

Report

# Minor or Preliminary Works Application

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Eliwana Iron Ore Mine Project



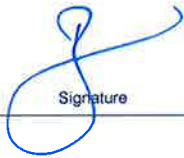
April 2018  
EW-AP-EN-0003



**Fortescue**  
The New Force in Iron Ore

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## CHECKLIST: REQUEST FOR MINOR OR PRELIMINARY WORK

Information to be provided	Provided?
<b>1. Information required to be submitted</b>	
1.1. Proposal Title	<input checked="" type="checkbox"/>
1.2. Assessment No.	<input checked="" type="checkbox"/>
<b>2. Information regarding proposed Minor or Preliminary Work</b>	
2.1. Details of the work proposed	<input checked="" type="checkbox"/>
2.2. Information which demonstrates that the work is associated with the implementation of the proposal	<input checked="" type="checkbox"/>
2.3. Details of the potential environmental impacts caused or likely to be caused by the work	<input checked="" type="checkbox"/>
2.4. Details of any decommissioning or rehabilitation works which would be carried out should the overall proposal not be implemented	<input checked="" type="checkbox"/>
2.5. Information which explains how the impact can be reversed (e.g. through rehabilitation)	<input checked="" type="checkbox"/>
2.6. Environmental justification for undertaking the work	<input checked="" type="checkbox"/>
<b>3. Other information (where relevant)</b>	
3.1. Spatial data showing the location and area of the work	<input checked="" type="checkbox"/>
3.2. Details of consultation with relevant stakeholders	<input checked="" type="checkbox"/>
<b>Documentation to submit a request</b>	<b>Attached?</b>
Completed checklist (this sheet) attached to the section 41A(3) request	<input checked="" type="checkbox"/>
Electronic copy of the request, including any applicable spatial data and other relevant information	<input checked="" type="checkbox"/>



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## 1. INTRODUCTION

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Fortescue Metals Group Limited (Fortescue) is seeking consent from the Environmental Protection Authority (EPA) under Section 41A(3) of the *Environmental Protection Act 1986* (EP Act) to undertake minor or preliminary works associated with early construction activities for the Eliwana Iron Ore Mine Project (the Eliwana Mine Project), which is currently under formal assessment under Part IV or the EP Act.

The Eliwana Mine Project was referred to the EPA under Section 38 of the EP Act on 7 July 2017. The EPA subsequently determined that the Eliwana Project would be assessed by Public Environmental Review on 27 July 2017.

**Proposal Title:** Eliwana Iron Ore Mine Project

**Assessment Number:** 2125

### 1.1 Eliwana Project Description

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The Eliwana Mine Project is located approximately 90 km west-north-west of Tom Price (Figure 1). Fortescue currently owns and operates a number of mining and infrastructure projects in the Pilbara; including the Cloudbreak, Solomon and Christmas Creek iron ore mines along with the Fortescue railway network and the Anderson Point port facility.

Over the life of the mine, the average annual production rate is estimated at 30 Mtpa, with infrastructure to be constructed to accommodate annual production rates up to 50 Mtpa, allowing future flexibility. The estimated mine life is at least 24 years.

The key characteristics of the Eliwana Mine Project are summarised in Table 1 and Table 2

**Table 1: Summary of proposal**

Item	Description
Proposal title	Eliwana Iron Ore Mine Project
Proponent name	Fortescue Metals Group Ltd
Short description	The Proposal is to develop above and below water table iron ore deposits, 90 km west-north-west of Tom Price, in the Pilbara region of Western Australia (Figure 1). The Proposal includes the development of mine pits and associated infrastructure, processing facilities, water management infrastructure for groundwater abstraction and surplus water disposal, temporary and permanent waste landforms and tailings storage facilities.



**Table 2: Location and proposed extent of physical and operational extent**

Element	Proposed Extent		
<b>Physical Elements</b>			
Mine and associated infrastructure	Clearing of up to 8,560 ha of native vegetation within the 53,368 ha Mine Development Envelope		
<b>Operational Elements</b>			
Mine pits	<table border="0"> <tr> <td style="vertical-align: top;">                     Eliwana Area:                     <ul style="list-style-type: none"> <li>• Below water table mining</li> <li>• Episodic operational mining void water bodies</li> <li>• Permanent and episodic post closure mine void water bodies</li> </ul> </td> <td style="vertical-align: top; padding-left: 20px;">                     Flying Fish Area:                     <ul style="list-style-type: none"> <li>• Above water table mining</li> <li>• Episodic mining void water bodies</li> </ul> </td> </tr> </table>	Eliwana Area: <ul style="list-style-type: none"> <li>• Below water table mining</li> <li>• Episodic operational mining void water bodies</li> <li>• Permanent and episodic post closure mine void water bodies</li> </ul>	Flying Fish Area: <ul style="list-style-type: none"> <li>• Above water table mining</li> <li>• Episodic mining void water bodies</li> </ul>
Eliwana Area: <ul style="list-style-type: none"> <li>• Below water table mining</li> <li>• Episodic operational mining void water bodies</li> <li>• Permanent and episodic post closure mine void water bodies</li> </ul>	Flying Fish Area: <ul style="list-style-type: none"> <li>• Above water table mining</li> <li>• Episodic mining void water bodies</li> </ul>		
Ore processing (waste)	Disposal of up to 1.2 Gt of waste rock to temporary and permanent waste rock landforms		
Ore processing (tailings)	Disposal of up to 84 Mt of tailings into tailings storage facilities		
Water supply	Up to 12 GL/a, supplied from a combination of mine dewatering and water supply borefields		
Power supply	Onsite power generation		
Dewatering	Abstraction of up to 14 GL/a of groundwater		
Surplus water management	Up to 4 GL/a of surplus water will be managed through a combination of surface discharge and controlled aquifer reinjection		

Table 3 provides a list of major infrastructure associated with the Eliwana Project.

**Table 3: Proposed infrastructure: mine development area**

<ul style="list-style-type: none"> <li>• open cut pits</li> <li>• waste landforms</li> <li>• tailings storage facilities (above and below water table)</li> <li>• ore processing facility</li> <li>• ROM (run-of-mine) facility</li> <li>• crushing and screening facilities</li> <li>• borrow areas</li> <li>• ore stockpiles</li> <li>• topsoil stockpiles</li> <li>• conveyors</li> <li>• haul roads</li> <li>• access roads</li> <li>• dewatering and surplus water management infrastructure</li> <li>• gas and water pipelines</li> <li>• water supply borefield</li> <li>• bridges</li> </ul>	<ul style="list-style-type: none"> <li>• culverts and surface water management infrastructure</li> <li>• water storage infrastructure</li> <li>• airport</li> <li>• accommodation camps (construction)</li> <li>• accommodation camp (operations)</li> <li>• communications infrastructure</li> <li>• landfill and bioremediation facilities</li> <li>• explosives storage facility</li> <li>• laydown areas</li> <li>• fuel storage</li> <li>• power station</li> <li>• power transmission lines</li> <li>• workshops and warehouses</li> <li>• laboratory and sample stations</li> <li>• administration buildings</li> <li>• wastewater treatment plants.</li> </ul>
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## 2. MINOR OR PRELIMINARY WORK

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Section 41A(3) of the EP Act allows a proponent to request Ministerial consent to undertake minor or preliminary works, for activities which are associated with the implementation of the proposal but are unlikely to have a significant impact on the environment.

### 2.1 Criteria for Minor or Preliminary Work

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Proponents must demonstrate the following criteria for the EPA to consent to the minor or preliminary work:

1. The work must be associated with the implementation of the proposal.
2. The potential environmental impacts of the work must not be significant.
3. Whether the impact can be reversed (e.g. through rehabilitation).
4. The environmental justification for the work (e.g. avoid breeding season, avoid phytophthora spread during winter rainfall).

### 2.2 Content of a Request for EPA Consent for Minor or Preliminary Work

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The EPA requires that proponents follow the *Checklist: Request for EPA consent for minor or preliminary work* when preparing a request for EPA consent to undertake minor or preliminary work. A completed copy of this checklist is provided at the beginning of this document.

This request includes the following:

1. Assessment details (Section 1).
2. Details of the proposed work (Section 1.1: Eliwana Project Description and Section 2.3: Minor or Preliminary Work proposed).
3. Information to demonstrate that the work is associated with the implementation of the proposal (Section 1.1, Section 2.3).
4. Details of the potential environmental impacts likely to be caused by the work (Section 3).
5. Details of any decommissioning or rehabilitation work which would be carried out should the proposal not be approved for implementation (Section 4).
6. Information to demonstrate that the impact can be reversed (e.g. through rehabilitation) (Section 4).
7. Environmental justification for the work (Section 5).
8. Other approvals required for the work (Section 6).

## 2.3 Minor or Preliminary Work Proposed

Fortescue requests consent to undertake a number of activities as minor or preliminary work for the Eliwana Mine Project. A detailed description of each activity and information demonstrating how the activities are associated with the implementation of the Eliwana Mine Project is provided below. An overview of proposed works is provided in Table 4.

**Table 4: Disturbance figures broken down by each activity**

Item	Disturbance (in Hectares)
Camp – including spray field	40.0
Aerodrome	68.8
Roads and Pipeline	36.3
Roads only	0.7
Pipelines only	3.6
Topsoil stockpiles	27.5
Borrow pits	21.1
Turkey Nest	0.6
Laydown area	17.4
<b>TOTAL</b>	<b>216.0</b>

The proposed disturbance is associated with the implementation of the larger Eliwana Mine Project and is herein referred to as “minor works”. The minor works will allow essential infrastructure construction and upgrades while the project is under assessment by the EPA. The environmental impacts are comparable to mineral exploration and will be regulated in detail under the *Mining Act 1978*, Part V of the *Environmental Protection Act 1986* and through conditions imposed under these environmental approvals.

