoll habitat in the form of **Riverine, Drainage Line** and **Rocky Hill** habitat within 1km of a previous Northern Quoll record. | Endangered under the EPBC Act and under Schedule 2 of the WA BC Act. | 96 ha | 31 ha of moderate value Northern Quoll habitat co-occurs with high value Pilbara Olive Python habitat, resulting in **65 ha** net offset total. | 65 ha | $1,653 | $107,445 |
| | Clearing of *moderate value* Ghost Bat habitat in the form of **Riverine, Drainage Line** and **Rocky Hill** habitat within 5km of a Ghost Bat cave. | Vulnerable under the EPBC Act; Vulnerable under Schedule 3 of the WA BC Act | 507 ha | 399 ha of moderate value Ghost Bat habitat co-occurs with high value Pilbara Olive Python habitat, resulting in **108 ha** net offset total. | 108 ha | $1,653 | $178,524 |
| | Clearing of *moderate value* Pilbara Leaf-nosed Bat habitat in the form of **Riverine, Alluvial Plain, Drainage Line** and **Rocky Hill** habitat within 10km of a Pilbara Leaf-nosed Bat cave. | Vulnerable under the EPBC Act; Vulnerable under Schedule 3 of the WA BC Act | 263 ha | 214 ha of moderate value Pilbara Leaf-nosed Bat habitat co-occurs with high value Pilbara Olive Python habitat, or moderate value Ghost Bat habitat, resulting in **49 ha** net offset total. | 49 ha | $1,653 | $80,997 |
| **Total Gascoyne Bioregion Offset** | | | | | | | **$2,079,859** |
| **TOTAL INDICATIVE OFFSET FOR PROPOSAL** | | | | | | | **$4,751,051** |

**Pilbara Bioregion**

The total offset value for the Pilbara Bioregion is estimated to be **$2,671,192** (of which $2,342,301 is directly related to MNES impacts). The contributions are inclusive of offsets at the higher rates for MNES, which also include benefits to the other listed environmental values. The actual offset amounts will be based on clearing which is documented in the Impact Reconciliation Procedure (IRP) and reported biennially via the Impact Reconciliation Report (IRR).

**Gascoyne Bioregion**

For the Gascoyne Bioregion, the significant residual impacts to MNES relate to clearing of moderate value habitat within the vicinity of identified high value habitat, estimated to equate to **$379,859**. Given there is limited significant residual impact to MNES species in the Gascoyne region as a result of the Proposal, the Proponent considers that the benefits of any offset for this region specifically for MNES would be better utilised and provide more meaningful gains for MNES species if managed in a coordinated way via the WA PEOF. Therefore, the Proponent is seeking to utilise the provisions of the Special Purpose Statement of the PEOF to include the funding into the PEOF.

In recognition of the clearing of good to excellent vegetation in this Bioregion, combined with the presence of the restricted and conservation significant *Aluta quadrata* population at Western Range, a research-based offset is proposed in partnership with Botanical Gardens and Parks Authority (BGPA) (Kings Park) as part of an overall Paraburdoo *Aluta quadrata* offset program, amounting to **$1.7M** (which is included as part of the total offset for the Proposal described above). The combined financial contribution for *Aluta quadrata* incorporating both bioregions therefore amounts to **$1,702,972**. A summary of the *Aluta quadrata* offset program is presented below.

## Proposed *Aluta quadrata* Offset Program

The Proponent has been developing an offset program to address residual impacts to *Aluta quadrata* in partnership with the Botanical Gardens and Parks Authority (BGPA). The proposed BGPA program will bring the studies on *Aluta quadrata* in line with the work currently being undertaken on other similar threatened flora species in Western Australia by focussing on establishing a baseline of understanding of the pollination biology, breeding biology, and mating system of *A. quadrata* across multiple sites surrounding the proposed impact site with the following key objectives:

- Identify the pollinator community of *A. quadrata*.
- Develop baseline data on the recruitment, growth and survival of the population.
- Assess the soil seedbank and examine the persistence of seed in soil.
- Identify the breeding system of *A. quadrata* (including genetic work).

A summary of the key aspects of the study are summarised below:

- **Pollination ecology of *Aluta quadrata***
    - Identify and quantify activity of the pollinator community of *A. quadrata* (and the surrounding vegetation).
    - Assess how disturbance may affect the dynamics of the pollinator community that the plant species may depend on.
    - Compare composition and visitation of pollinators to *A. quadrata* among different

