ENVIRONMENTAL SCOPING DOCUMENT

WEST ANGELAS IRON ORE PROJECT, DEPOSIT C, D AND G PROPOSAL

Proposal:	West Angelas Iron Ore Project, Deposit C, D and G Proposal
Location:	West Angelas is located approximately 130 kilometres west of Newman in the Pilbara region of Western Australia.
Local Government Area:	Shire of East Pilbara
Proponent:	Robe River Mining Co. Pty. Ltd. Australian Company Number 008 694 246
Proponent Address:	152-158 St Georges Terrace PERTH WA 6000 GPO Box A42, PERTH WA 6001
Assessment Number:	2132
Public Review Period:	Environmental Review Document - 8 weeks

1 Introduction

The Environmental Protection Authority (EPA) has determined that the above Proposal is to be assessed under Part IV of the *Environmental Protection Act 1986* (EP Act).

The purpose of the Environmental Scoping Document (ESD) is to define the form, content, timing and procedure of the environmental review, required by section 40(3) of the EP Act. Robe River Mining Co. Pty. Ltd. (the Proponent) has prepared this ESD according to the procedures in the EPA's *Environmental Impact Assessment (Part IV Divisions 1 and 2) Procedures Manual 2016* (Procedures Manual).

The Proponent will conduct the environmental review in accordance with this ESD and report to the EPA in an Environmental Review Document. As well as the requirements identified in this ESD, the Environmental Review Document will address the requirements identified in the EPA's *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2016* (Administrative Procedures). When the EPA is satisfied that the Environmental Review Document addresses these requirements, the Proponent will be required to release the Environmental Review Document for a public review period of 8 weeks.

Form

The form of the Environmental Review document required under section 40(3) of the EP Act is according to the *Environmental Review Document template*.

Content

The Environmental Review document required under section 40(3) of the EP Act includes the content outlined in sections 2 to 6 of this ESD.

Timing

Table 1 sets out the timeline for the assessment of the Proposal agreed between the Proponent and the EPA.

Table 1: Assessment timeline

Key Assessment Milestones	Completion Date
EPA approves ESD	30 November 2017
Proponent submits draft Environmental Review Document	1 December 2017
EPA provides comment on draft Environmental Review Document *(6 weeks from receipt of Environmental Review Document)*	+ 6 weeks (+ 3 weeks) 2 February 2018
Proponent submits revised Environmental Review Document	+ 6 weeks 16 March 2018
EPA authorises release of Environmental Review Document for public review *(2 weeks from EPA approval of Environmental Review Document)*	+ 2 weeks 30 March 2018
Proponent releases Environmental Review document for public review *(8 weeks)*	16 April 2018
Close of public review period	+ 8 weeks 8 June 2018
EPA provides Summary of Submissions *(3 weeks from close of public review period)*	+ 3 weeks 29 June 2018
Proponent provides Response to Submissions	+ 8 weeks 24 August 2018
EPA reviews the Response to Submissions *(4 weeks from receipt of Response to Submissions)*	+ 4 weeks 21 September 2018
EPA prepares draft Assessment Report and completes assessment *(6 weeks from EPA accepting Response to Submissions)*	+ 6 weeks 2 November 2018
EPA finalises Assessment Report (including two weeks consultation on draft conditions) and gives report to Minister *(6 weeks from completion of assessment)*	+ 6 weeks 21 December 2018

Procedure

The environmental review will be according to the procedures in the Administrative Procedures and the Procedures Manual.

This ESD will be released for public review. The ESD will be available on the EPA website (www.epa.wa.gov.au) upon endorsement and will be appended to the revised Environmental Review document.

2 The Proposal

The subject of this ESD is the Proposal by Robe River Mining Co. Pty. Ltd (the Proponent) to expand the existing West Angelas Project to include above and below water table mining of Deposits C, D and G and associated infrastructure.

This Proposal is located adjacent to the existing West Angelas Iron Ore Mine, located approximately 130 kilometres (km) northwest of Newman in the Pilbara region of Western Australia (Figure 1). The Proposal will be contained within the proposed Mine Development Envelope (Figure 2) and Linear Infrastructure Development Envelope (Figure 3).

The current Ministerial Statement 970 (dated 12 June 2014) and Ministerial Statement 1015 (dated 21 August 2015) authorise clearing of up to 7,890 hectares (ha) within the 22,600 ha West Angelas Mine Development Envelope.

Subject to approval of this Proposal, the Proponent requests that a new Ministerial Statement is published to supersede the existing Ministerial Statements, which authorises clearing of up to 12,200 ha within the 26,400 ha West Angelas Mine Development Envelope.

The key characteristics of the Proposal are set out in Tables 2 and 3. These key characteristics may change as a result of the findings of studies conducted and the application of the mitigation hierarchy by the Proponent.

Table 2: Summary of the Proposal

Proposal	West Angelas Iron Ore Project, Deposit C, D and G Proposal
Proponent	Robe River Mining Co. Pty. Ltd.
Short description	The existing West Angelas Iron Ore Project, located approximately 130 kilometres west of Newman in the Pilbara region of Western Australia, is the subject of Ministerial Statement 970 (dated 12 June 2014) and Ministerial Statement 1015 (dated 21 August 2015) and involves above and below water table, open-cut iron ore mining from Deposits A, A west, B, E, and F and the construction and operation of associated infrastructure. This Proposal is a revision of the existing West Angelas Iron Ore Project and includes the above and below water table, open-cut iron ore mining from Deposits C, D and G and the construction and operation of associated infrastructure.

Table 3: Location and authorised extent of physical and operational elements of the Proposal

Element	Existing Authorised Extent	Proposed Authorised Extent (This Proposal)	Proposed Authorised Extent (Revised Proposal)
Mine and associated infrastructure (Figure 2)	Clearing of no more than 7,890 hectares (ha) within the 22,600 ha West Angelas Mine Development Envelope.	Additional clearing of no more than 4,310 ha within an extended West Angelas Mine Development Envelope (extended by 3,800 ha).	Clearing of no more than 12,200 ha within the 26,400 ha West Angelas Mine Development Envelope. No clearing within the West Angelas Cracking Clay Priority Ecological Community, PEC-2015-5 and clearing of no more than 20 ha of other representations of the West Angelas Cracking Clay Priority Ecological Community.
Linear infrastructure (Figure 3)	Not specified.		Clearing no more than 1,500 ha within the West Angelas Linear Infrastructure Development Envelope.

Dewatering	Not specified under Part IV of the EP Act. Abstraction of up to 5.4 GL/a of groundwater for dewatering purposes (excluding potable supply) approved under a groundwater licence issued under the *Rights in Water Irrigation Act 1914*.	Additional abstraction of up to 8 GL/a of groundwater for dewatering purposes (excluding potable supply).	Abstraction of up to 14 GL/a of groundwater for dewatering purposes (excluding potable supply).
Borefield (Figure 3)	Turee B Borefield - Licensed under the RIWI Act 1914 (GWL103136) for 3,102,500 kL		Extraction of no more than 3,102, 500 Kl
Surplus water management (Figure 4)	Not specified under Part IV of the EP Act. Discharge of up to 6 GL/a of surplus dewatering water to a local ephemeral tributary of Turee Creek East approved under a licence issued under Part V of the EP Act.	Additional discharge of up to 6 GL/a of surplus dewatering water to a local ephemeral tributary of Turee Creek East.	Discharge of up to 12 GL/a of surplus dewatering water to a local ephemeral tributary of Turee Creek East. The surface discharge extent will not extend within the boundary of Karijini National Park (under natural no-flow conditions).
Backfilling	Not specified.	Below water table pits will be backfilled to a level which will not allow the formation of permanent pit lakes.	Below water table pits will be backfilled to a level which will not allow the formation of permanent pit lakes.