The minor works are essential to provide safe access to site via the development of the aerodrome and upgrading of roads and establishing a camp to house personnel. Currently, personnel are required to drive considerable distances from several exploration camps on small indirect roads, which is a safety risk that Fortescue is striving to reduce. Fortescue has the vision of being the “safest, low cost and most profitable iron ore producer” and in line with this vision, Fortescue is striving to reduce the travel safety risk to as low as reasonably practicable (ALARP). Flying personnel to site, housing them in a central comp location and upgrading access roads is a key management measure to reduce travel safety risk to ALARP.

Similar works were applied for and granted during the construction of the Solomon mine site and other similar projects in the Pilbara. The Solomon Minor works approval allowed for basic, low impact and non-permanent infrastructure to be established prior to the assessment and subsequent granting of the larger referred project.

There has been considerable effort expended to ensure the minor works disturbance footprint and activities will have the minimum impact on the environment. Approval of the minor works

will allow for a gradual implementation of the Eliwana Project, which is likely to reduce the overall environmental impacts of the entire Eliwana Mine and Railway projects. Should minor works not proceed, the construction timeframe will be considerably shortened requiring a greater intensity of work, which in turn requires significantly larger camp footprints, larger laydown areas and wider roads with commensurately larger environmental impacts.

### 2.3.1 Clearing Controls

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Fortescue manages clearing of native vegetation through a Land Use Certificate System (LUC), previously known as a Ground Disturbance Permit (GDP). A LUC identifies the area to be disturbed and considers multiple factors, such as environmental (significant values and approvals), heritage, *Mining Act 1978* tenure, pastoral leases and water, before disturbance is permitted. Each LUC application is reviewed for each factor by technical leads with Fortescue before approval. Conditions are placed on each LUC with regards to the identified factors to ensure clearing is undertaken in accordance with legal obligations and with regards to environmental or heritage values. The LUC process allows applicants to modify their application to avoid significant or sensitive values in consultation with the technical leads prior to approval of the LUC.

Conditions of the LUC may include ground inspections for conservation significant flora or fauna depending on the receiving environment and the conditions of any environmental approval applicable to the area. No LUC would be approved without the area having been subject to heritage survey.

### 2.3.2 Construction Camp

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Fortescue proposes to construct a camp that will accommodate construction personnel required to conduct minor works and additionally, should the Eliwana Mine Project receive full approval, the camp will serve as the main camp for the operations of site.

The camp will accommodate up to 800 personnel at full development and will require the clearing of 40 ha including a Waste Water Treatment Plant (WWTP) and associated spray field.

#### **Waste Water Treatment**

A WWTP, with an estimated capacity of 280 kL per day, will be required to support the proposed accommodation camp. A spray field is required to release treated waste water to the environment. The release of treated waste water is regulated under Part V of the *Environmental Protection Act 1986*, administered by the Department of Water and Environmental Regulation (DWER). The conditions of any Part V Licence will depend on the risk assessment undertaken by DWER in accordance with published guidance. Fortescue anticipates that the conditions of any Part V License issued for the release of treated waste water will include monitoring of the quality of the treated effluent on a regular basis.

Fortescue operates several WWTP at its existing operating sites under license from DWER.

### 2.3.3 Access Roads

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Fortescue proposes to construct up to 15.2 km of access roads. These roads will be used by light and heavy vehicles to undertake the proposed minor works. The roads will be 20 m wide, however, only 12 m of additional widening will be required as 6 m will be or has been cleared under existing approvals for preceding exploration activities. This will require the disturbance of a total of 18.2 ha of vegetation (Figure 2).

As a portion of the access road is within Eliwana Railway Project Area, a separate application for minor or preliminary works will be submitted to the EPA as part of the Eliwana Railway Project. The relationship between the two applications is represented in Figure 3.

Fortescue currently accesses the project area using third-party owned and operated roads, which includes access through the Rio Tinto Brockman 4 gate. During the minor works, this will continue to be the main access to site.

### 2.3.4 Aerodrome

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Fortescue proposes to construct an aerodrome to allow personnel safe access to the Eliwana Mine Project Area. Up to 68.8 ha of disturbance is required for the construction of the aerodrome. Preliminary discussions with aviation regulators has identified a suitable location (Figure 1).

Due to the remote location of the Project area, road travel to site is long and indirect. Fortescue aims to provide the safest environment to its employees and believe the construction of an airport will deliver this. Alternately, all construction personnel and equipment would have to enter the site via roads, which constitutes a lengthy drive through third party mining operations which has been highlighted as a safety risk.

### 2.3.5 Construction Materials Source and Handling

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#### **Borrow Pits**

Construction materials required for minor works will be sourced from borrow pits within the Eliwana Mine Project Area. The borrow material is proposed to be extracted from the locations provided in Figure 2. It is proposed that 21.1 ha of disturbance within two envelopes totalling 72.6 ha will be required for borrow. The exact locations of borrow pits within the borrow envelope will be determined following geotechnical testing.

## Topsoil Stockpiles

Topsoil will be removed from areas of disturbance and stockpiled for future use during rehabilitation. Topsoil stockpiles will be situated within the indicative footprint of disturbance where possible. Topsoil stockpile areas have been designated at several locations within the project site and are shown in Figure 2. A total of 27.5 ha of disturbance is required for topsoil stockpiles.

## Construction Material Stockpiles

Temporary stockpiles of materials required for construction will be required within the indicative footprint of disturbance. No additional clearing is required for these temporary stockpiles.

## Mobile Crushing and Screening

Mobile crushing and screening may be required for construction materials. These activities will be undertaken within the indicative disturbance footprint and no additional clearing will be required.

## Concrete Batching

Concrete batching is required for construction activities and will be undertaken within the indicative disturbance footprint and no additional clearing will be required.

### 2.3.6 Construction Water Supply and Storage Infrastructure

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Development of construction water supply infrastructure will allow for minor works to be undertaken onsite and will provide the foundation for water supply during the operation of the mine site should the Eliwana Project receive full approval.

## Construction Water Supply

A water pipeline corridor requiring up to 18.2 ha will be constructed parallel to the main access roads to create a link between production bores and site infrastructure. Where possible, pipeline routes will follow existing roads. Fortescue is undertaking investigations to determine the most productive location for groundwater bores in the Talisman area (Figure 2). These investigations are being undertaken under the authority of Programme of Work applications under the *Mining Act 1978*. Once established, an additional 3.6 ha of disturbance will be required to link the water supply bores at the bore field to the main pipeline.

## Water Requirements During Construction

A total of 1.6 GL of water, to be supplied by a dedicated borefield, is required for construction purposes. The borefield location is indicated in Figure 2 of the minor works application supplied to DWER.

## Turkeys Nests

One turkeys nest (a small water storage dam) requiring 0.6 ha of clearing will be constructed to store construction water (Figure 2).

### 3. POTENTIAL ENVIRONMENTAL IMPACTS

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The potential environmental impacts associated with the development of minor works has been assessed according to the preliminary environmental factors assigned to the broader Eliwana Iron Ore Mine Project.

#### 3.1 Hydrological Processes & Inland Waters Environmental Quality

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The minor works will not significantly impact the hydrological processes of the landscape, consistent with the scale of the existing exploration activities. Several roads will be constructed that will pass through drainage lines, however there will be no significant impact to the movement of surface water through the landscape. The environmental impacts are analogous to mineral exploration and will be regulated in detail under the *Mining Act 1978* and through conditions imposed under other environmental approvals (e.g. Part V of the EP Act).

##### Surface Drainage

The proposed roads and infrastructure are located in upper catchments of tributaries which flow into either Duck Creek or Boolgeeda Creek. Infrastructure and roads have been located to avoid higher order drainage lines (i.e. significant creeks). Figures 4, 5 and 6 demonstrates that surface drainage features in areas such as the proposed camp and laydown areas are minor and there is limited catchment upstream of the proposed disturbance.

The proposed camp will be constructed to utilise the existing topography as much as possible and as such changes to existing drainage lines will be minimised. Earthworks may result in some small areas of catchments being diverted around the infrastructure areas during surface flow events, however this will be limited to lower order drainage lines. This camp will also feature internal drainage designs to control surface water flow, to be discharged downstream of the camp.

The proposed aerodrome will feature a level pad which is likely to require modifications to the existing topography (cut and fill) to ensure a level runway. While some low order drainage lines will be impacted by the proposed disturbance (Figure 5), the aerodrome is located on high ground with small catchment areas upstream of the proposed disturbance and minimal potential for large flows.

For both the camp and the aerodrome, the lack of riparian vegetation in these areas (Figures 4 and 5) indicates that there is very little surface water flow in these drainage lines. The aerodrome and camp have been located specifically to avoid major drainage lines to limit the amount of fill material and engineered surface drainage protection required and to minimise impacts to downstream vegetation. A small area of *Eucalyptus camaldulensis* dominated vegetation occurs downstream of the camp, however the majority of surface flow through this community flows through drainage lines unimpeded by the proposed works.



The proposed roads cross lower order creeks (albeit some are of higher order than those within camp and airport footprints) and those intercepted will be managed with low level floodways or culvert crossings if required. Overall, there will be very minimal disruptions to surface water flows in creeks intercepted by roads.

Fortescue will seek both a Native Vegetation Clearing Permit and a Mining Proposal from the DMIRS to undertake the proposed works. Conditions imposed on the clearing permit under Part V of the *Environmental Protection Act, 1986* will adequately manage surface drainage.

Fortescue manages impacts to surface water through its *Surface Water Management Plan 100-PL-EN-1015*.

### Potential Water Drawdown

Modelling of the extent of groundwater drawdown associated with the minor works borefield has not been undertaken. Fortescue highlights that the volume of groundwater to be supplied by this borefield (no more than 1.6GL over a 12 month period) is significantly less than the volume of groundwater that will be abstracted for mining on an annual basis during operation of the Eliwana Mine.