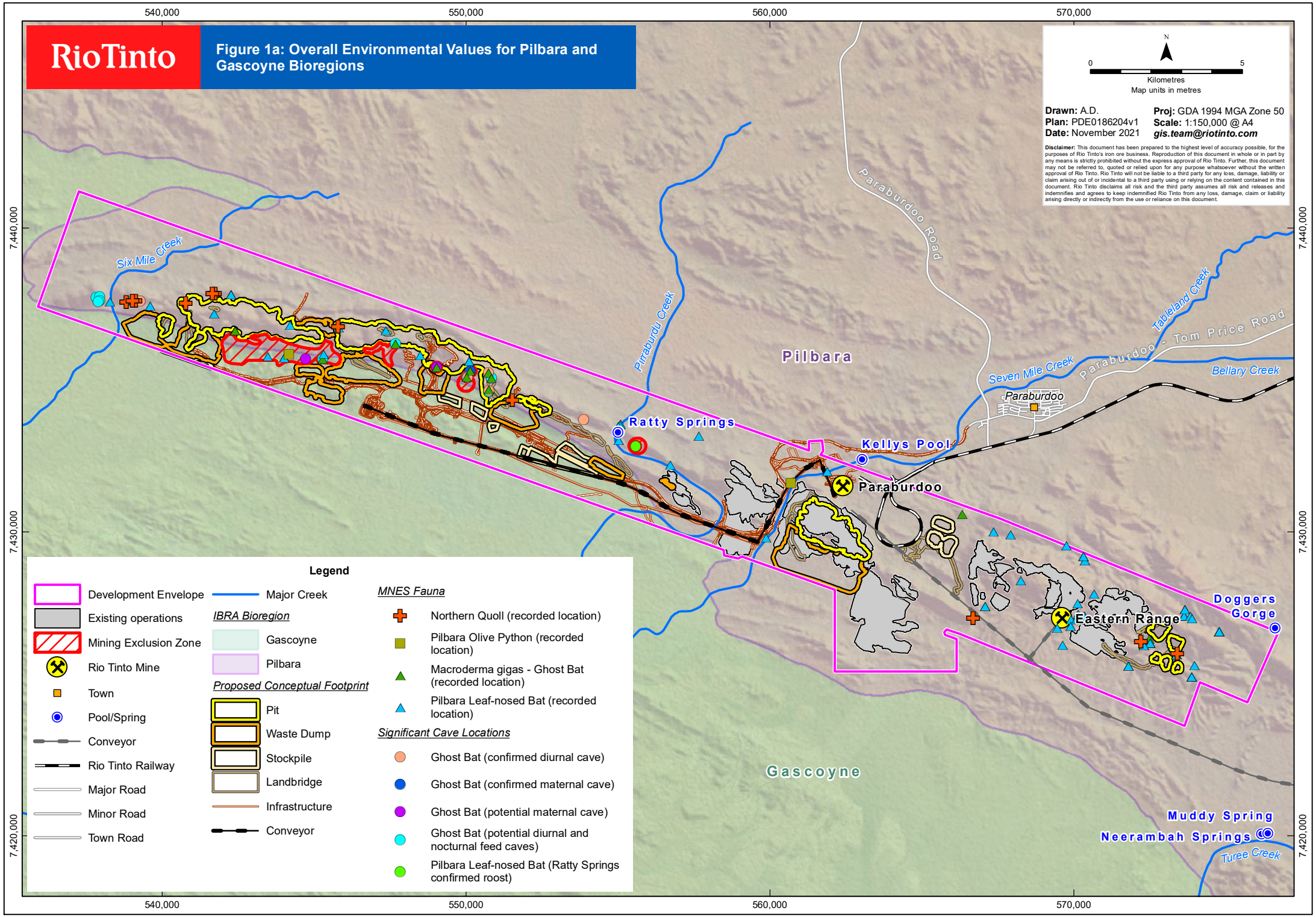
- **Phenology of *A. quadrata*, including plant growth, flowering and fruiting regimes**
    - Quantify phenology of *A. quadrata* as well as assess how growth and reproduction varies in response to seasonal changes in rainfall, ambient temperature, soil temperature, soil moisture, plant age, and positions in the landscape.

- **Reproduction of *A. quadrata* (including studies on the breeding system)**
    - Identify the breeding system of *A. quadrata* to generate baseline data on the variability of flowering and seed production of mature plants of *A. quadrata* from multiple populations across its distribution.

- **Population demography *of A. quadrata***

- Understand the demographic processes and their variability in relation to environmental conditions, seasonal patterns and life stages (seed, seedling, juvenile and adult plant) for baseline information to determine population dynamics for management.

The program will directly improve the understanding of *A. quadrata* which will provide a basis for the conservation and management of critical processes which sustain the population and provide a foundation for understanding potential impacts of disturbance on these aspects of reproductive biology.