3 Preliminary key environmental factors and required work

The Proponent has assessed the environmental factors relevant to this Proposal, in accordance with the approach in the EPA's *Statement of Environmental Principles, Factors and Objectives* (2016) and the EPA's Environmental Factor Guidelines and Environmental Factor Technical Guidance. The following preliminary key environmental factors have been identified for the environmental review:

1. Flora and Vegetation;
2. Terrestrial Fauna;
3. Subterranean Fauna;
4. Hydrological Processes;
5. Inland Waters Environmental Quality;
6. Air Quality; and
7. Social Surroundings.

Table 4 outlines the work required for each preliminary key environmental factor and contains the following elements for each factor:

- **EPA objective** for that factor.
- **Proposal activities** that may have a significant impact on that factor.
- **Potential impacts and risks** to that factor resulting from the proposal (direct, indirect and cumulative impacts at a local and regional scale).

- **Required work** for that factor.
- **Relevant policy and guidance** relevant to the assessment.

Table 4: Preliminary key environmental factors and required work

Flora and Vegetation	
EPA Objective	*To protect flora and vegetation so that biological diversity and ecological integrity are maintained*
Relevant aspects	*Clearing* This Proposal includes clearing of up to 4,310 ha of vegetation, including the following vegetation communities of elevated conservation significance: • One occurrence of approximately 15.5 ha of the West Angelas Cracking Clay Priority Ecological Community (PEC); and • Riparian vegetation (Turee Creek East tributary). Clearing is also expected to result in the direct loss of some individuals of the following six recorded Priority Flora species and one species of potential interest (SPI): • Two P2 flora species (*Aristida lazaridis* and *Eremophila pusilliflora Buirchell & A.P.Br.*); • Four P3 flora species (*Acacia subtiliformis*, *Rhagodia* sp. Hamersley (M. Trudgen 17794), *Sida* sp. Barlee Range (S. van Leeuwen 1642) and *Triodia* sp. Mt Ella (M.E. Trudgen 12739)); and • One SPI (*Eulalia* sp. (Three Rivers Station, B.Forsyth AQ6789133)). *Alteration of the natural hydrological regime* This Proposal is expected to contribute to alteration of the natural hydrological regime: • Disruption to natural patterns of surface water flow is likely to cause inundation and / or shadowing effects on vegetation communities including the West Angelas Cracking Clay PEC, recognised as being dependent on those natural patterns of surface water flow; and • Discharge will result in a change to the hydrological regime of Turee Creek East from an ephemeral hydrologic regime to a perennial hydrologic regime for the surface discharge extent, resulting in inevitable changes to riparian vegetation. Riparian vegetation along Turee Creek East (within the modelled extent of surface water discharge) supports two of the three common Pilbara species known to be phreatophytic: *Eucalyptus victrix* and potentially *Eucalyptus camaldulensis*. *Groundwater drawdown* This Proposal also includes groundwater drawdown, expected to result in declining health or death of some individuals of the dominant potentially groundwater dependent species; *Eucalyptus victrix* and *Eucalyptus camaldulensis* as a result of unmitigated groundwater drawdown beneath Karijini National Park.
Potential impacts and risks	Potential impacts to flora and vegetation include the following: • Loss of vegetation (including vegetation communities of elevated conservation significance) as a result of clearing. • Loss or alteration of vegetation (including vegetation communities of elevated conservation significance) as a result of altered hydrological regimes (quality and quantity of surface water). • Loss or alteration of riparian vegetation as a result of surface water discharge. • Loss or alteration of potentially groundwater dependant vegetation as a result of groundwater drawdown. • Loss of conservation significant flora species as a result of clearing. • Alteration of vegetation (including vegetation communities of elevated conservation significance) as a result of ingress of weeds. • Increased risk (altered fire regime) for fire resulting in vegetation loss or change. • Loss of the native seed bank from the areas cleared.

Required work	• Identify and characterise flora species and vegetation communities within the Proposal area and any other areas that may be directly or indirectly impacted as a result of this Proposal in accordance with the requirements of EPA *Environmental Factor Guideline: Flora and Vegetation* (2016) through:
	  • Desktop review of previous flora and vegetation surveys undertaken within the Proposal area; and
	  • Detailed flora and vegetation surveys in areas not previously surveyed that are likely to be

	directly or indirectly impacted as a result of this Proposal. Surveys (if required) are to be undertaken in accordance with the requirements of EPA *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment (2016)*.

Required work	• Assess the conservation significance of flora species and vegetation communities in a local and regional context, including:
	  • Provide a detailed description of conservation significant flora species and vegetation communities that occur within the Proposal area, including, but not limited to;
	  o Priority Flora species, and
	  o Priority Ecological Community: West Angelas Cracking Clay
	  and assess the percentage of those species / extent of those communities that are likely to be directly or indirectly impacted as a result of this Proposal to demonstrate whether or not an impact on the local and regional representation of conservation significant flora species and vegetation communities is likely to occur.
	  • Identify vegetation communities which are potentially groundwater dependent. Provide a detailed description of the methodology used in the identification and mapping of potentially groundwater dependent communities and assess the extent of these communities that are likely to be directly or indirectly impacted as a result of this Proposal.
	  • Provide maps showing the recorded locations of conservation significant vegetation communities.
	• Provide a detailed description and analysis (including tables and figures / maps where appropriate) of the potential impacts to conservation significant flora species and vegetation communities within the Proposal area including direct impacts from clearing (include an analysis of approved clearing and proposed clearing for this Proposal), and indirect impacts such as altered hydrological regime, surface water discharge, groundwater drawdown and spread of weeds.
	• Determine and discuss the significance of potential direct, indirect (such as altered hydrological regimes, surface water discharge, groundwater drawdown, ingress of weeds) and cumulative impacts to conservation significant flora species and vegetation communities (at a local and regional scale), with a specific focus on potentially groundwater dependent vegetation within Karijini National Park, as a result of the Proposal.
	• Present a spatially distributed risk assessment of likely impacts to groundwater dependent vegetation based on an understanding of dependence and projected hydrological and hydrogeological changes. Include consideration whether potential impacts to potentially groundwater dependent vegetation within Karijini National Park will be reversible.
	• Discuss proposed outcomes / objectives, management strategies and monitoring (including methodology, frequency and location, trigger and threshold criteria, contingency actions, review and reporting) to be implemented to demonstrate that the Proposal has considered the mitigation hierarchy to ensure impacts (direct and indirect) to flora species and vegetation communities are avoided / minimised and are not greater than predicted.
	• Predict the residual impacts to conservation significant flora species and vegetation communities as a result of the Proposal, following the application of the mitigation hierarchy. Identify whether the residual impacts are significant by applying the Significant Residual Impact Model in the WA Environmental Offsets Guideline.
	• Propose an offsets position for potential significant residual impacts to significant flora species and vegetation communities as a result of the Proposal that demonstrates application of the WA Environmental Offsets Policy and Guideline.
	• Demonstrate in the Environmental Review Document how the EPA's objective for this factor can be met.
	• Review and where necessary propose revisions to the requirements of the existing conditions of Ministerial Statement 970 and 1015 that could be applied to the entire Revised Proposal in order to address potential impacts to conservation significant flora species and vegetation communities.
	• Review and where necessary revise the existing Environmental Management Plan to be applied to the entire Revised Proposal (*Appendix 4 of the Environmental Review Document*) in order to ensure that potential impacts to conservation significant flora species and vegetation communities