Fortescue does not consider the volume of groundwater to be abstracted from the Wittenoom aquifer to be a significant volume. It is not uncommon for Fortescue to hold *Rights in Water and Irrigation Act, 1914* (RIWI Act) 5C Licences supporting exploration camps in the order of 100,000 kL per annum and currently extracts 60,000 kL per annum from the Wittenoom Formation to support its exploration programme at Eliwana.

Fortescue provides these examples to highlight that it is not unusual for DWER to issue licenses for groundwater abstraction for similar volumes in the Pilbara without requirement for formal assessment by the EPA. Impacts to groundwater and environmental values supported by groundwater, such as stygofauna can be managed through the RIWI Act.

## 3.2 Flora and Vegetation

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The minor works area has been subject to extensive flora and vegetation survey effort and thus the impacts of the minor works are quantifiable. The most relevant previous surveys relating to flora and vegetation include:

- Eliwana and Flying Fish Level 2 Flora and Vegetation Survey (Ecoscape, 2015)
- Western Hub Rail Link Level 2 Flora and Vegetation Survey (Ecoscape, 2014)
- Eliwana Consolidated Detailed Flora and Vegetation Survey (Biota, 2017)

### 3.2.1 Vegetation Communities

A total of 48 vegetation communities have been mapped within the Eliwana Mine Development Area. Under the minor works proposal, up to 216 ha of native vegetation will be cleared from 11 vegetation communities as depicted in Table 5. The impact to the abundance of all of the vegetation communities within the minor works footprint is low, with the reduction to all vegetation communities below 4% of the mapped extent.

**Table 5: Vegetation communities to be impacted by the minor works proposal**

Veg Type Code	Description	Mapped Extent (ha)	Disturbance (ha)	% Reduction
AanAprTw	<i>Acacia 'aneura'</i> , <i>A. pruinocarpa</i> mid open woodland over <i>Triodia wiseana</i> mid open hummock grassland	75.9	0.50	0.66
AanTwTe	<i>Acacia 'aneura'</i> low woodland over <i>Triodia wiseana</i> , <i>T. epactia</i> low sparse hummock grassland	258.4	8.66	3.35
AeTwTe	<i>Acacia exigua</i> , <i>A. marramamba</i> and /or <i>A. bivenosa</i> mid sparse shrubland over <i>Triodia wiseana</i> , <i>T. epactia</i> low open hummock grassland	2,398.4	3.84	0.16
AiTw/EITa	MOSAIC: <i>Acacia inaequilatera</i> tall sparse shrubland over <i>Triodia wiseana</i> low open hummock grassland / <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> low open woodland over <i>Triodia angusta</i> , <i>T. longiceps</i> , <i>T. wiseana</i> low open hummock grassland	8,549.6	108.76	1.16
ChAbTw	<i>Corymbia hamersleyana</i> , <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> mid open woodland over <i>Acacia bivenosa</i> , <i>A. synchronica</i> , <i>A. ancistrocarpa</i> mid-tall sparse shrubland over <i>Triodia wiseana</i> low sparse hummock grassland	1,421.8	0.39	0.03
ChAiTw/EIAbTlo	Mosaic: <i>Corymbia hamersleyana</i> and/ or <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> low isolated trees over <i>Acacia inaequilatera</i> and/ or <i>A. bivenosa</i> mid-tall sparse shrubland over <i>Triodia wiseana</i> low hummock grassland / <i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i>	2,6026.2	68.98	0.24
EgAatTe	<i>Eucalyptus gamophylla</i> mid sparse mallee shrubland over <i>Acacia atkinsiana</i> , <i>A. bivenosa</i> , <i>A. exigua</i> tall sparse shrubland over <i>Triodia epactia</i> , <i>T. wiseana</i> mid hummock grassland	2,960.8	1.97	0.07
EIAarTwTspr	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> mid isolated trees <i>Acacia arida</i> mid open shrubland over <i>Triodia wiseana</i> , <i>T. sp.</i> Robe River (M.E. Trudgen et al. MET 12367) mid hummock grassland	2,622.6	20.91	0.27
EITa	<i>Eucalyptus leucophloia</i> subsp. <i>leucophloia</i> low open woodland over <i>Triodia angusta</i> , <i>T. longiceps</i> , <i>T. wiseana</i> low open hummock grassland	7,555.4	38.38	0.40

Veg Type Code	Description	Mapped Extent (ha)	Disturbance (ha)	% Reduction
EvAcCcERIt	<i>Eucalyptus victrix</i> low-mid open woodland over <i>Acacia citrinoviridis</i> and/ or <i>Melaleuca glomerata</i> tall open shrubland over * <i>Cenchrus ciliaris</i> , <i>Eriachne tenuiculmis</i> mid open tussock grassland	566	1.33	0.24
ExAcTHtTe	<i>Eucalyptus xerothermica</i> low open woodland over <i>Acacia citrinoviridis</i> , <i>A. bivenosa</i> , <i>A. pyrifolia</i> tall sparse shrubland over <i>Themeda triandra</i> , <i>Chrysopogon fallax</i> mid tussock grassland over <i>Triodia epactia</i> mid hummock grassland	557.7	0.53	0.09

\* The disturbance figures for vegetation types total 254.2 ha. This is because the calculations have been made based on polygon shapes that are larger than the proposed disturbance i.e. borrow locations total 71.5 ha, however only 21.1 ha of this will be cleared. Because there is a possibility that clearing may occur anywhere within the designated envelope, the entire envelope has been used to quantify potential impacts.

### 3.2.2 Conservation significant vegetation communities

During the design of infrastructure placement, specific attention was given to avoiding flora and vegetation communities of environmental significance. There will be no impact to Threatened Ecological Communities (TEC) or Priority Ecological Communities (PEC) under this proposal. A Priority Ecological Community: *Triodia sp. Robe River* assemblages of mesas of the West Pilbara occurs 360 m at its closest point to the north of the camp access road. No clearing is proposed within 360 m of this community which occurs on the top of mesas and therefore won't be impacted by this proposal through direct or indirect measures.

### 3.2.3 Groundwater dependent and potentially groundwater dependent vegetation

Groundwater Dependant Vegetation (GDV) is defined as terrestrial vegetation that is dependent on the presence of groundwater to meet some or all of its ecological water requirement (Astron, 2016). One vegetation unit has been identified within the minor works footprint that is potentially GDV:

EvAcCcERIt - *Eucalyptus victrix* low-mid open woodland over *Acacia citrinoviridis*, *Melaleuca glomerata* tall sparse shrubland over *Eriachne tenuiculmis* mid sparse tussock grassland.

Approximately 1.3 ha of this potential GDV will be impacted for minor works. A total of 566 ha of this vegetation unit has been mapped within the local area (Biota, 2017), resulting in the removal of 0.24% of the mapped extent.

The potential GDV is associated with creek lines and as such follows a thin linear alignment. Roads and pipelines are proposed to cross the vegetation unit in two locations, the first near the camp and in the second for water infrastructure near the water production bores. Given the low impact nature of the proposed development, the unavailability of these crossings and the relatively small area of clearing there will not be a significant impact on this vegetation community.

### Water Drawdown from Borefield

The potential sensitive receptors located within proximity to the proposed bores are represented in Figure 6. In this instance, the only potential sensitive receptor to groundwater drawdown is vegetation within Pinarra Creek dominated by *Eucalyptus victrix* (EvAcCcERIt), with bores located immediately south of the vegetation community. Depth to groundwater in this area is approximately 20-30 m below ground level. At these depths it is highly unlikely that *E. victrix* is dependent on groundwater for its water requirements and would be obtaining water from the vadose zone, which would be recharged from surface water flows during the annual wet season.

#### 3.2.4 Conservation significant flora

No Threatened Flora listed under the *Environment Protection and Biodiversity Conservation Act 1999* or the *Biodiversity Conservation Act 2016* is anticipated to occur as a result of the Proposal.

All known locations of Priority flora has been avoided by a minimum of 50 m under this proposal. All infrastructure locations have been designed to ensure there will not be any impact to Priority flora. Priority flora species that occur within proximity to the minor works footprint are listed in Table 6.

**Table 6: Conservation significant flora within proximity of the mine minor works footprint**

Species	Conservation status	Location	Distance to disturbance
<i>Pentalepis trichodesmoides subsp. hispida</i>	Priority 2	Near to mine camp road	Closest location 80 m
<i>Indigofera sp. Bungaroo Creek</i>	Priority 3	Surrounding the eastern side of the mine camp in creek line	Closest location 80 m
<i>Triodia sp. Robe River</i>	Priority 4	Near mine access road	More than 200 m

### 3.3 Terrestrial Fauna

The minor works area has been subject to extensive fauna survey effort and thus the impacts of the minor works are quantifiable. Fortescue engaged Ecoscape (Australia) Pty Ltd (Ecoscape) to conduct a consolidated Level 2 terrestrial fauna assessment of the Eliwana Mine Project. A total of 41 previous fauna survey reports were consulted to develop the *Eliwana Project*:

*Consolidated Vertebrate Fauna Survey* (Ecoscape, 2017) of which five surveys overlapped with the Eliwana railway development area. These were:

- Western Hub Project - Eliwana and Flying Fish Terrestrial Vertebrate Fauna Assessment (Ecologia Environment, 2015)
- Western Hub Project: The Edge Vertebrate Fauna Survey (Biologic, 2014)
- Nammuldi Infill Areas Fauna Survey Report, (Biota Environmental Sciences, 2010)
- Vegetation, Flora and Fauna Assessment and Targeted Conservation Significant Flora and Fauna Survey: Eliwana (Ecoscape, 2012)
- Short Range Endemic Invertebrate Fauna Survey of Eliwana and Flying Fish (Phoenix Environmental Sciences, 2013)

### 3.3.1 Fauna habitat

Four broad fauna habitat types, as mapped by Ecoscape (2017), occur within the minor works footprint. Details regarding these habitat types are listed in Table 7, including whether they support conservation significant fauna.