RioTinto
Figure 1a: Overall Environmental Values for Pilbara and Gascoyne Bioregions
N
0
5
Kilometres
Map units in metres
Drawn: A.D.
Plan: PDE0186204v1
Date: November 2021
Proj: GDA 1994 MGA Zone 50
Scale: 1:150,000 @ A4
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7,440,000
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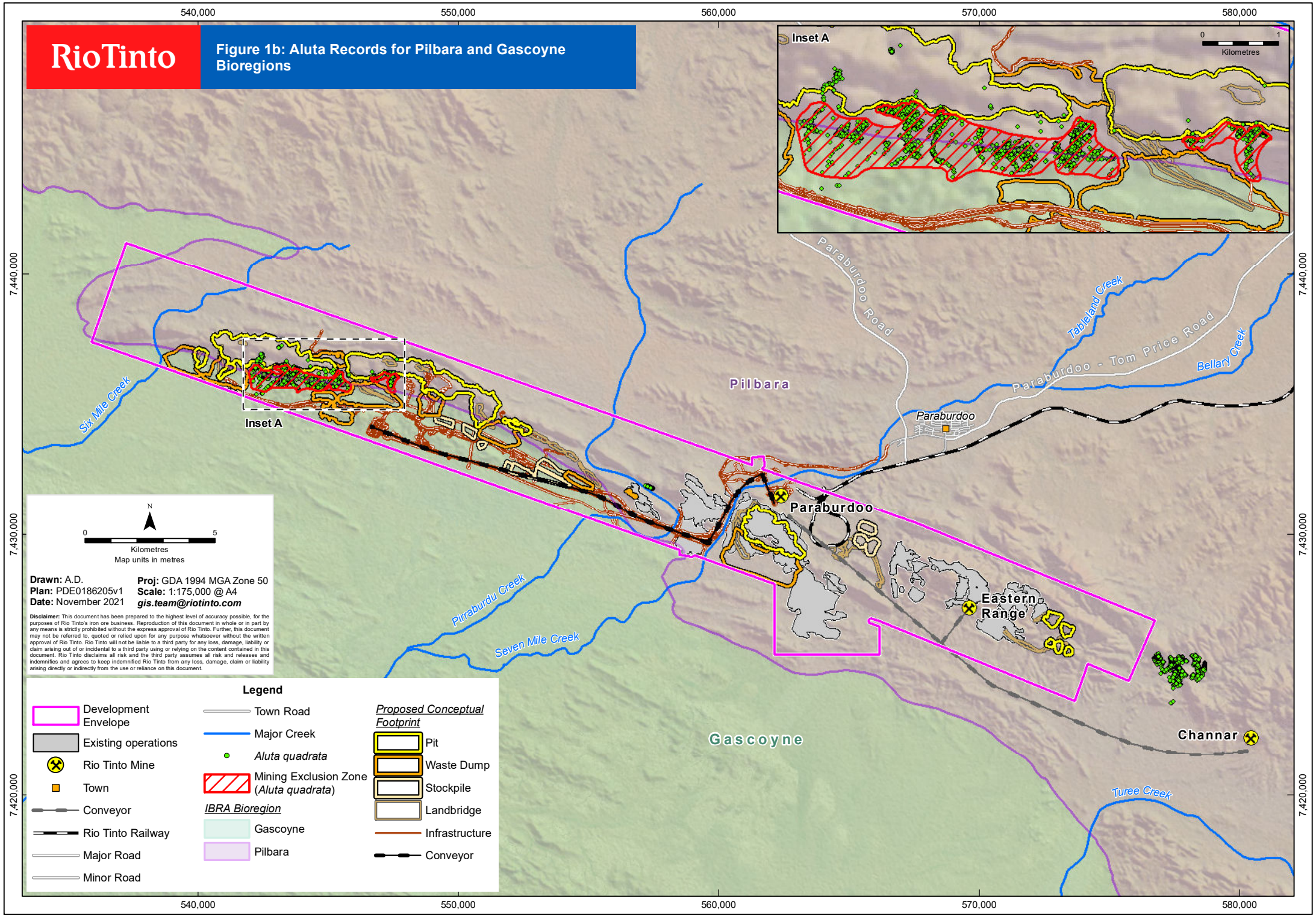
Six Mile Creek
Pirraburdu Creek
Paraburdoo Road
Tableland Creek
Paraburdoo - Tom Price Road
Bellary Creek
Seven Mile Creek
Pilbara
Paraburdoo
Ratty Springs
Kellys Pool
Paraburdoo
Doggers Gorge
Eastern Range
Gascoyne
Muddy Spring
Neerambah Springs
Turee Creek
Legend
Development Envelope
Existing operations
Mining Exclusion Zone
Rio Tinto Mine
Town
Pool/Spring
Conveyor
Rio Tinto Railway
Major Road
Minor Road
Town Road
Major Creek
IBRA Bioregion
Gascoyne
Pilbara
Proposed Conceptual Footprint
Pit
Waste Dump
Stockpile
Landbridge
Infrastructure
Conveyor
MNES Fauna
Northern Quoll (recorded location)
Pilbara Olive Python (recorded location)
Macroderma gigas - Ghost Bat (recorded location)
Pilbara Leaf-nosed Bat (recorded location)
Significant Cave Locations
Ghost Bat (confirmed diurnal cave)
Ghost Bat (confirmed maternal cave)
Ghost Bat (potential maternal cave)
Ghost Bat (potential diurnal and nocturnal feed caves)
Pilbara Leaf-nosed Bat (Ratty Springs confirmed roost)