	are addressed. The revised Plan should include the following: • Description of the proposal's dewatering activities (including surplus dewater discharge) and it's potential to impact groundwater dependent vegetation and health of riparian vegetation within Karijini National Park; and • Description of the mitigation hierarchy (avoid / minimise) relating to mitigating the disturbance to the West Angelas Cracking Clay Priority Ecological Community. The following should also be addressed in the plan: • Invasive species control – control of weeds, in particular through construction of infrastructure, transport and/or entry and exit points, riparian and GDE areas, vegetation units considered to have high local significance (e.g. rare units, habitat for conservation significant species) and in areas identified as in 'excellent condition'. • Monitoring (including methodology, frequency and location, review and reporting) – monitoring of conservation significant vegetation communities to inform, through the environmental criteria, if the conditioned environmental outcome is being achieved. • Management (including trigger and threshold criteria and contingency actions) – adaptive management actions to be implemented to mitigate and manage impacts to achieve the conditioned environmental outcome. • Prepare a Closure Plan consistent with DMP and EPA *Guidelines for Preparing Mine Closure Plans* (2015), which includes a Closure Objective to ensure that vegetation on rehabilitated land is self-sustaining and compatible with the final land use and also includes methodologies and criteria to ensure progressive rehabilitation of vegetation composed of native species of local provenance. • Predict the inherent and residual impacts before and after applying the mitigation hierarchy and identify whether the residual impacts are significant by applying the Significant Residual Impact Model in the WA Environmental Offsets Guideline. • Quantify any significant residual impacts by completing the Offset Template, spatially defining the area of 'good' to 'excellent' native vegetation that will be disturbed as a result of this proposal and propose an appropriate offsets package that demonstrates application of the WA Environmental Offsets Policy and Guideline.
Relevant policies	<u>EPA Policy and Guidance</u> EPA *Statement of Environmental Principles, Factors and Objectives* (2016). EPA *Environmental Factor Guideline: Flora and Vegetation* (2016). EPA *Technical Guidance: Flora and Vegetation Surveys for Environmental Impact Assessment* (2016). EPA *Instructions on how to prepare an Environmental Review Document* (2016). EPA *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans* (2016). DMP and EPA *Guidelines for Preparing Mine Closure Plans* (2015). <u>Other policy and guidance</u> Department of Water *Western Australian Water in Mining Guideline* (2013). Government of Western Australia *WA Environmental Offsets Policy* (2011). Government of Western Australia *WA Environmental Offsets Guidelines* (2014). *Outcomes-based Conditions Policy Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth of Australia, 2016).
Terrestrial Fauna	
EPA Objective	*To protect terrestrial fauna so that biological diversity and ecological integrity are maintained*
Relevant aspects	*Clearing* This Proposal includes clearing of potential fauna habitat, including habitats for conservation significant fauna species, and potential loss of some individuals of conservation significant species: • Three conservation significant fauna species: the Pilbara Leaf-nosed Bat (*Rhinonicteris aurantia*), Fork-tailed Swift (*Apus pacificus*) and Western Pebble-mound Mouse (*Pseudomys chapmani*) were recorded within the Proposal area.

	• Two conservation significant fauna species: Ghost Bat (*Macroderma gigas*) and Pilbara Barking Gecko (*Underwoodisaurus seorsus*) were recorded in the West Angelas region. • Seven species: the Northern Quoll (*Dasyurus hallucatus*); Pilbara Olive Python (*Liasis olivaceus barroni*); Rainbow Bee-eater (*Merops ornatus*); Grey Falcon (*Falco hypoleucos*); Peregrine Falcon (*Falco peregrinus*); Blind Snake (*Ramphotyphlops ganei*); and Short-tailed Mouse (*Leggadina lakedownensis*) were assessed as having a moderate to high likelihood of occurrence in the West Angelas region. • Eight potential Short Range Endemic species: two species of mygalomorph spider; one species of scorpion; one species of pseudoscorpion and four species of isopod
Potential impacts and risks	Potential impacts to Terrestrial Fauna include the following: • Loss of potential fauna habitat (including habitats for conservation significant fauna species) as a result of clearing; and • Loss of fauna individuals (including individuals of elevated conservation significance, if present) as a result of clearing. • Direct impacts to fauna from increased vehicle strikes, and as a result of construction and operation of the mine. • Potential to disrupt localised fauna linkages and effective habitat quality including edge effects for native fauna or result in the death or injury of terrestrial fauna. • Potential to introduce / attract feral animals.

Required work	• Identify and characterise fauna species and habitats within the Proposal area and any other areas that may be directly or indirectly impacted as a result of this Proposal in accordance with the requirements of EPA *Environmental Factor Guideline: Terrestrial Fauna* (2016) through:
	  • Desktop review of previous terrestrial fauna and Short Range Endemic surveys undertaken within the Proposal area; and
	  • Detailed terrestrial fauna and Short Range Endemic surveys in areas not previously surveyed that are likely to be directly or indirectly impacted as a result of this Proposal. Surveys (if required) are to be undertaken in accordance with the requirements of EPA *Technical Guidance: Terrestrial Fauna Surveys (2016)*, *Sampling Methods for Terrestrial Vertebrate Fauna* (2016) and *Sampling of Short Range Endemic Invertebrate Fauna* (2016).
	• Assess the conservation significance of fauna species and habitats in a local and regional context, including:
	  • Provide a detailed description of conservation significant fauna species that are known, or likely, to occupy habitats within the Proposal area, including:
	  ○ known existing threats to conservation significant fauna species;
	  ○ information on their distribution (including known occurrences), ecology and habitat preferences at both the local and regional level (consider habitats that provide important ecological function within the Proposal area such as geological features that may support habitat specific communities); and
	  ○ information on the conservation value of each habitat, and local and regional representation of habitats
	  and assess the extent of those habitats that are likely to be directly or indirectly impacted as a result of this Proposal to demonstrate whether or not an impact on conservation significant fauna species is likely to occur.
	  • Assess the likelihood that habitats within the Proposal area support Short Range Endemic invertebrate species and the extent (local and regional) of those habitats that are likely to be directly or indirectly impacted as a result of this Proposal to demonstrate whether or not an impact on Short Range Endemic invertebrate species is likely to occur.
	  • Provide maps showing the recorded locations of conservation significant fauna species and Short Range Endemic invertebrate fauna species in relation to habitats.
	• Provide a detailed description of the potential impacts to conservation significant fauna species and habitats within the Proposal area including direct impacts from clearing, and indirect impacts such as vibration from blasting.
	• Assess the extent of habitats to be potentially impacted to assist in determination of significance of impacts. Provide maps to differentiate habitat on the basis of use e.g. breeding habitat, migration pathways, and / or foraging / feeding / dispersal habitat (if / where relevant).