The minor works have been designed to avoid all areas of significant habitat for the Ghost Bat (*Macroderma gigas*), Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*), Pilbara Olive Python (*Liasis olivaceus barroni*) and Northern Quoll (*Dasyurus hallucatus*) that have been identified from the survey effort.

Fauna habitat is affected to some extent by grazing and trampling by cattle and feral donkeys in localised areas, but generally is considered to be in good condition (Ecoscape, 2017).

Despite targeted searches, no significant roost caves supporting the Pilbara Leaf-nosed Bat or Ghost Bat are known from within the broader Mine Development Envelope that encompasses the minor works proposal.

**Table 7: Fauna habitat of the minor works area**

Habitat Type	Area mapped (ha)	Description	Significant Fauna
Drainage Line/River/Creek (Minor)	931	Dense, variable shrub layer, sometimes with occasional Eucalypt overstorey. Shrub layer of <i>Acacia</i> , <i>Grevillea</i> over <i>Themeda</i> tussock grasses.	Peregrine Falcon (foraging) Grey Falcon (foraging)
Lower Slopes/Hillslopes	37,100	Rolling hills, footslopes of hills with a hard rocky substrate. Tree strata of <i>Eucalyptus leucophloia</i> , <i>Acacia</i> , over a shrub layer of <i>Senna</i> and a spinifex hummock grassland.	Western Pebble-mound Mouse
Plain (Shrubland)	162	Mixed <i>Acacia</i> (mulga) woodland over spinifex hummock grassland.	Nil

Habitat Type	Area mapped (ha)	Description	Significant Fauna
Plain (Stony/Gibber)	23,262	Relatively flat, slightly undulating plain with open shrubland of Acacia's and <i>Senna</i> over a spinifex hummock grassland. Substrate of bedrock with scattered pebbles and stones.	Western Pebble-mound Mouse Grey Falcon (foraging)

### 3.3.2 Conservation significant fauna

The minor works have been designed to avoid all areas of significant fauna habitat identified from surveying. Within the proposed minor works disturbance footprint, two conservation significant species are likely to use the habitat types that will be impacted by this proposal for foraging and dispersal:

- Peregrine Falcon (Specially Protected); and
- Grey Falcon (Vulnerable).

The Pebble-mound Mouse (Priority 4) is likely to use some of the proposed disturbance footprint for breeding purposes. The small area of clearing proposed under the minor works is unlikely to significantly impact the continued existence of these species.

Given the low impact nature of the proposed disturbance, it is unlikely there would be a significant impact on terrestrial fauna.

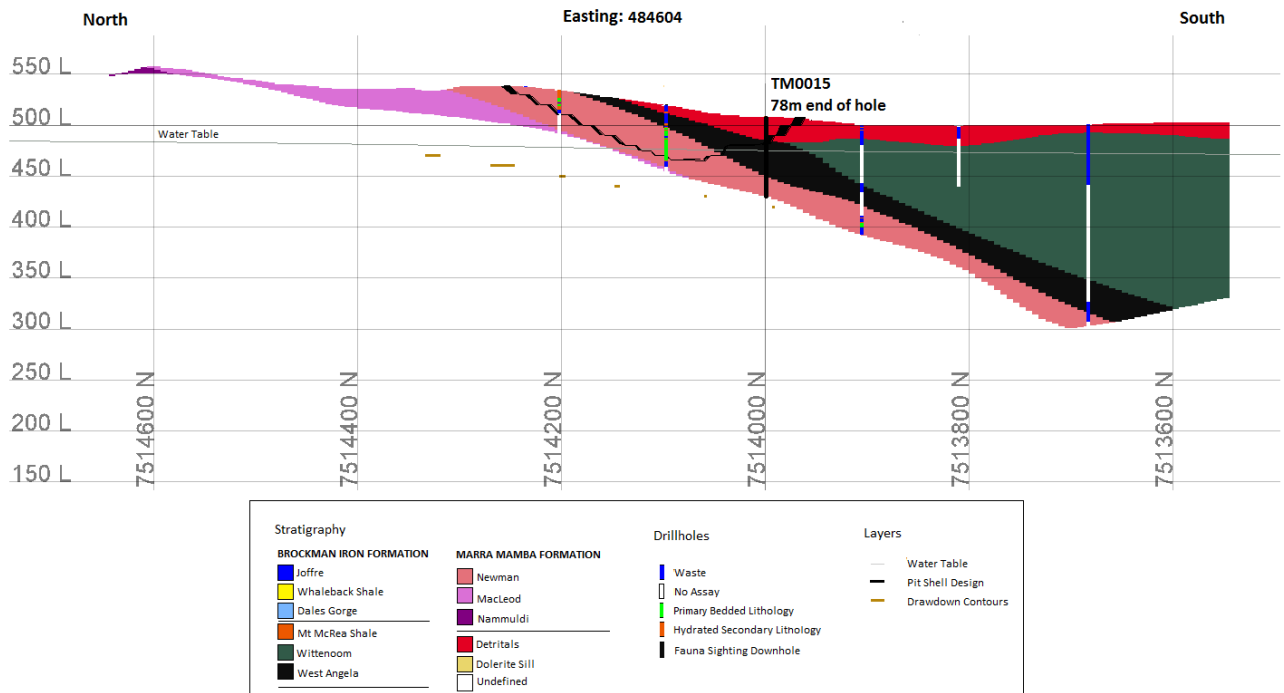
### 3.4 Subterranean Fauna

The minor works area and surrounds has been subject to extensive subterranean fauna survey effort. The most relevant previous surveys relating to flora and vegetation include:

- The Western Hub Baseline Subterranean Fauna Assessment (Bennalongia, 2015); and
- Eliwana project subterranean fauna assessment (Biologic, 2017).

No specimens described as sort range endemic (SRE) species have been identified within the minor works area. In addition, no significant habitat for SRE species has been identified in the minor works area.

Fortescue has not conducted specific water drawdown modelling for the minor works, associated with water abstraction for construction water supply. Water drawdown modelling will be undertaken for the proposed Talisman mine void which is planned under the greater Eliwana Iron Ore Mine Proposal. Plate 1 shows the geological structures which potentially provide habitat for stygofauna.



**Plate 1: Cross Section through Talisman Pit.**

In this cross section, which cuts through Talisman Pit in the area of the proposed borefield, the Newman Member of the Marra Mamba formation (light pink colour) and the Wittenoom Formation (dark green) is considered stygofauna habitat and stygofauna specimens have been recorded from these habitats. There is likely to be deeper potential habitats within these layers that will not be impacted by mine dewatering during operations and by deduction, will not be impacted by minor works. The West Angles Member (Black) is likely to be stygofauna habitat where weathering has occurred.

Figure 8 shows the potential extent of both the Wittenoom and Marra Mamba Formations in the vicinity of Talisman Pit.

There is expected to be a 30 m decline in groundwater levels around the Talisman pit during operations (not during minor works) due to mine dewatering and there will remain extensive stygofauna habitat in this area during operations. The decline in groundwater levels associated with the short term abstraction for minor works water supply is unlikely to have any significant impact on stygofauna or their habitat.

### 3.5 Social Surroundings

The minor works area is located within the Puutu Kunti Kurrama and Pinikura (PKKP) Native Title Determination area. Fortescue has entered into various agreements with the PKKP People which contain heritage management processes (Heritage Agreements). Fortescue signed a Land Access Agreement (LAA) with the PKKP People on 28 May 2010. The LAA includes comprehensive provisions including agreed processes and protocols around cultural heritage

management and environmental protection and facilitate exploration, mining and development activities within the Native Title Determination areas.

Fortescue has commissioned, funded and facilitated ethnographic and archaeological heritage surveys which have been completed by PKKP People or their nominated representatives and by independent heritage professionals nominated and engaged by the traditional owners or their representatives. Those surveys were completed in accordance with the contractual terms and heritage processes set out in the Agreements and to ensure compliance with relevant legislation, including the *Aboriginal Heritage Act 1972*.

A total of 17 archaeological or ethnographic surveys have been undertaken over the Mine Development Envelope to identify places of significance to the Traditional Owners. The results of these surveys have not been included for culturally sensitive reasons.

There has been considerable effort to design the placement of minor works infrastructure to be sensitive of culturally significant sites. An important aspect of the LAAs is the establishment of Working Groups and Committees, for Fortescue to meet with and consult with the Traditional Owners relating to the identification, protection and management of cultural heritage and operational and development planning. Fortescue will continue to consult with PKKP on all aspects of the project and its planning.

Fortescue will undertake all works in accordance with statutory and contractual requirements, in accordance with the appropriate approvals and Fortescue's Land Use Certification system.

Fortescue has protocols and notification arrangements with pastoralists that may be affected by the works associated with this proposal. The Proposal intersects the Hamersley pastoral station and Unallocated Crown Land. Due to the low impact nature of the proposed activities, it is unlikely to result in impacts to the operations at the Hamersley pastoral station.

### **3.6 Air Quality**

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Given the low impact nature of the proposed disturbance, air quality is not anticipated to be significantly impacted by the proposed works.

### **3.7 Summary**

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The ground disturbance associated with the minor works has been designed to avoid conservation significant flora, vegetation, fauna and fauna habitat. Some small areas of potential Groundwater Dependent Vegetation will be cleared for linear infrastructure (roads and water pipelines). The impacts to this ecosystem are anticipated to be insignificant and reversible.

Fortescue considers that the level of disturbance associated with the minor works proposed is similar in scale to exploration activities authorised under the Mining Act. Fortescue believes that



the Mining Act and Part V of the EP Act will adequately manage the disturbance associated with this proposal.