RioTinto
Figure 1b: Aluta Records for Pilbara and Gascoyne Bioregions
Inset A
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Kilometres
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580,000
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Paraburdoo Road
Tableland Creek
Paraburdoo - Tom Price Road
Bellary Creek
Six Mile Creek
Pilbara
Paraburdoo
Pirraburdu Creek
Seven Mile Creek
Eastern Range
Channar
Gascoyne
Turee Creek
N
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Kilometres
Map units in metres
Drawn: A.D.
Plan: PDE0186205v1
Date: November 2021
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Legend
Development Envelope
Existing operations
Rio Tinto Mine
Town
Conveyor
Rio Tinto Railway
Major Road
Minor Road
Town Road
Major Creek
Aluta quadrata
Mining Exclusion Zone (Aluta quadrata)
IBRA Bioregion
Gascoyne
Pilbara
Proposed Conceptual Footprint
Pit
Waste Dump
Stockpile
Landbridge
Infrastructure
Conveyor

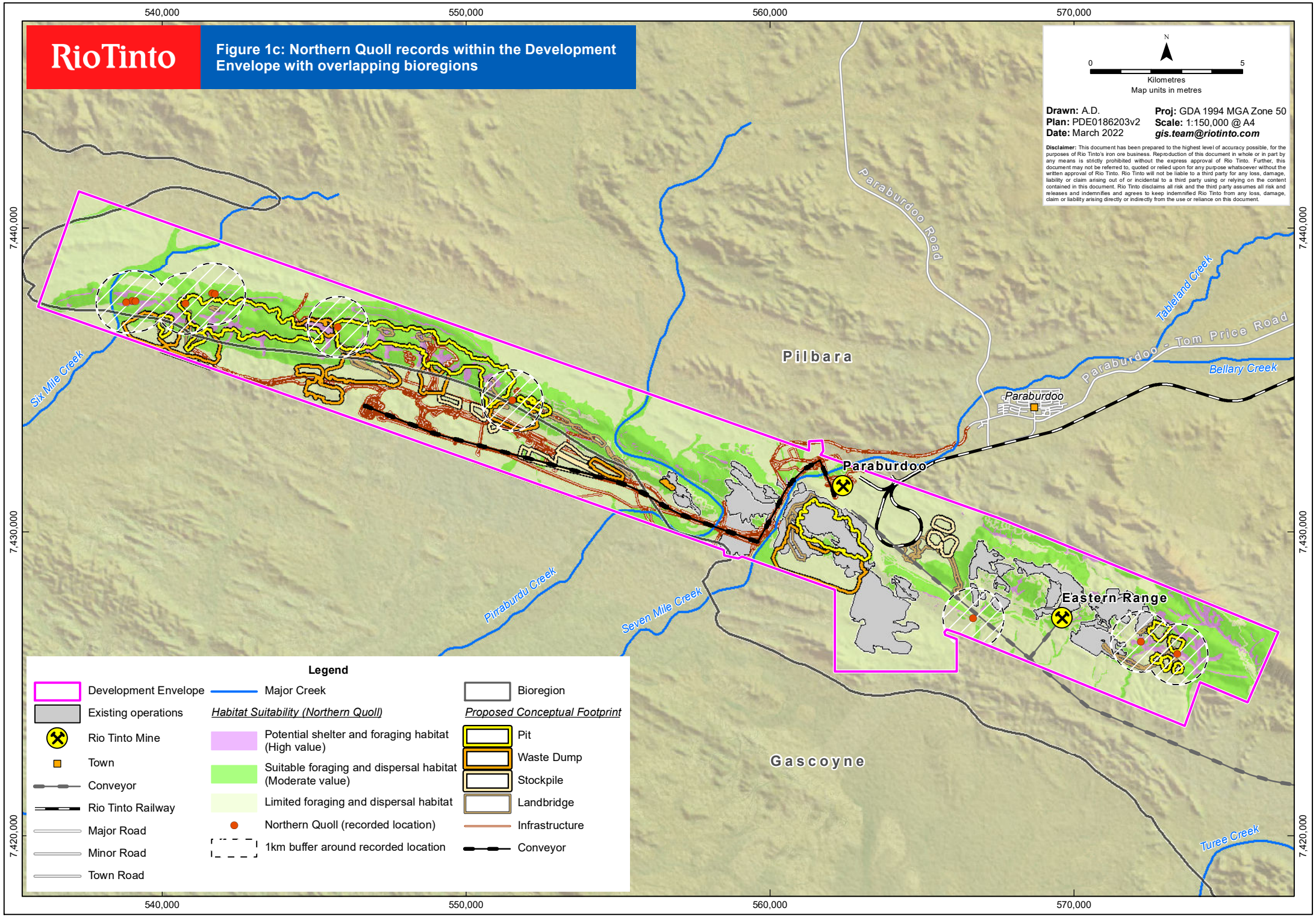
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Figure 1c: Northern Quoll records within the Development Envelope with overlapping bioregions
N
0
5
Kilometres
Map units in metres
Drawn: A.D.
Plan: PDE0186203v2
Date: March 2022
Proj: GDA 1994 MGA Zone 50
Scale: 1:150,000 @ A4
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Paraburdoo Road
Tableland Creek
Paraburdoo - Tom Price Road
Bellary Creek
Six Mile Creek
Pilbara
Paraburdoo
Paraburdoo
Pirraburdu Creek
Seven Mile Creek
Eastern Range
Gascoyne
Turee Creek
Legend
Development Envelope
Existing operations
Rio Tinto Mine
Town
Conveyor
Rio Tinto Railway
Major Road
Minor Road
Town Road
Major Creek
Habitat Suitability (Northern Quoll)
Potential shelter and foraging habitat (High value)
Suitable foraging and dispersal habitat (Moderate value)
Limited foraging and dispersal habitat
Northern Quoll (recorded location)
1km buffer around recorded location
Bioregion
Proposed Conceptual Footprint
Pit
Waste Dump
Stockpile
Landbridge
Infrastructure
Conveyor