	• Determine and discuss the significance of potential direct, indirect and cumulative impacts to conservation significant fauna species and habitats (at a local and regional scale) as a result of this Proposal. • Discuss proposed outcomes / objectives, management strategies and monitoring (including methodology, frequency and location, trigger and threshold criteria, contingency actions, review and reporting) to be implemented to demonstrate that the Proposal has considered the mitigation hierarchy to ensure impacts (direct and indirect) to fauna species and habitats are avoided / minimised and are not greater than predicted. • Predict the residual impacts to conservation significant fauna species and habitats as a result of the Proposal, following the application of the mitigation hierarchy. Identify whether the residual impacts are significant. • Demonstrate in the Environmental Review Document how the EPA's objective for this factor can be met. • Review and where necessary propose revisions to the requirements of the existing conditions of Ministerial Statement 970 and 1015 that could be applied to the entire Revised Proposal in order to address potential impacts to conservation significant fauna species and habitats. • Review and where necessary revise the existing Environmental Management Plan to be applied to the entire Revised Proposal (*Appendix 4 of the Environmental Review Document*) in order to ensure that potential impacts to conservation significant fauna species and habitats are addressed. The objectives of the revised Plan are to ensure the following: • avoid / minimise disturbance to conservation significant fauna. • Prepare a Closure Plan consistent with DMP and EPA *Guidelines for Preparing Mine Closure Plans* (2015), which includes a Closure Objective to ensure that vegetation on rehabilitated land is self-sustaining and compatible with the final land use and also includes methodologies and criteria to ensure progressive rehabilitation of habitat for conservation significant species. • Predict the inherent and residual impacts before and after applying the mitigation hierarchy and identify whether the residual impacts are significant by applying the Significant Residual Impact Model in the WA Environmental Offsets Guidelines. • Quantify any significant residual impacts by completing the Offset Template, spatially defining the habitat area for each significant fauna species that will be disturbed as a result of this proposal and propose an appropriate offsets package that demonstrates application of the WA Environmental Offsets Policy and Guideline. Demonstrate how the project has considered the WA guidance for offsets. Note: Conservation significant fauna are defined as species that are listed under the *Environment Protection and Biodiversity Conservation Act 1999* and *Wildlife Conservation Act 1950*, and the Department of Biodiversity, Conservation and Attractions Priority Species that are likely to have their conservation status changed by the proposal.
Relevant policies	<u>EPA Policy and Guidance</u> EPA *Statement of Environmental Principles, Factors and Objectives* (2016). EPA *Environmental Factor Guideline: Terrestrial Fauna* (2016). EPA Technical Guidance: *Sampling Methods for Terrestrial Vertebrate Fauna* (2016). EPA Technical Guidance: *Terrestrial Fauna Surveys* (2016). EPA Technical Guidance: *Sampling of Short Range Endemic Invertebrate Fauna* (2016). EPA *Instructions on how to prepare an Environmental Review Document* (2016) EPA *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans* (2016). DMP and EPA *Guidelines for Preparing Mine Closure Plans* (2015). <u>Other policy and guidance</u> Government of Western Australia *WA Environmental Offsets Policy* (2011). Government of Western Australia *WA Environmental Offsets Guidelines* (2014). *Outcomes-based Conditions Policy Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth of Australia, 2016).
Subterranean Fauna	
EPA	*To protect subterranean fauna so that biological diversity and ecological integrity are maintained*

Objective	
Relevant aspects	*Clearing, Mining and Groundwater drawdown* This Proposal includes clearing, mining and groundwater drawdown of potential subterranean fauna habitat and potential loss of some subterranean fauna individuals.
Potential impacts and risks	Potential impacts to Subterranean Fauna include the following: • Direct loss / mortality of individuals. • Loss or alteration (degradation) of potential subterranean fauna habitat and assemblage as a result of mining. • Loss or alteration (degradation) of potential subterranean fauna habitat and assemblage as a result of groundwater drawdown from dewatering. • Loss or alteration (degradation) of potential subterranean fauna habitat and assemblage as a result of clearing. • Loss or alteration (degradation) of potential subterranean fauna habitat and assemblage as a result of contamination.

Required work	• Identify and characterise subterranean fauna species and habitats within the Proposal area and surrounding areas that may be directly or indirectly impacted as a result of this Proposal in accordance with the requirements of EPA *Environmental Factor Guideline: Subterranean Fauna* (2016) through:
	  • a desktop review of previous subterranean fauna surveys undertaken within the Proposal area and surrounding areas (including, but not limited to, existing regional subterranean fauna surveys to provide the regional context of the subterranean fauna of the Proposal area);
	  • detailed subterranean fauna surveys within the Proposal area and surrounding areas (where possible) to understand the potential for subterranean fauna species to occur in areas not previously surveyed that are likely to be directly or indirectly impacted as a result of this Proposal. Surveys are to be undertaken in accordance with the requirements of EPA *Technical Guidance: Subterranean Fauna Survey* (2016) and *Sampling Methods for Subterranean Fauna* (2016); and
	  • assessment of the potential presence of subterranean fauna species, assemblages and habitats within the Proposal area and surrounding areas based on the available information.
	• Assess the local and regional conservation significance of subterranean fauna species assemblages and habitats, including:
	  • Provide a detailed description of subterranean fauna habitats within the Proposal area and surrounding areas (where possible) including:
	  ○ information on the local and regional representation of the habitat;
	  ○ habitat continuity;
	  ○ habitat connectivity; and
	  ○ an appropriate explanation of the likely distribution of species within those habitats.
	  and assess the extent of those habitats that are likely to be directly or indirectly impacted as a result of this Proposal to demonstrate whether or not an impact on subterranean fauna species is likely to occur.
	  • Provide maps showing the recorded locations of subterranean fauna species in relation to habitats.
	• Provide a detailed description of the potential impacts to subterranean fauna species, assemblages and habitats within the Proposal area including direct impacts from mining and groundwater drawdown, and indirect impacts such as clearing and contamination.
	• Determine and discuss the significance of potential direct, indirect and cumulative impacts to subterranean fauna species, assemblages and habitats as a result of this Proposal.
	• Discuss proposed outcomes / objectives and management strategies to be implemented to demonstrate that the Proposal has considered the mitigation hierarchy to ensure impacts (direct and indirect) to subterranean fauna are avoided / minimised and are not greater than predicted.
	• Predict the residual impacts to subterranean fauna as a result of the Proposal, following the application of the mitigation hierarchy. Identify whether the residual impacts are significant.
	• Demonstrate in the Environmental Review Document how the EPA's objective for this factor can