#### 4. DECOMMISSIONING/REHABILITATION AND REVERSIBILITY OF IMPACTS

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The types of activities planned under minor works have been designed with the constraint that they will be temporary in nature and can be rehabilitated to reverse any environmental impacts that may have occurred. The environmental impacts are analogous to mineral exploration and will be regulated in detail under the *Mining Act 1978* and through conditions imposed under other environmental approvals.

In addition, the location of the activities have been designed to occur in environmental features that are common in the landscape, thereby reducing the environmental impact while improving the reversibility of the impacts.

A Mining Proposal is required to undertake the proposed works and a Mine Closure Plan is required to be submitted in support of the Mining Proposal. Rehabilitation of the minor works footprint will be undertaken in accordance with the Mine Closure Plan.

All of the minor works infrastructure such as camps, signage, stockpiles and water pipes can be decommissioned and removed. Borrow pits can be backfilled, disturbance can be contoured and revegetation can take place that will ensure the impacts of the disturbance are reversible.

## 5. ENVIRONMENTAL JUSTIFICATION

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The wet season in the Pilbara region (December – February) is associated with sporadic and intense rainfall events. Fortescue proposes to undertake these works in the dry season (June - August) when rainfall is generally low. Extreme rainfall events could significantly interrupt the proposed works as construction activities cannot be conducted when it is too wet. Heavy rainfall during construction can cause erosion and sedimentation if it strikes before management measures are in place. Hence, on environmental grounds, it is preferable to conduct the works in the dry season.

## 6. OTHER APPROVALS REQUIRED

A number of other environmental approvals required in order to undertake the proposed minor or preliminary work (Table 8).

**Table 8: Other approvals required**

Activity	Legislation	Approval Required
Change to potential impacts to Matters of National Environmental Significance	<i>Environment Protection and Biodiversity Conservation Act 1999</i>	A revised referral will be submitted which excludes the proposed minor or preliminary works from the Eliwana Iron Ore Project which is currently under assessment by the Department of Environment and Energy.
Land Clearing	EP Act (Part V)	A Native Vegetation Clearing Permit will be required for all land clearing activities to be undertaken as minor or preliminary works.
Schedule 1 Activities	EP Act (Part V)/ <i>Environmental Protection Regulations 1987</i>	Approval under Part V of the EP Act for will be required for the following premises: <ul style="list-style-type: none"> <li>• Category 12/70: Screening etc. of material</li> <li>• Category 54/85: Sewage Facility</li> <li>• Category 73: Bulk storage of chemicals</li> <li>• Category 77: Concrete batching</li> </ul> Approval types will include Works Approvals, Licences and Registrations.
Development of mining-related infrastructure on mining tenure	<i>Mining Act 1978</i>	A Mining Proposal will be required for the approval of mining-related infrastructure and activities to be undertaken on tenure granted under the <i>Mining Act 1978</i> . A Mine Closure Plan will also be required to be submitted with a mining proposal detailing how disturbance will be rehabilitated if it is required.
Construction of wells and abstraction of groundwater	<i>Rights in Water and Irrigation Act 1914</i>	Approval to construct a well for the purpose of groundwater production (26D Licence) and approval to abstract groundwater (5C Licence) will be required for camp and construction water supply infrastructure proposed within the minor or preliminary work scope.

## 7. CONCLUSION

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Fortescue proposes to undertake minor works associated with the Eliwana Iron Ore Mine Project referred to the Environmental Protection Authority. The works are essential to ensure that low environmental risk activities of the project can continue to be developed while the project is under assessment from the EPA. The minor works have been designed to have a low environmental impact and be reversible through decommissioning and rehabilitation.

## REFERENCES

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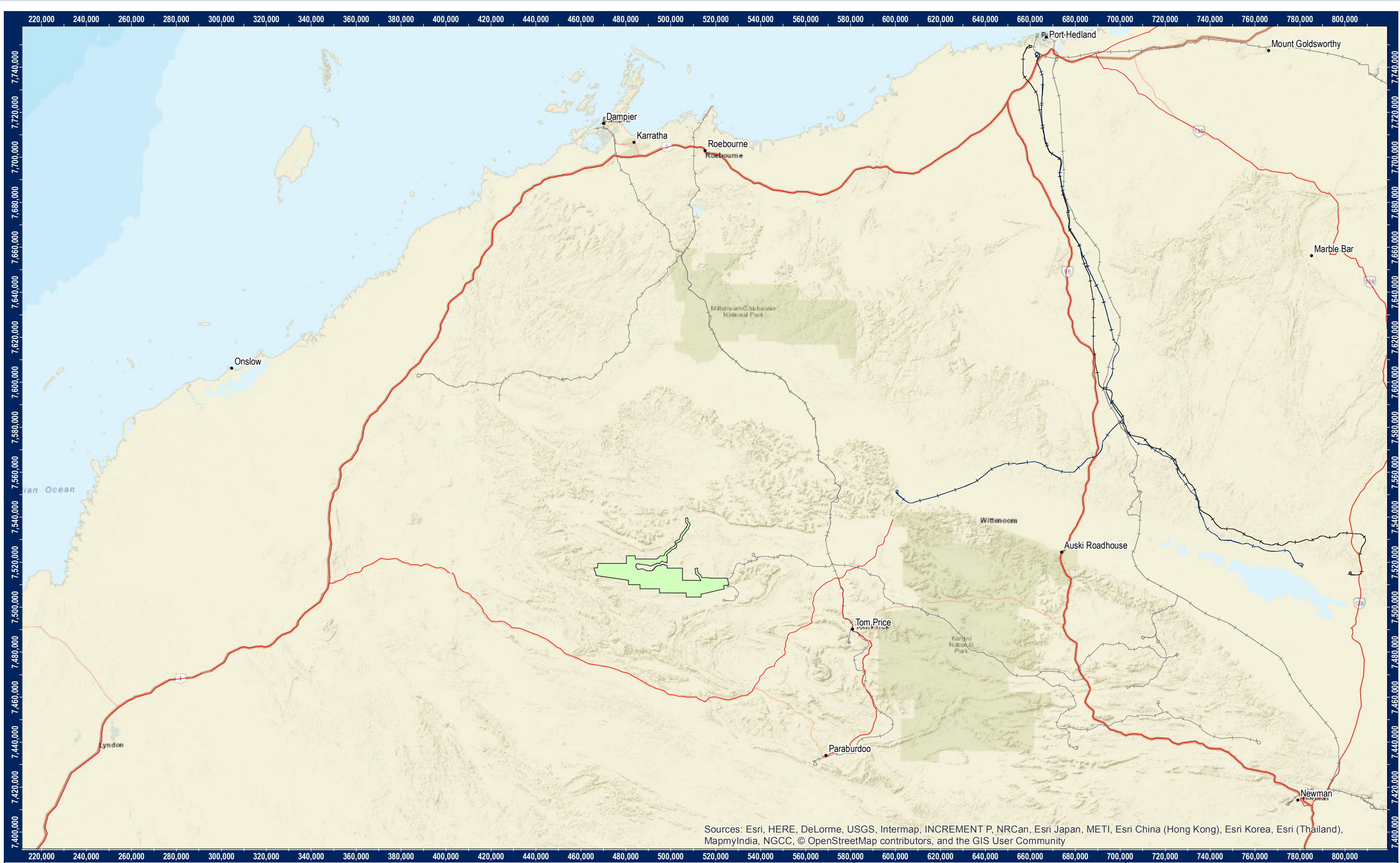
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## Figure 1: Location of the Eliwana Mine Project

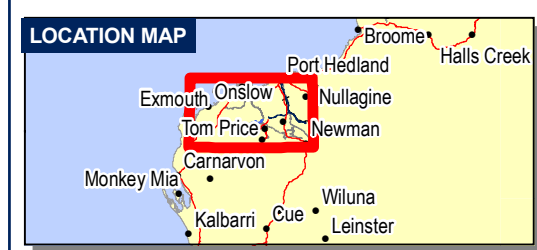
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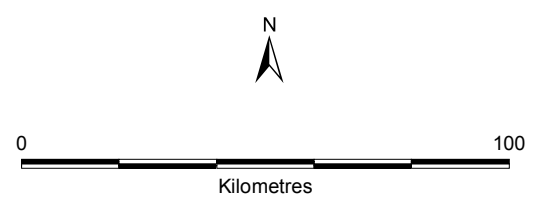




Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community



- LEGEND**
- GOV\_Towns
  - 2M Roads
  - FMG\_Rail\_Alignments
  - 3RD\_Rail\_Alignments
  - <all other values>
  - Company**
  - BHP
  - Rio Tinto
  - Mine Development Envelope



Requested By: Chris Heary  
 Drawn By: Chris Heary  
 Revised By: cheary  
 Approved By:  
 Scale: 1:1,550,000  
 Coordinate System: GDA 1994 MGA Zone 50  
 Document Name: Eliwana Mine Project Location Map

Date: 14/02/2018  
 Size: A3L  
 Revision: 0  
 Confidentiality: 1

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**Eliwana Mine Project  
Location Map**



**Fortescue Metals Group Ltd**  
The New Force in Iron Ore



**Figure 2: Proposed Disturbance by Activity**

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**LEGEND**

- Eliwana Mine Camp
- Roads and Water Pipelines
- Aerodrome
- Equipment laydown
- Borrow
- Camp Sprayfield
- Water Pipelines
- Turkeys Nest
- Topsoil Stockpiles

Data Source(s):  
FMG, Aerial Mosaic, 2017



**Mine Early Works  
Eliwana**

Requested By: C. Heary	Date: 14/02/2018
Drawn By: C. Heary	Size: A3L
Revised By: cheary	Revision: 0
Approved By:	Confidentiality: 1
Scale: 1:37,000	
Coordinate System: GDA 1994 MGA Zone 50	
Document Name: Mine MPW Final Workspace 140218	