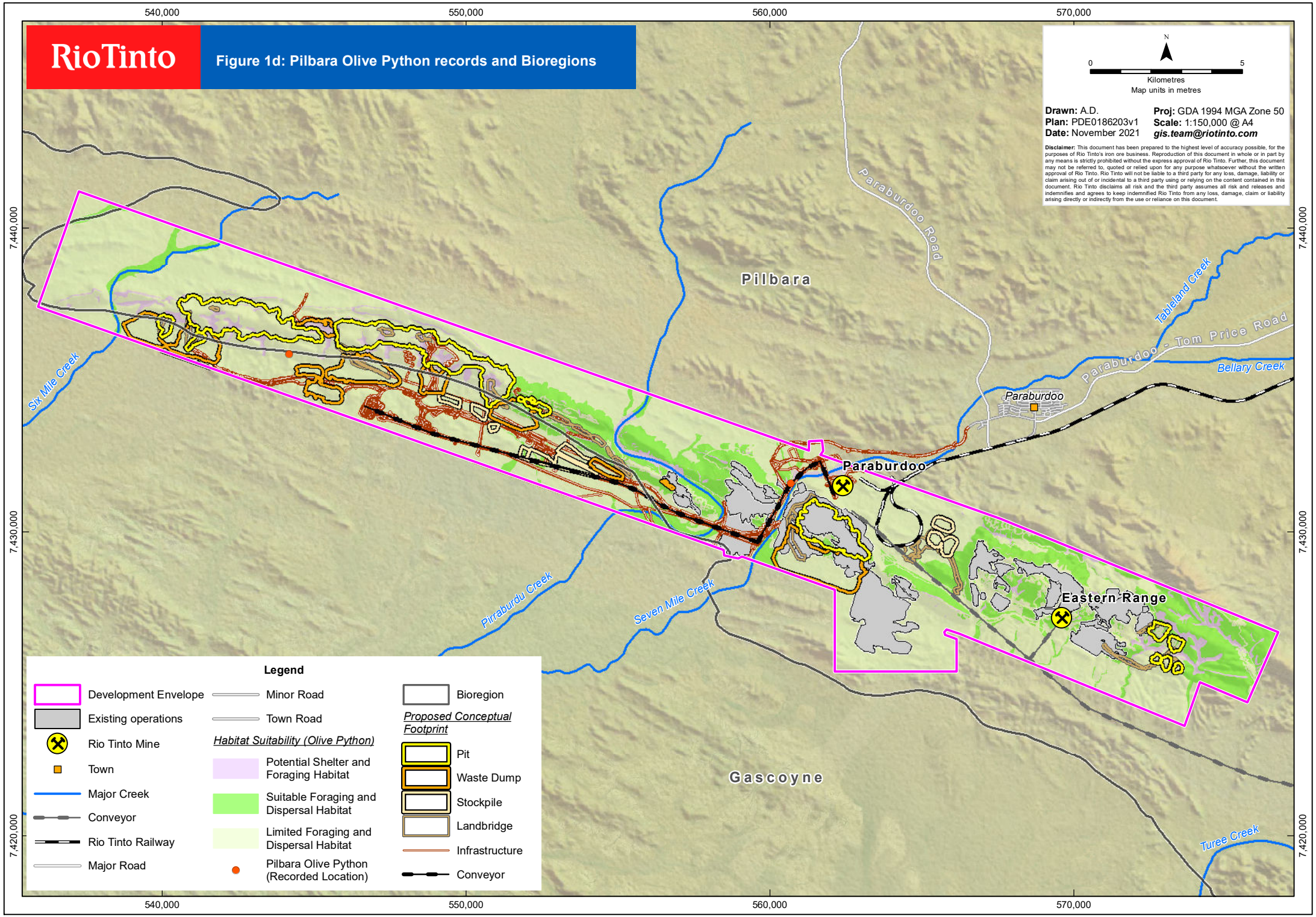
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Figure 1d: Pilbara Olive Python records and Bioregions
N
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Kilometres
Map units in metres
Drawn: A.D.
Plan: PDE0186203v1
Date: November 2021
Proj: GDA 1994 MGA Zone 50
Scale: 1:150,000 @ A4
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540,000
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Pilbara
Gascoyne
Paraburdoo Road
Tableland Creek
Paraburdoo - Tom Price Road
Bellary Creek
Six Mile Creek
Paraburdoo
Paraburdoo
Eastern Range
Pirraburdu Creek
Seven Mile Creek
Turee Creek
Legend
Development Envelope
Existing operations
Rio Tinto Mine
Town
Major Creek
Conveyor
Rio Tinto Railway
Major Road
Minor Road
Town Road
Habitat Suitability (Olive Python)
Potential Shelter and Foraging Habitat
Suitable Foraging and Dispersal Habitat
Limited Foraging and Dispersal Habitat
Pilbara Olive Python (Recorded Location)
Bioregion
Proposed Conceptual Footprint
Pit
Waste Dump
Stockpile
Landbridge
Infrastructure
Conveyor