	be met. • Prepare a Closure Plan consistent with DMP and EPA *Guidelines for Preparing Mine Closure Plans* (2015), which requires that below water table pits will be backfilled to a level to prevent the formation of permanent pit lakes.
Relevant policies	<u>EPA Policy and Guidance</u> EPA *Statement of Environmental Principles, Factors and Objectives* (2016). EPA *Environmental Factor Guideline: Subterranean Fauna* (2016). EPA Technical Guidance: *Subterranean Fauna Survey* (2016). EPA Technical Guidance: *Sampling Methods for Subterranean Fauna* (2016). EPA *Instructions on how to prepare an Environmental Review Document* (2016). DMP and EPA Guidelines for Preparing Mine Closure Plans (2015). <u>Other policy and guidance</u> Department of Water *Western Australian water in mining guideline* (2013).
Hydrological processes	
EPA Objective	*To maintain the hydrological regimes of groundwater and surface water so that environmental values are protected*
Relevant aspects	*Alteration of the natural hydrological regime* The east branch of Turee Creek (Turee Creek East) is an ephemeral watercourse which flows depending on the occurrence of high intensity rainfall events. This Proposal will intercept tributaries of Turee Creek East, resulting in changes (alteration and disruption) to the hydrological regime. *Groundwater drawdown* This Proposal includes dewatering to enable mining below the water table. Dewatering will result in the propagation of groundwater drawdown away from the orebodies and regionally beyond the boundary of Karijini National Park. *Surplus water management* Dewatering water from Deposits C and D will be integrated with the existing West Angelas operations integrated water management strategy; some dewatering water is expected to be used to supply local operational water demand, the remainder will be transferred to the existing operations to supply operational water demand. Surplus dewatering water, exceeding the operational water requirement, will be discharged to a tributary of Turee Creek East.
Potential impacts and risks	Potential impacts to hydrological processes include the following: • Changes to the hydrological regime of Turee Creek East as a result of mining (interception of creek tributaries). • Changes to the hydrological regime of Turee Creek East as a result of discharge of surplus dewatering water. • Groundwater drawdown as a result of groundwater abstraction for dewatering purposes. Potential impacts to any groundwater dependent ecosystems, groundwater fed pools and stygofauna. • Potential contamination of surrounding surface water and groundwater.

Required work	• Characterise the baseline hydrological and hydrogeological regimes, both in a local and regional context, including, but not limited to, a detailed description of catchment boundaries, creek flows, natural patterns of surface water (sheet) flows, flood patterns, groundwater levels and interdependence between surface and groundwater features within the Proposal area and any other areas that may be directly or indirectly impacted as a result of this Proposal in accordance with the requirements of EPA *Environmental Factor Guideline: Hydrological Processes* (2016).
	• Provide a detailed description of the potential impacts to hydrological and hydrogeological regimes as a result of this Proposal including:
	  • direct impacts such as;
	  ○ alteration of the natural hydrological regime as a result of mining;
	  ○ alteration of the natural hydrological regime as a result of discharge of surplus dewatering water;
	  ○ groundwater drawdown as a result of dewatering; and
	  • indirect impacts such as contamination.

- Conduct investigations to determine the significance of potential direct, indirect and cumulative impacts to hydrological and hydrogeological regimes (and any dependant environmental values) as a result of this Proposal, including;
  - Conceptual understanding of surface water systems (provide a detailed description (including figures / maps) of the potential alteration of the natural hydrological regime (including extent, degree and duration) and assess potential impacts to environmental values including but not limited to riparian vegetation of Turee Creek East).
  - Conceptual hydrogeological modelling and numerical modelling of groundwater systems (provide a detailed description (including figures / maps) of the potential groundwater drawdown (including extent, degree and duration) and assess potential impacts to environmental values including but not limited to potentially groundwater dependant vegetation communities within Karijini National Park).
  - Conceptual understanding of the extent of connectivity between surface and groundwater systems.
  - Site water balance modelling for the life of the proposal (provide a conceptual water balance, potential surplus water management options (i.e. reuse on site, local water supply, discharge of surplus dewatering water etc.), a detailed description of the proposed (most appropriate) water management strategy for this Proposal and assess potential impacts of this strategy to environmental values including but not limited to riparian vegetation of Turee Creek East).
  - Consider cumulative impacts to hydrological and hydrogeological regimes as a result of other projects and referred proposals in the catchment for which relevant information is publically available. Include consideration of abstraction from existing (approved) dewatering from deposits, existing (approved) abstraction from the water supply borefield and existing (approved) discharge. Any changes to existing water extraction should be incorporated into the conceptual hydrogeological model to provide for a full assessment of potential impacts to hydrological and hydrogeological regimes of the adjacent Karijini National Park.
  - Characterise any environmental values within the Proposal area and other areas (specifically within Karijini National Park) that may be directly or indirectly impacted by changes to the hydrological and hydrogeological regimes as a result of this Proposal (including extent, degree and duration of potential impacts).
  - Peer review – allow for appropriate confidence in predictions assured through an independent expert peer review of groundwater investigation methods and impact predictions.
- Discuss proposed outcomes / objectives, management strategies and monitoring (including methodology, frequency and location, trigger and threshold criteria, contingency actions, review and reporting) to be implemented to demonstrate that the Proposal has considered the mitigation hierarchy to ensure impacts (direct and indirect) to hydrological processes are avoided / minimised and are not greater than predicted. Include consideration of any requirement for ongoing access to Karijini National Park for monitoring purposes.
- Predict the residual impacts to hydrological and hydrogeological regimes as a result of the Proposal, following the application of the mitigation hierarchy. Identify whether the residual impacts are significant.
- Demonstrate in the Environmental Review Document how the EPA's objective for this factor can be met.
- Review and where necessary propose revisions to the requirements of the existing conditions of Ministerial Statement 970 and 1015 that could be applied to the entire Revised Proposal.
- Review and where necessary revise the existing Environmental Management Plan to be applied to the entire Revised Proposal (*Appendix 4 of the Environmental Review Document*). The objectives of the revised Plan are to ensure the following:
  - Description of the proposal's dewatering activities (including surplus dewater discharge) and it's potential to impact groundwater dependent vegetation and health of riparian vegetation within Karijini National Park; and
  - Description of potential impacts from discharge of surplus water, to the health of riparian vegetation of Turee Creek East.

  The following should also be addressed in the plan:
  - Monitoring (including methodology, frequency and location, review and reporting) –

	monitoring of conservation significant vegetation communities to inform, through the environmental criteria, if the conditioned environmental outcome is being achieved. • Management (including trigger and threshold criteria and contingency actions) – adaptive management actions to be implemented to mitigate and manage impacts to achieve the conditioned environmental outcome. • Prepare a Closure Plan consistent with DMP and EPA *Guidelines for Preparing Mine Closure Plans* (2015), which includes a Closure Objective requiring consideration of hydrological issues and also includes criteria to ensure hydrological regimes are maintained so that any dependant environmental values are protected.
Relevant policies	<u>EPA Policy and Guidance</u> EPA *Statement of Environmental Principles, Factors and Objectives* (2016). EPA *Environmental Factor Guideline: Hydrological Processes* (2016). EPA *Inland Waters of the Pilbara Western Australian (Part 1)*. EPA *Inland Waters of the Pilbara Western Australian (Part 2)*. EPA *Instructions on how to prepare an Environmental Review Document* (2016) EPA *Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans* (2016). DMP and EPA *Guidelines for Preparing Mine Closure Plans* (2015). <u>Other policy and guidance</u> Department of Water *Western Australian water in mining guideline* (2013). *Outcomes-based Conditions Policy Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth of Australia, 2016).
Inland waters environmental quality	
EPA Objective	*To maintain the quality of groundwater and surface water so that environmental values are protected*
Relevant aspects	*Mining and Groundwater drawdown* This Proposal includes mining which could expose potentially acid-forming (PAF) materials, causing acid and metalliferous drainage (AMD), impacting groundwater quality. This Proposal also includes groundwater drawdown which could expose PAF material in previously saturated layers to oxygen, causing AMD, impacting groundwater quality. However, the Proponent has undertaken an extensive geochemical assessment to understand potential risks associated with acidification and / or metal enrichment; the likelihood of encountering PAF materials generating AMD is considered low for all deposits. This Proposal specifies that below water table pits are to be backfilled to a level to prevent post-closure exposure of the groundwater table and the formation of permanent pit lakes.
Potential impacts and risks	Potential impacts to groundwater or surface water quality include the following: • Mining could expose PAF materials and / or dewatering could expose PAF material in previously saturated layers to oxygen causing AMD. • Post closure aspects such as the formation of permanent pit lakes.