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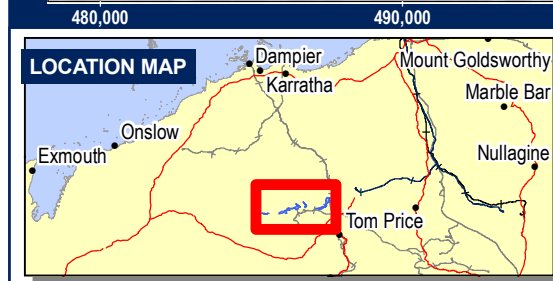
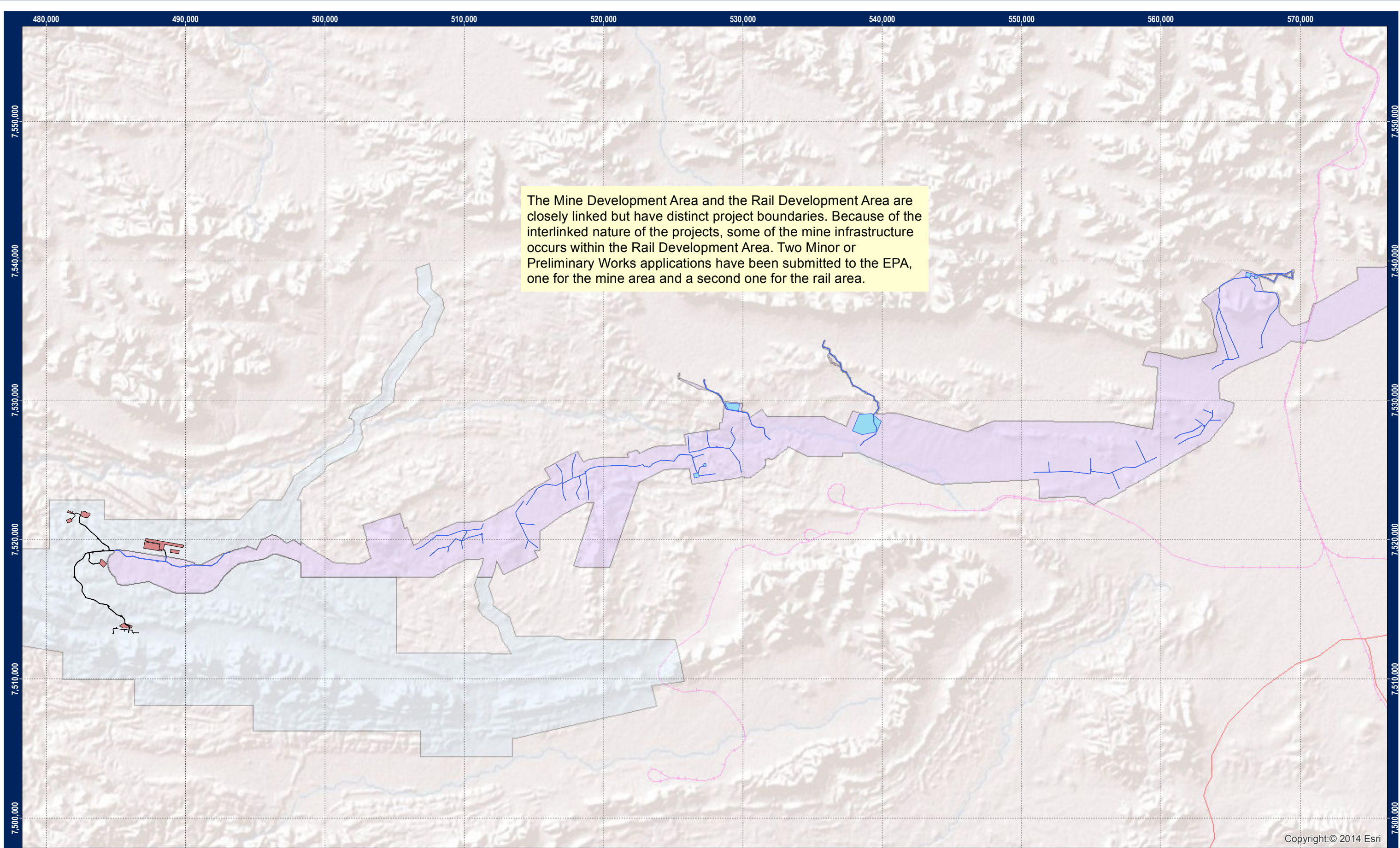


### **Figure 3: Relationship Between Mine and Railway Minor or Preliminary Works**



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**LEGEND**

- Mine Area Early Works
- Rail Area Early Works
- Mine Development Envelope
- Rail Development Envelope
- 2M Roads
- Rio Tinto

**3RD\_Rail\_Alignments**

**Company**

N

0      5      10      15

Kilometres

Requested By: Chris Heary  
 Drawn By: Chris Heary  
 Revised By: cheary  
 Approved By:  
 Scale: 1:250,000  
 Coordinate System: GDA 1994 MGA Zone 50  
 Document Name: Relationship between MPW projects 2

Date: 15/02/2018  
 Size: A3L  
 Revision: 0  
 Confidentiality: 1

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**Relationship between mine and rail early works**



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The New Force in Iron Ore

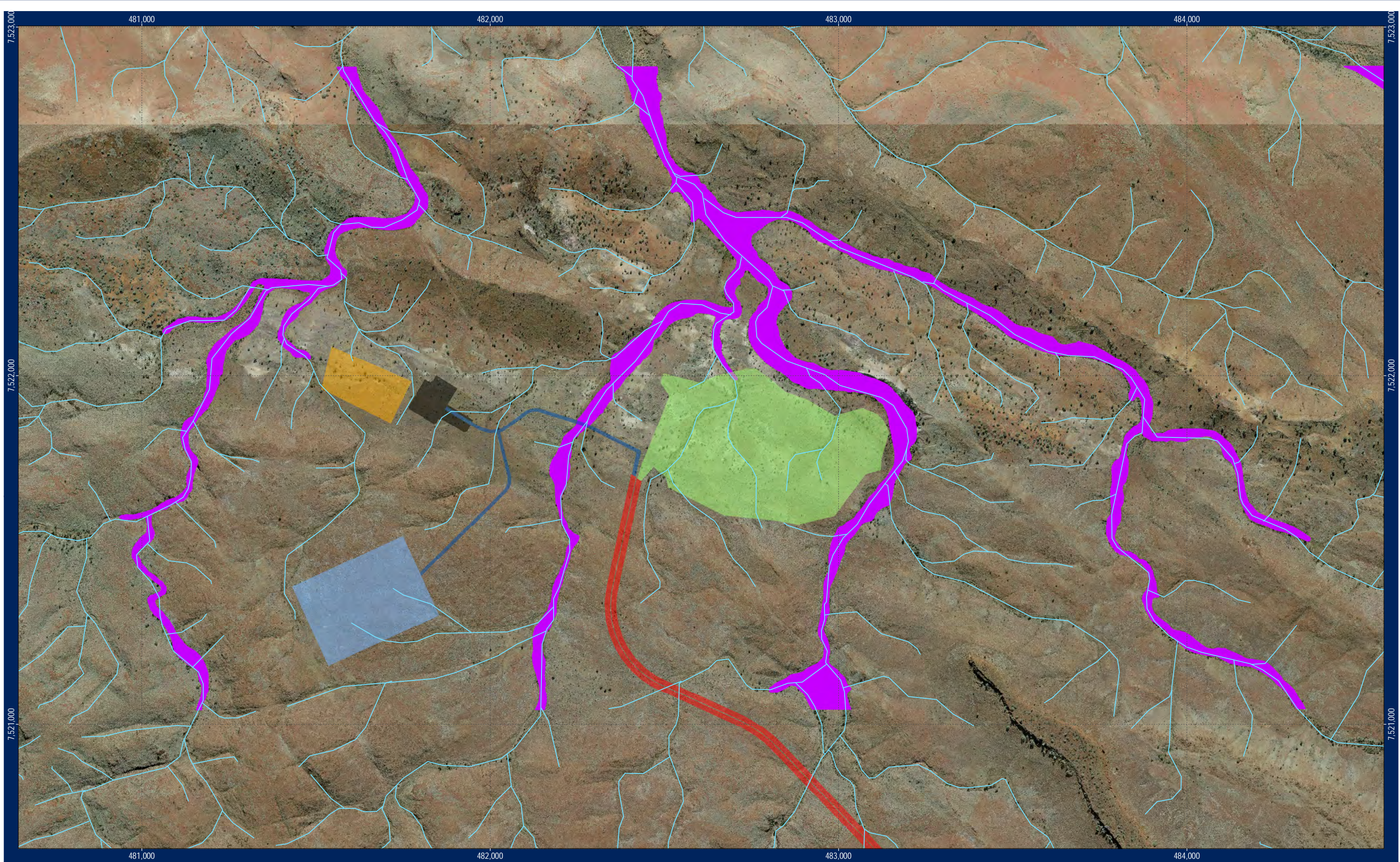
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**Figure 4: Surface Drainage Eliwana Mine Camp**

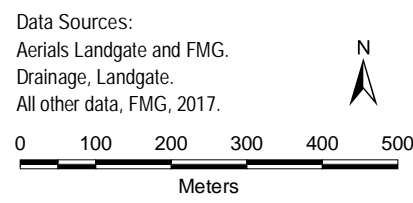
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**LEGEND**

Drainage	Mine Camp
Riparian Vegetation	Pipeline
<b>Minor Preliminary Works</b>	Roads
Building	Sprayfield
	Topsoil Stockpile