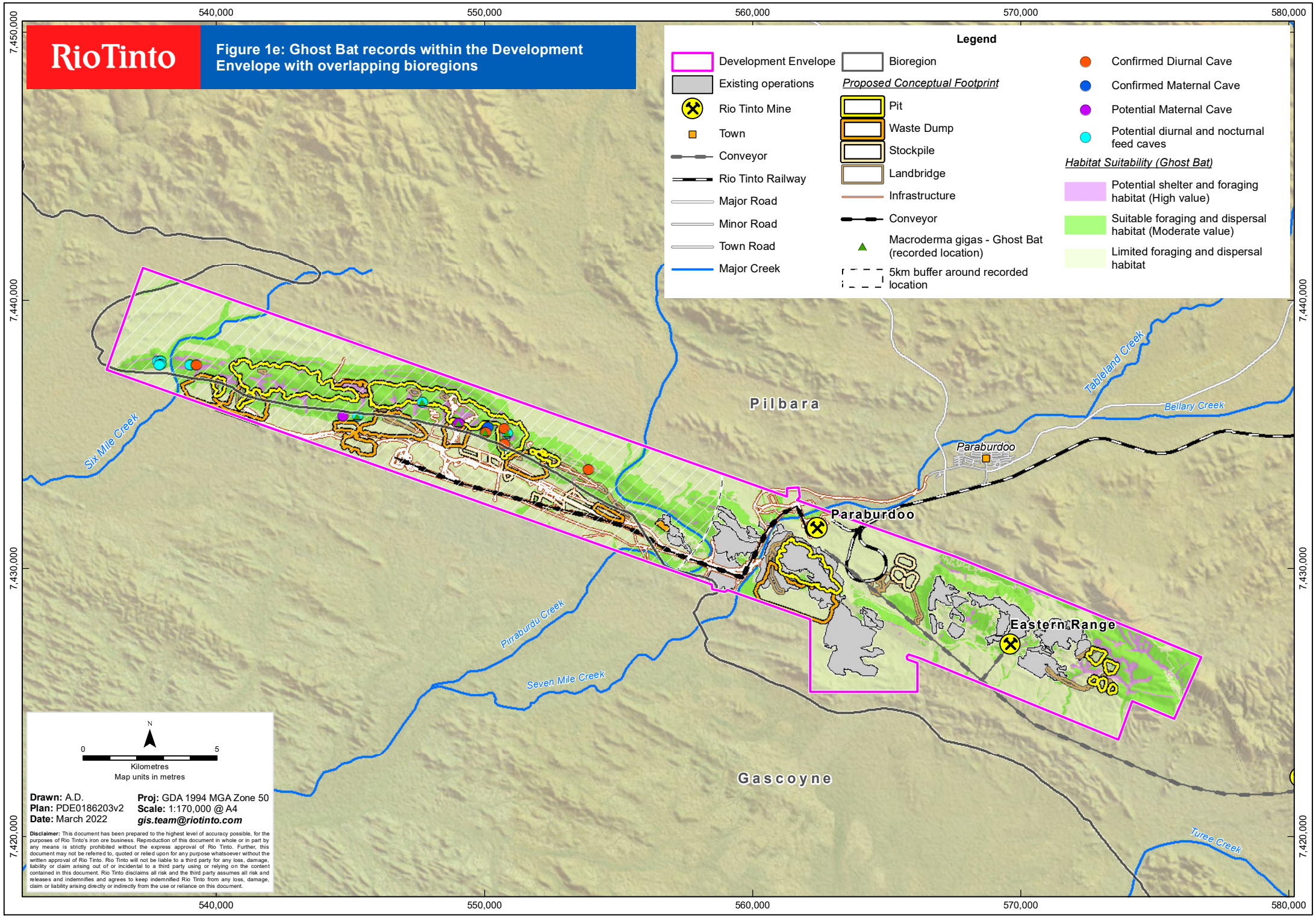
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Figure 1e: Ghost Bat records within the Development Envelope with overlapping bioregions
Legend
Development Envelope
Existing operations
Rio Tinto Mine
Town
Conveyor
Rio Tinto Railway
Major Road
Minor Road
Town Road
Major Creek
Bioregion
Proposed Conceptual Footprint
Pit
Waste Dump
Stockpile
Landbridge
Infrastructure
Conveyor
Macroderma gigas - Ghost Bat (recorded location)
5km buffer around recorded location
Confirmed Diurnal Cave
Confirmed Maternal Cave
Potential Maternal Cave
Potential diurnal and nocturnal feed caves
Habitat Suitability (Ghost Bat)
Potential shelter and foraging habitat (High value)
Suitable foraging and dispersal habitat (Moderate value)
Limited foraging and dispersal habitat
540,000
550,000
560,000
570,000
580,000
7,450,000
7,440,000
7,430,000
7,420,000
Pilbara
Gascoyne
Six Mile Creek
Pirraburdu Creek