Required work	• Characterise any sensitive receptors within the Proposal area and any other areas that may be directly or indirectly impacted as a result of this Proposal in accordance with the requirements of EPA *Environmental Factor Guideline: Inland waters environmental quality* (2016).
	• Provide a detailed description of the potential impacts to groundwater or surface water quality as a result of mining and / or dewatering exposing PAF materials causing AMD.
	• Conduct investigations to determine the significance of potential direct, indirect and cumulative impacts to water quality as a result of this Proposal, including:
	  • Geochemical characterisation to understand the potential for acidification and / or metal enrichment to occur;
	  • Assessment of likelihood of encountering PAF materials; and
	  • Assessment of risk associated with AMD.
	• Discuss proposed outcomes / objectives, management strategies and monitoring to be implemented to demonstrate that the Proposal has considered the mitigation hierarchy to ensure

	impacts to water quality are avoided / minimised and are not greater than predicted. • Describe residual impacts to water quality as a result of the Proposal, following the application of the mitigation hierarchy. • Demonstrate in the Environmental Review Document how the EPA's objective for this factor can be met. • Prepare a Closure Plan consistent with DMP and EPA *Guidelines for Preparing Mine Closure Plans* (2015) which requires that below water table pits will be backfilled to a level to prevent the formation of permanent pit lakes.
Relevant policies	<u>EPA Policy and Guidance</u> EPA *Statement of Environmental Principles, Factors and Objectives* (2016). EPA *Environmental Factor Guideline: Inland waters environmental quality* (2016). EPA *Inland Waters of the Pilbara Western Australian (Part 1)*. EPA *Inland Waters of the Pilbara Western Australian (Part 2)*. EPA *Instructions on how to prepare an Environmental Review Document* (2016). DMP and EPA *Guidelines for Preparing Mine Closure Plans* (2015). <u>Other policy and guidance</u> Department of Water *Western Australian Water in Mining Guideline* (2013).
Air quality	
EPA Objective	*To maintain air quality and minimise emissions so that environmental values are protected*
Relevant aspects	*Clearing and Mining* This Proposal includes clearing and mining which are expected to generate dust and greenhouse gas emissions impacting air quality.
Potential impacts and risks	Potential impacts to air quality include the following: • Particulate (dust) emissions from construction activities (including clearing), vehicle movements, mining and processing, and wind erosion from cleared areas affect amenity of sensitive receptors. • Greenhouse gas emissions from additional mining activities.

Required work	• Characterise any sensitive receptors within the Proposal area and any other areas that may be directly or indirectly impacted by dust and greenhouse gas emissions as a result of this Proposal in accordance with the requirements of EPA *Environmental Factor Guideline: Air quality* (2016).
	• Provide a detailed description of the potential impacts to air quality as a result of this Proposal including:
	  • dust emissions generated by clearing, vehicle movements, mining and processing, and wind erosion from cleared areas; and
	  • greenhouse gas emissions generated by diesel and electricity consumption.
	• Conduct investigations to determine the significance of potential direct, indirect and cumulative impacts to air quality as a result of this Proposal, including:
	  • dust dispersion modelling, and
	  • greenhouse gas calculations (including estimation of expected Scope 1 (direct) greenhouse gas emissions).
	• Discuss proposed outcomes / objectives, management strategies and monitoring to be implemented to demonstrate that the Proposal has considered the mitigation hierarchy to ensure impacts to air quality are avoided / minimised and are not greater than predicted.
	• Describe residual impacts to air quality as a result of the Proposal, following the application of the mitigation hierarchy.
	• Demonstrate in the Environmental Review Document how the EPA's objective for this factor can be met.

Relevant policies	<u>EPA Policy and Guidance</u> EPA *Statement of Environmental Principles, Factors and Objectives* (2016).

	EPA *Environmental Factor Guideline: Air quality* (2016). EPA *Instructions on how to prepare an Environmental Review Document* (2016). <u>Other policy and guidance</u> *Clean Energy Act 2011*. *National Greenhouse and Energy Reporting Act 2007*.
Social surroundings	
EPA Objective	*To ensure that social surroundings are not materially affected*
Relevant aspects	*Clearing, Mining*, *Alteration of the natural hydrological regime and groundwater drawdown* *Amenity:* This Proposal includes clearing and mining which are expected to result in permanent changes to local landforms. The location of West Angelas is very remote. Karijini National Park is located approximately 12 km west of the existing West Angelas Project and approximately 2.5 km west of the Proposal area. Access to West Angelas and the adjacent portion of Karijini National Park is limited. The nearest town, Newman, is located approximately 130 km east of West Angelas. The visual landscape of the region is predominantly natural in appearance, with localised areas of highly modified landscapes due to mining. Changes to local landforms are not expected to be particularly prominent in the regional landscape and to be consistent with some of the existing visual landscape. *Heritage:* This Proposal is located within the traditional lands of the Yinhawangka People. Ethnographic and archaeological surveys within the West Angelas area have identified a rich and diverse region of heritage sites of ethnographic and / or archaeological significance.
Relevant aspects	Two sites of ethnographic significance and numerous archaeological sites including artefact scatters, rockshelters, scarred trees and rock art sites have been identified in the region. Some of these sites are considered to be of high ethnographic and / or archaeological significance to Traditional Owners. Heritage sites could potentially be disturbed by clearing, groundwater drawdown and surplus water discharge. However, it is considered unlikely that potential environmental impacts will affect sites considered to be of high ethnographic and / or archaeological significance to Traditional Owners.
Potential impacts and risks	Potential impacts to social surroundings include the following: • Permanent changes to local landforms could result in visual impacts that are prominent within the regional landscape. • Sites of ethnographic and / or archaeological significance to the Yinhawangka Traditional Owners could potentially be impacted by proposed activities including clearing, alteration of the natural hydrological regime and groundwater drawdown.

Required work	• Characterise any sensitive receptors including heritage sites of ethnographic and / or archaeological significance within the Proposal area and any other areas that may be directly or indirectly impacted as a result of this Proposal in accordance with the requirements of EPA *Environmental Factor Guideline: Social surroundings* (2016).
	• Provide a detailed description of the potential impacts to social surroundings (specifically heritage sites of ethnographic and / or archaeological significance) as a result of changes to the environment including:
	  • impacts to visual amenity within Karijini National Park;
	  • direct impacts to heritage sites from clearing; and
	  • indirect impacts to heritage sites such as alteration of the natural hydrological regime as a result of mining and groundwater drawdown as a result of dewatering.
	• Conduct investigations to determine the significance of potential direct, indirect and cumulative impacts to social surroundings (specifically heritage sites of ethnographic and / or archaeological significance) as a result of this Proposal, including;
	  • Ethnographic and archaeological surveys in consultation with the Traditional Owners to identify Aboriginal sites of significance and identify concerns, and
	  • Ecological, hydrological and hydrogeological assessments (where relevant).