Requested By: M. Dowling  
 Drawn By: S. Costello  
 Revised By: scostello  
 Approved By: P. Mastalir  
 Scale: 1:10,000  
 Coordinate System: GDA 1994 MGA Zone 50  
 Document Name: 750EW\_MP\_EN\_0012.002\_r0

Date: 12-Mar-18  
 Size: A3L  
 Revision: 0  
 Confidentiality: 1

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**Surface Drainage - Eliwana Camp**  
 Figure 1

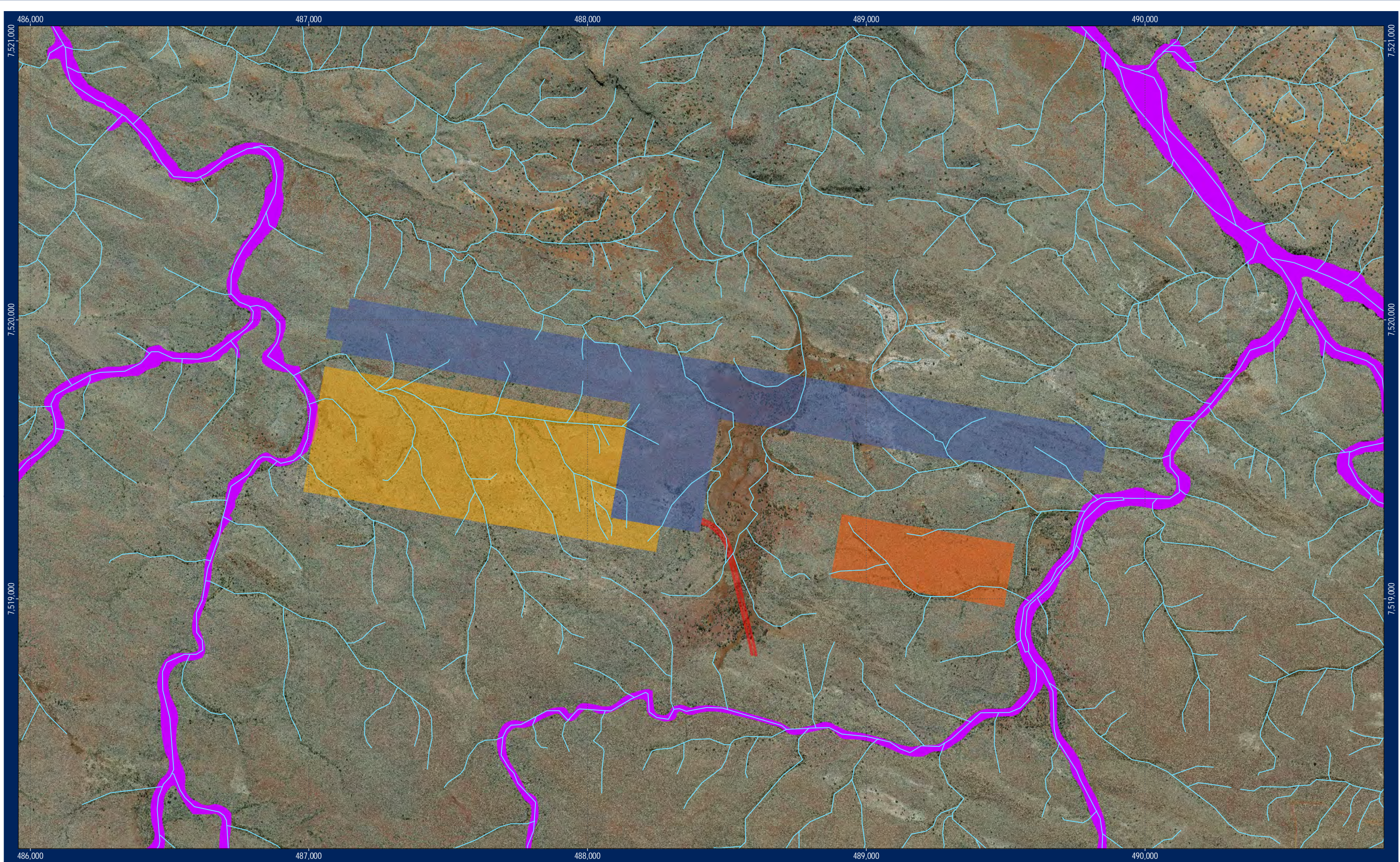
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## Figure 5: Surface Drainage Aerodrome

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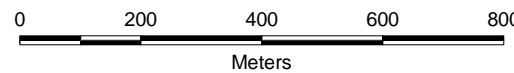




**LEGEND**

- Drainage
- Riparian Vegetation
- Minor Preliminary Works**
- Airstrip Indicative Footprint
- Borrow Envelope
- Roads
- Topsoil Stockpile

Data Sources:  
 Drainage, Landgate.  
 All other data, FMG, 2017.



Requested By: M. Dowling  
 Drawn By: S. Costello  
 Revised By: scostello  
 Approved By: P. Mastalir  
 Scale: 1:12,500  
 Coordinate System: GDA 1994 MGA Zone 50  
 Document Name: 750EW\_MP\_EN\_0012.003\_r0

Date: 12-Mar-18  
 Size: A3L  
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**Surface Drainage - Eliwana Aerodrome**  
 Figure 2



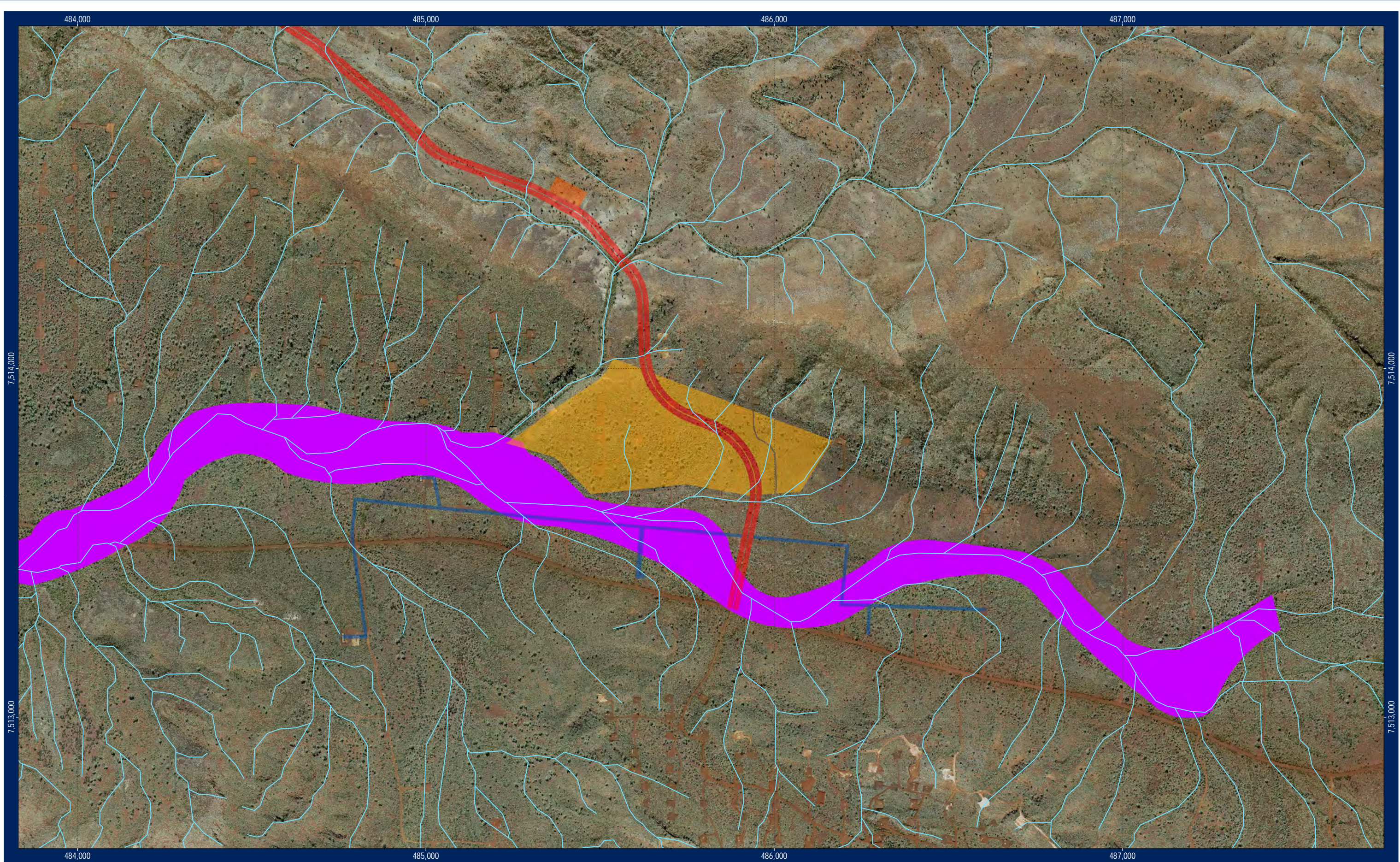
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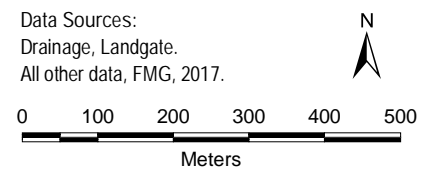
**Figure 6: Surface Drainage Borefield**

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**LEGEND**

- Drainage
- Vegetation Community - EvAcCcERIt
- Minor Preliminary Works**
- Borrow Envelope
- Pipeline
- Roads
- Topsoil Stockpile



Requested By: M. Dowling  
 Drawn By: S. Costello  
 Revised By: scostello  
 Approved By: P. Mastalir  
 Scale: 1:10,000  
 Coordinate System: GDA 1994 MGA Zone 50  
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 Size: A3L  
 Revision: 0  
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**Borefield - Sensitive Receptors**  
 Figure 3