Seven Mile Creek
Tableland Creek
Bellary Creek
Turee Creek
Paraburdoo
Paraburdoo
Eastern Range
N
0
5
Kilometres
Map units in metres
Drawn: A.D.
Plan: PDE0186203v2
Date: March 2022
Proj: GDA 1994 MGA Zone 50
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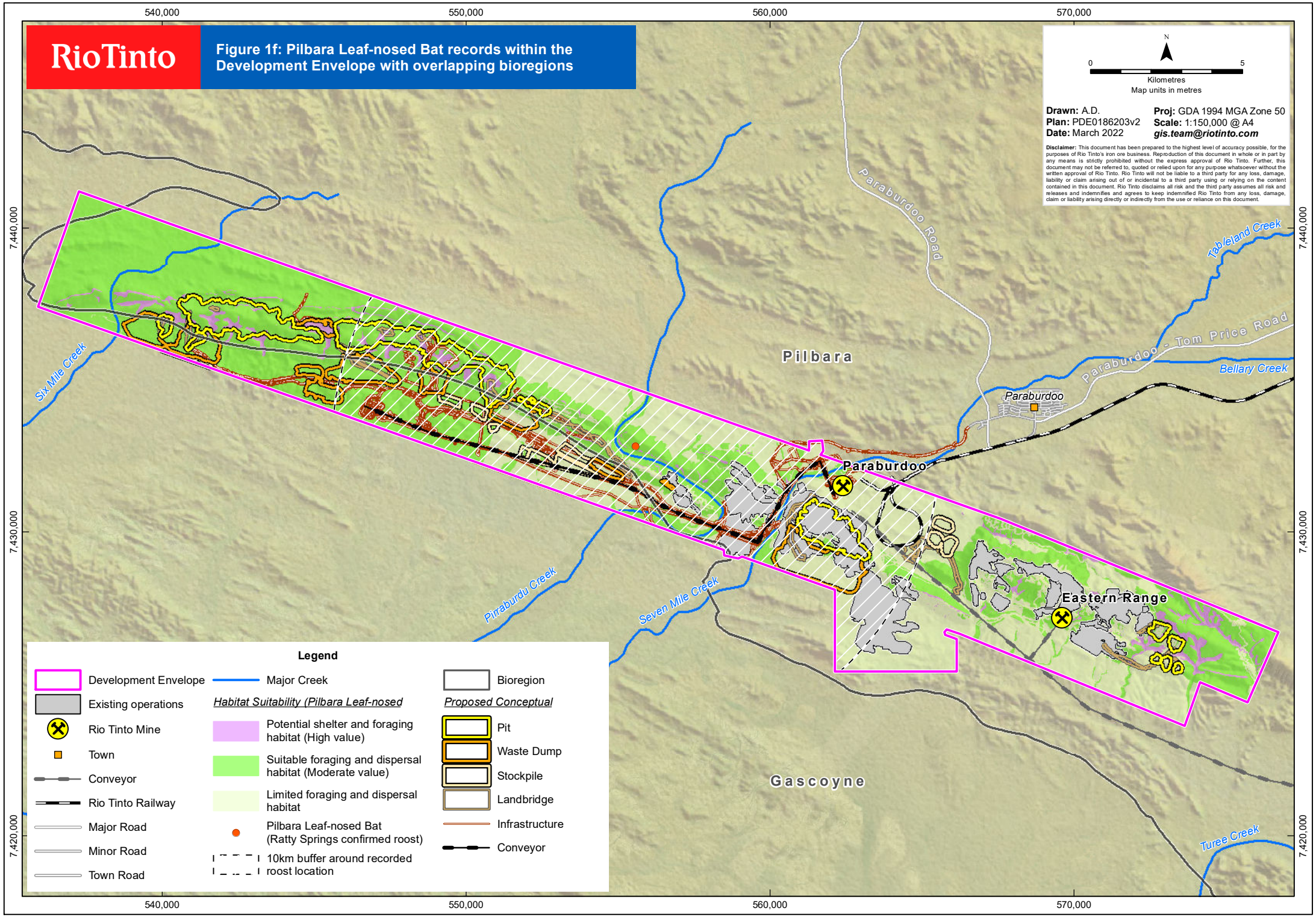
RioTinto
Figure 1f: Pilbara Leaf-nosed Bat records within the Development Envelope with overlapping bioregions
N
0
5
Kilometres
Map units in metres
Drawn: A.D.
Plan: PDE0186203v2
Date: March 2022
Proj: GDA 1994 MGA Zone 50
Scale: 1:150,000 @ A4
gis.team@riotinto.com
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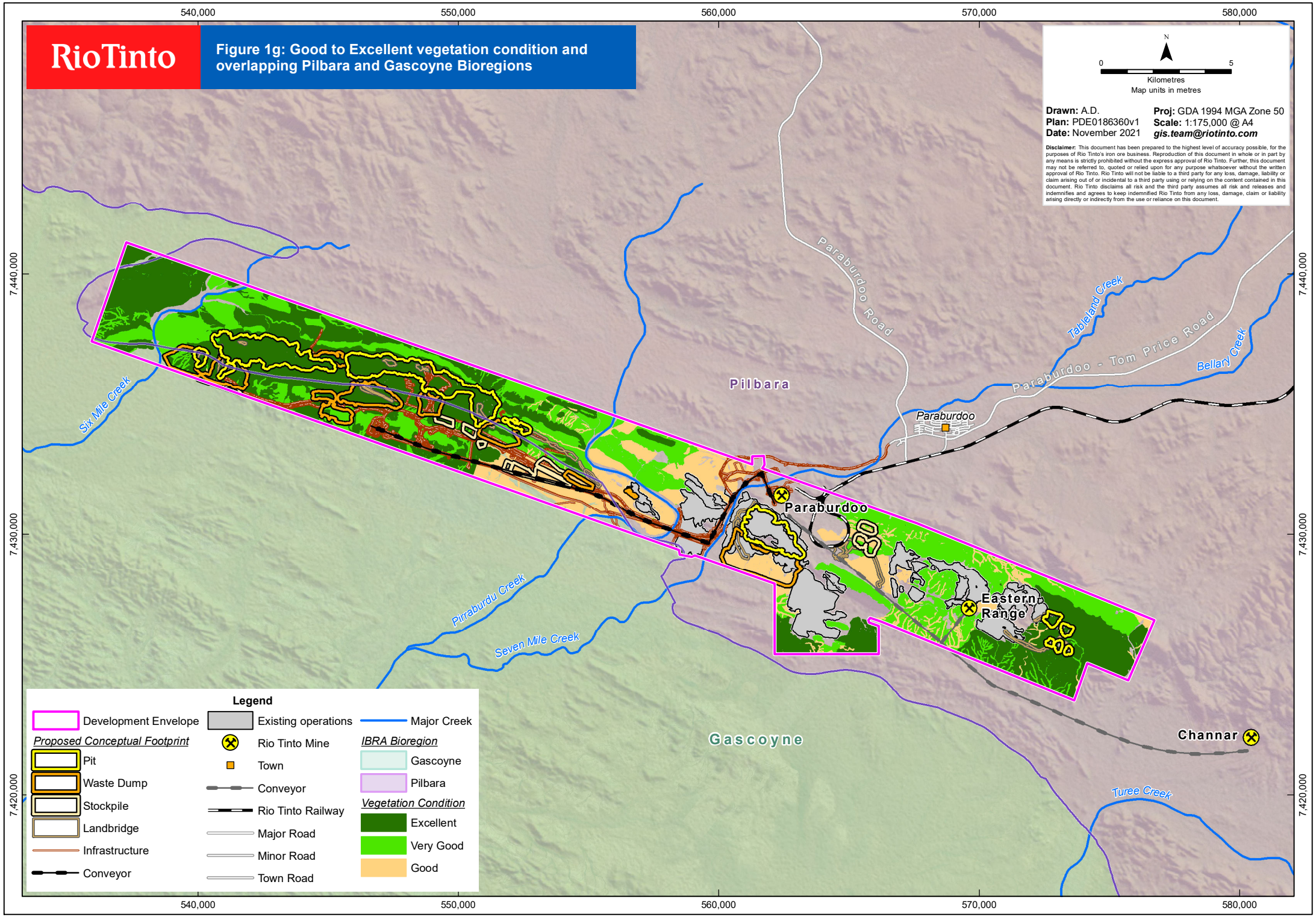
540,000
550,000
560,000
570,000
7,440,000
7,430,000
7,420,000
Paraburdoo Road
Tableland Creek
Paraburdoo - Tom Price Road
Bellary Creek
Six Mile Creek
Pilbara
Paraburdoo
Paraburdoo
Eastern Range
Pirraburdu Creek
Seven Mile Creek
Gascoyne
Turee Creek
Legend
Development Envelope
Existing operations
Rio Tinto Mine
Town
Conveyor
Rio Tinto Railway
Major Road
Minor Road
Town Road
Major Creek
Habitat Suitability (Pilbara Leaf-nosed
Potential shelter and foraging habitat (High value)
Suitable foraging and dispersal habitat (Moderate value)
Limited foraging and dispersal habitat
Pilbara Leaf-nosed Bat (Ratty Springs confirmed roost)
10km buffer around recorded roost location
Bioregion
Proposed Conceptual
Pit
Waste Dump
Stockpile
Landbridge
Infrastructure
Conveyor


RioTinto
Figure 1g: Good to Excellent vegetation condition and overlapping Pilbara and Gascoyne Bioregions
N
0
5
Kilometres
Map units in metres
Drawn: A.D.
Plan: PDE0186360v1
Date: November 2021
Proj: GDA 1994 MGA Zone 50
Scale: 1:175,000 @ A4
gis.team@riotinto.com
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Major Creek
IBRA Bioregion
Gascoyne
Pilbara
Vegetation Condition
Excellent
Very Good
Good