	• Provide detail on consultation that has been, and will continue to be, undertaken with Traditional Owners. • Discuss proposed outcomes / objectives and management strategies to be implemented to demonstrate that the Proposal has considered the mitigation hierarchy to ensure impacts to social surrounds are avoided / minimised and are not greater than predicted. • Describe residual impacts to social surrounds as a result of the Proposal, following the application of the mitigation hierarchy. • Demonstrate in the Environmental Review Document how the EPA's objective for this factor can be met. • Prepare a Mine Closure Plan consistent with DMP and EPA *Guidelines for Preparing Mine Closure Plans* (2015), which considers social surrounds
Relevant policies	<u>EPA Policy and Guidance</u> EPA *Statement of Environmental Principles, Factors and Objectives* (2016). EPA *Environmental Factor Guideline: Social surroundings* (2016). EPA *Instructions on how to prepare an Environmental Review Document* (2016). <u>Other policy and guidance</u> Department of Aboriginal Affairs and Department of Premier and Cabinet *Due Diligence Guidelines, Version 3.0* (2013).

4 Other environmental factors

The following other environmental factors are relevant to this Proposal and will be addressed during the environmental review and discussed in the Environmental Review Document, but are not significant enough to warrant detailed assessment or the setting of conditions by the EPA, or are impacts that can be regulated by other statutory processes to meet the EPA's objectives:

- Landforms;
- Terrestrial Environmental Quality;
- Human Health.

5 Stakeholder Consultation

Consultation with stakeholders has been ongoing since operations commenced at West Angelas. The Proponent will continue to consult with relevant stakeholders during the environmental approval process and implementation of this Proposal. This includes the decision-making authorities (see section 6), other relevant state government agencies and local government authorities, local communities and non-government organisations.

The Proponent identified the following state government agencies and local government authorities, local communities and non-government organisations as key stakeholders for this Proposal:

Government agencies and local government authorities:

- Department of Water and Environmental Regulation (DWER);
- Department of Biodiversity Conservation and Attractions (DBCA);
- Department of Mines, Industry Regulation and Safety (DMIRS);
- Department of Jobs, Tourism, Science and Innovation (DJTSI);
- Department of Aboriginal Affairs (DAA); and
- Shire of East Pilbara.

Local communities:

- Yinhawangka Traditional Owners.

The Proponent will document the following in the Environmental Review Document:

- identified stakeholders;
- the stakeholder consultation undertaken and the outcomes, including decision-making authorities' specific regulatory approvals and any adjustments to the proposal as a result of consultation; and
- future plans for consultation.

6 Decision-making authorities

The Proponent has identified the decision-making authorities listed in Table 4 for this Proposal. Additional decision-making authorities may be identified during the course of the assessment.

Table 5 Decision-making authorities

Decision-making authority	Relevant legislation
Minister for State Development	*Iron Ore (Robe River) Agreement Act 1964*
Minister for Mines and Petroleum	*Mining Act 1978*
Minister for Lands	*Land Administration Act 1997*
Department of Water and Environmental Regulation	*Rights in Water and Irrigation Act 1914*
Minister for Environment	*Wildlife Conservation Act 1950*
Chief Executive Officer, Department of Water and Environmental Regulation	*Environmental Protection Act 1986*
State Mining Engineer, Department of Mines, Industry, Regulation and Safety.	*Mines Safety and Inspection Act 1994*
Minister for Aboriginal Affairs	*Aboriginal Heritage Act 1972*