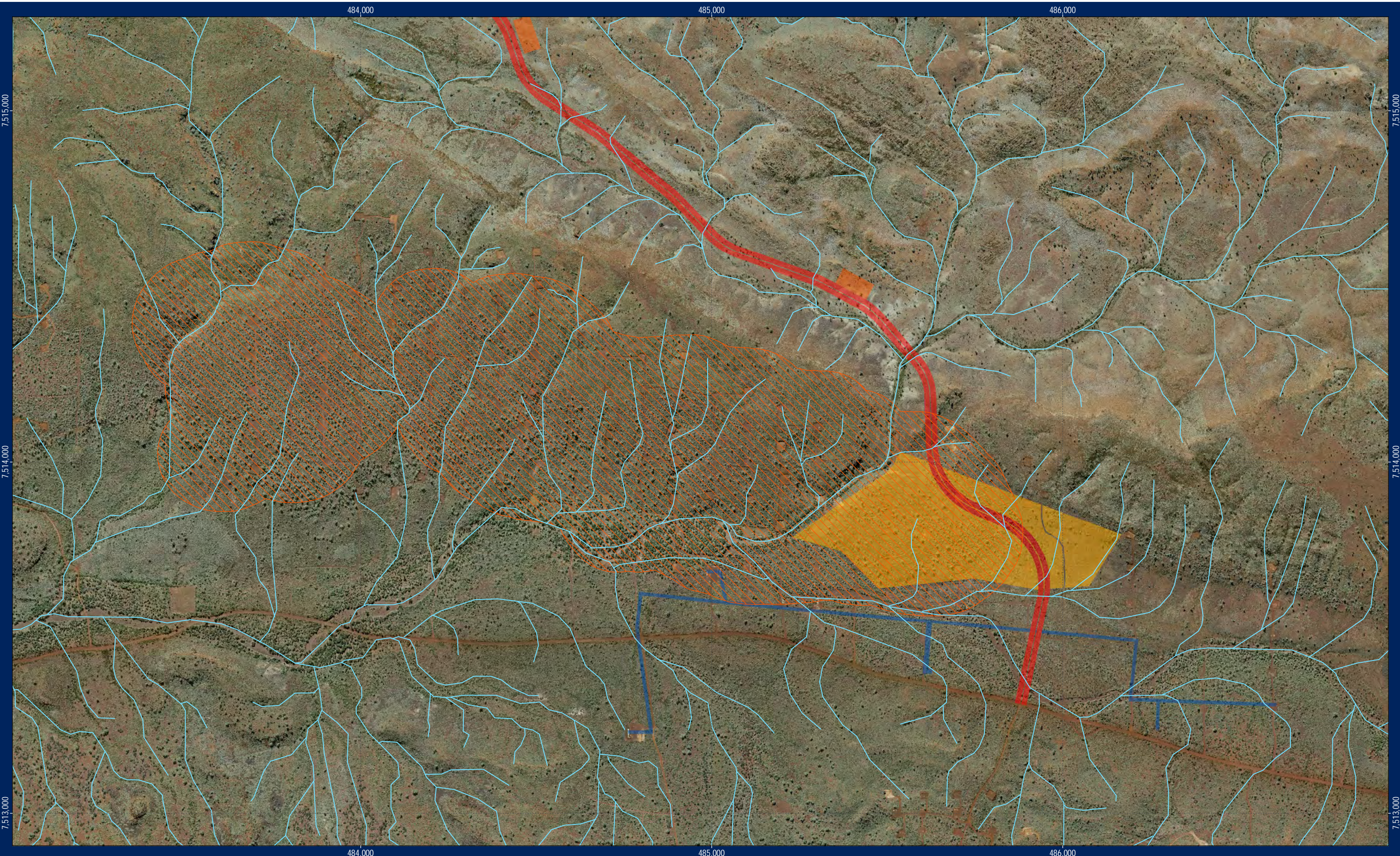




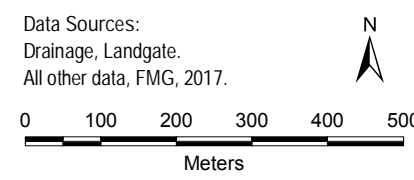
**Figure 7: Talisman Void in Relation to Borefield**

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- LEGEND**
- Drainage
  - ▨ Talisman Pit
  - ▨ Borrow Envelope
  - ▭ Pipeline
  - ▭ Roads
  - ▭ Topsoil Stockpile
- Minor Preliminary Works**



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 Scale: 1:10,000  
 Coordinate System: GDA 1994 MGA Zone 50  
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 Size: A3L  
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 Confidentiality: 1

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**Borefield - Talisman Pit Location**  
 Figure 1

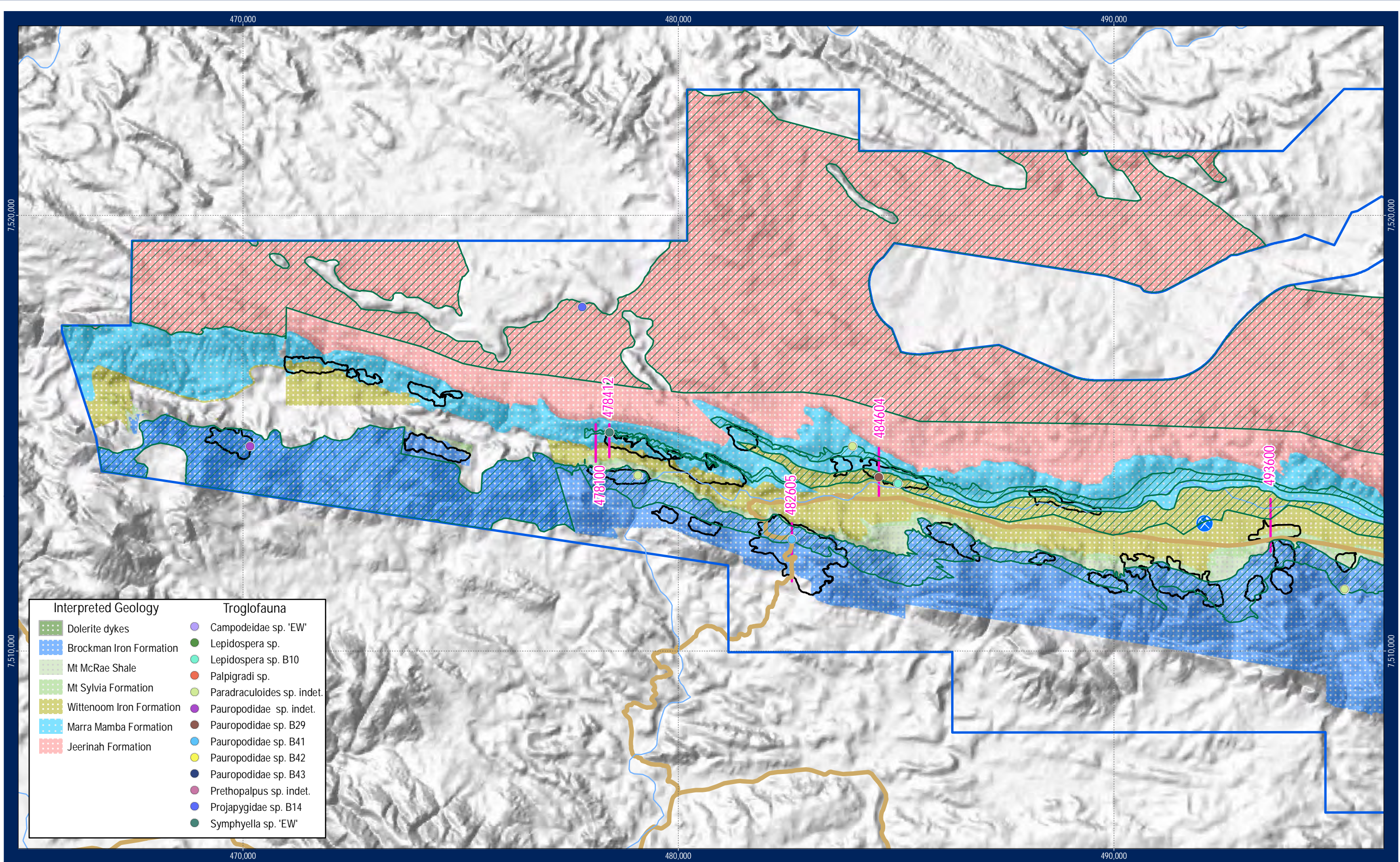




**Figure 8: Interpreted Geology and Troglifauna**



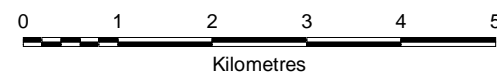
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Interpreted Geology	Troglofauna
Dolerite dykes	Campodeidae sp. 'EW'
Brockman Iron Formation	Lepidospera sp.
Mt McRae Shale	Lepidospera sp. B10
Mt Sylvia Formation	Palpigradi sp.
Wittenoom Iron Formation	Paradraculoides sp. indet.
Marra Mamba Formation	Pauropodidae sp. indet.
Jeerinah Formation	Pauropodidae sp. B29
	Pauropodidae sp. B41
	Pauropodidae sp. B42
	Pauropodidae sp. B43
	Prethopalpus sp. indet.
	Projapygidae sp. B14
	Symphyella sp. 'EW'

- Fortescue Projects
- Mine Development Envelope
- Troglofauna Habitat
- Major Drainage
- Indicative Mine Footprint
- Cross Section Lines

Data Sources:  
 Pastoral Stations based on source from Landgate.  
 Towns, Roads, Drainage, Landgate.  
 SRTM, GA.  
 All other data, FMG, 2017.



Requested By: A. Winzer  
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**Figure X**  
 Troglofauna - Restricted Species  
 Sheet 1 of 2



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