Figures

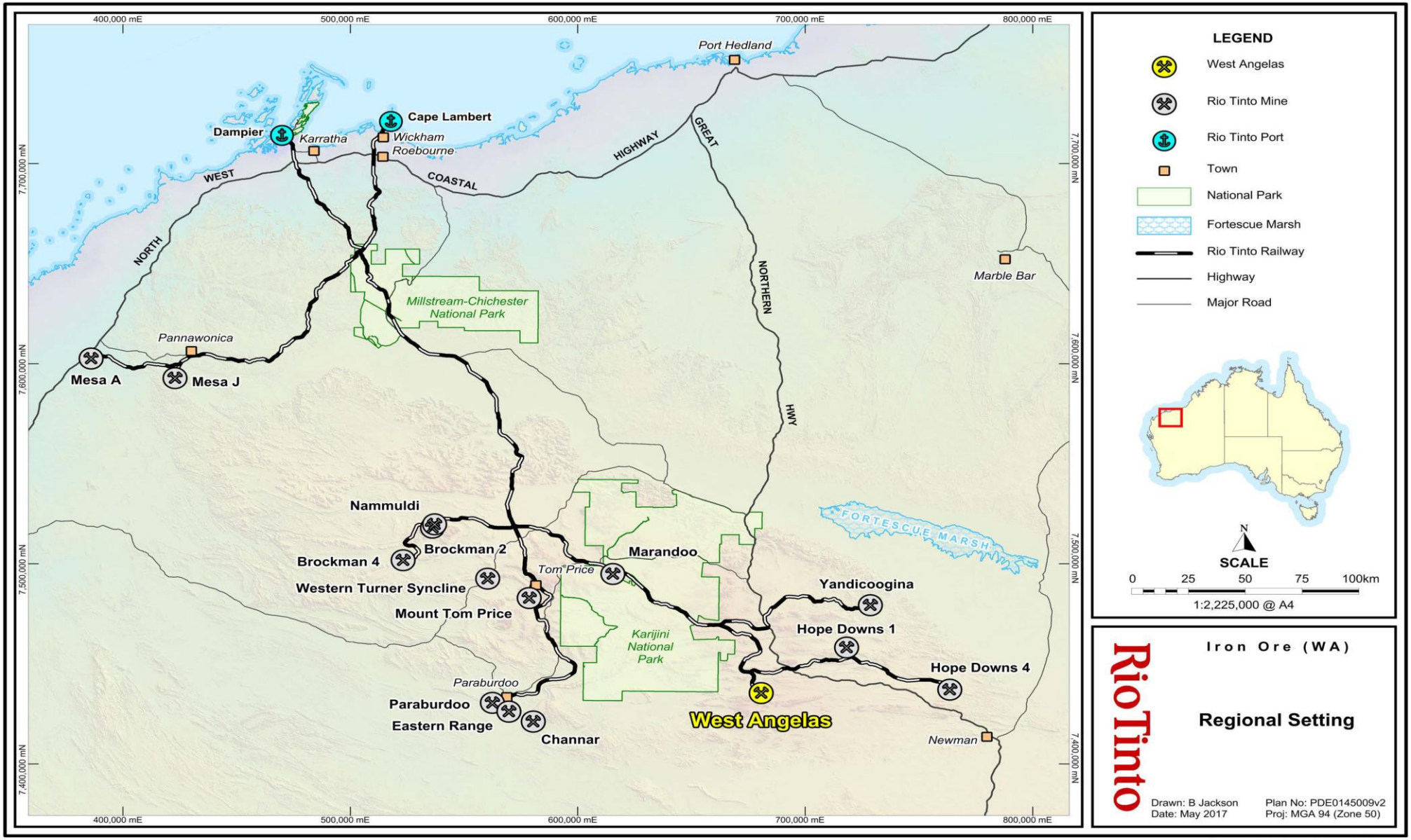

Figure 1 – Regional setting

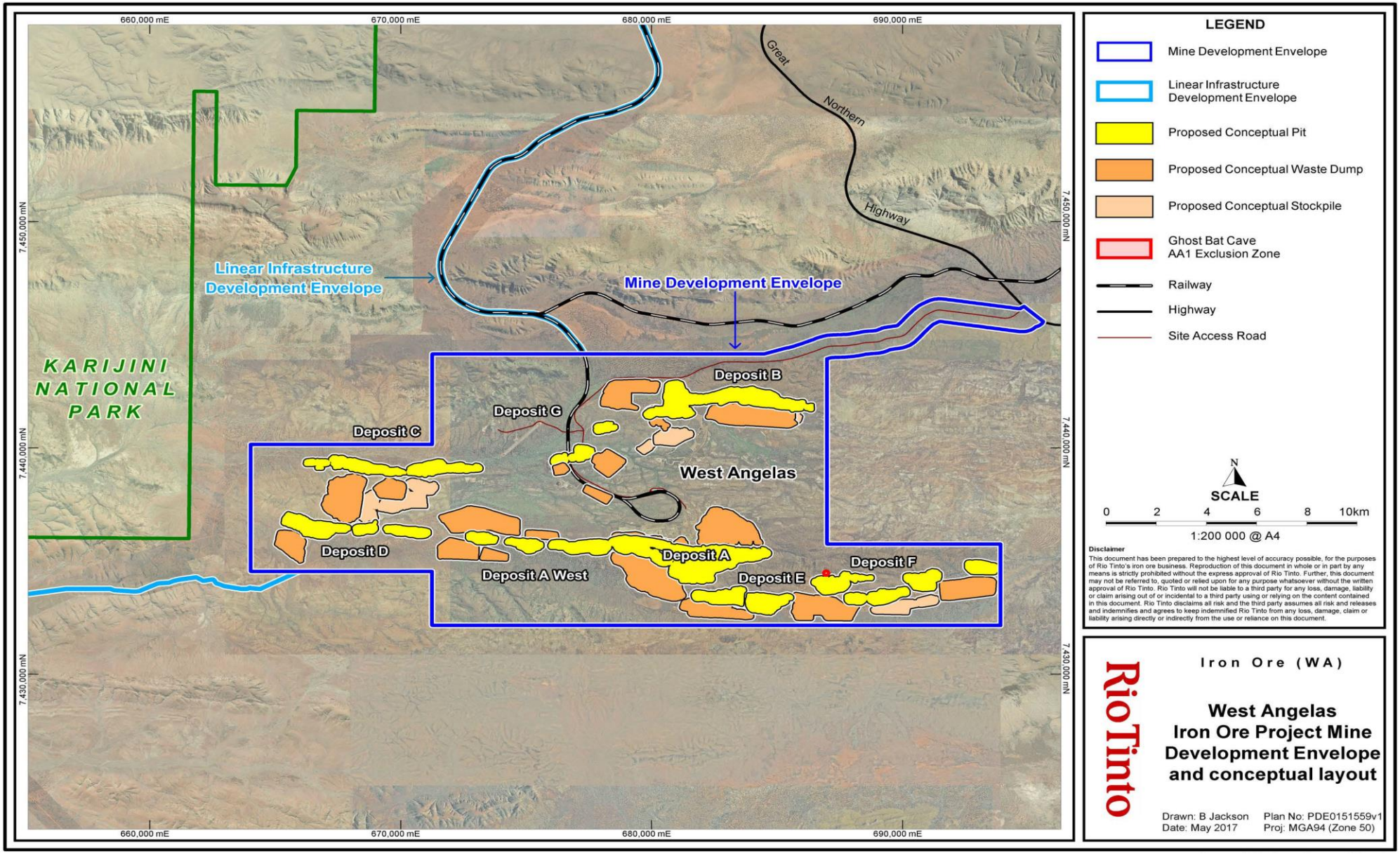

Figure 2 – West Angelas Iron Ore Project Mine Development Envelope and conceptual layout

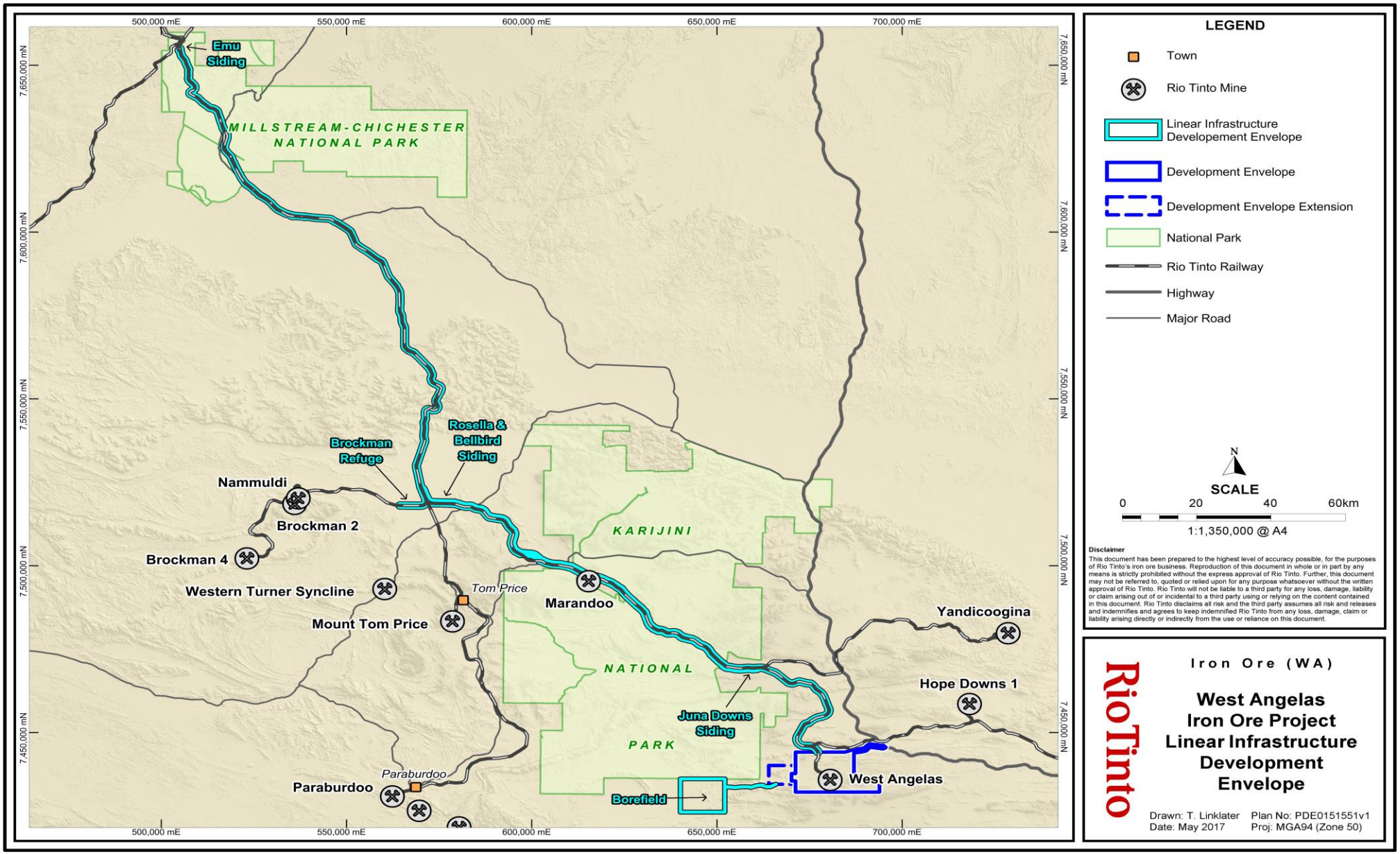

Figure 3 – West Angelas Iron Ore Project Linear Infrastructure Development Envelope

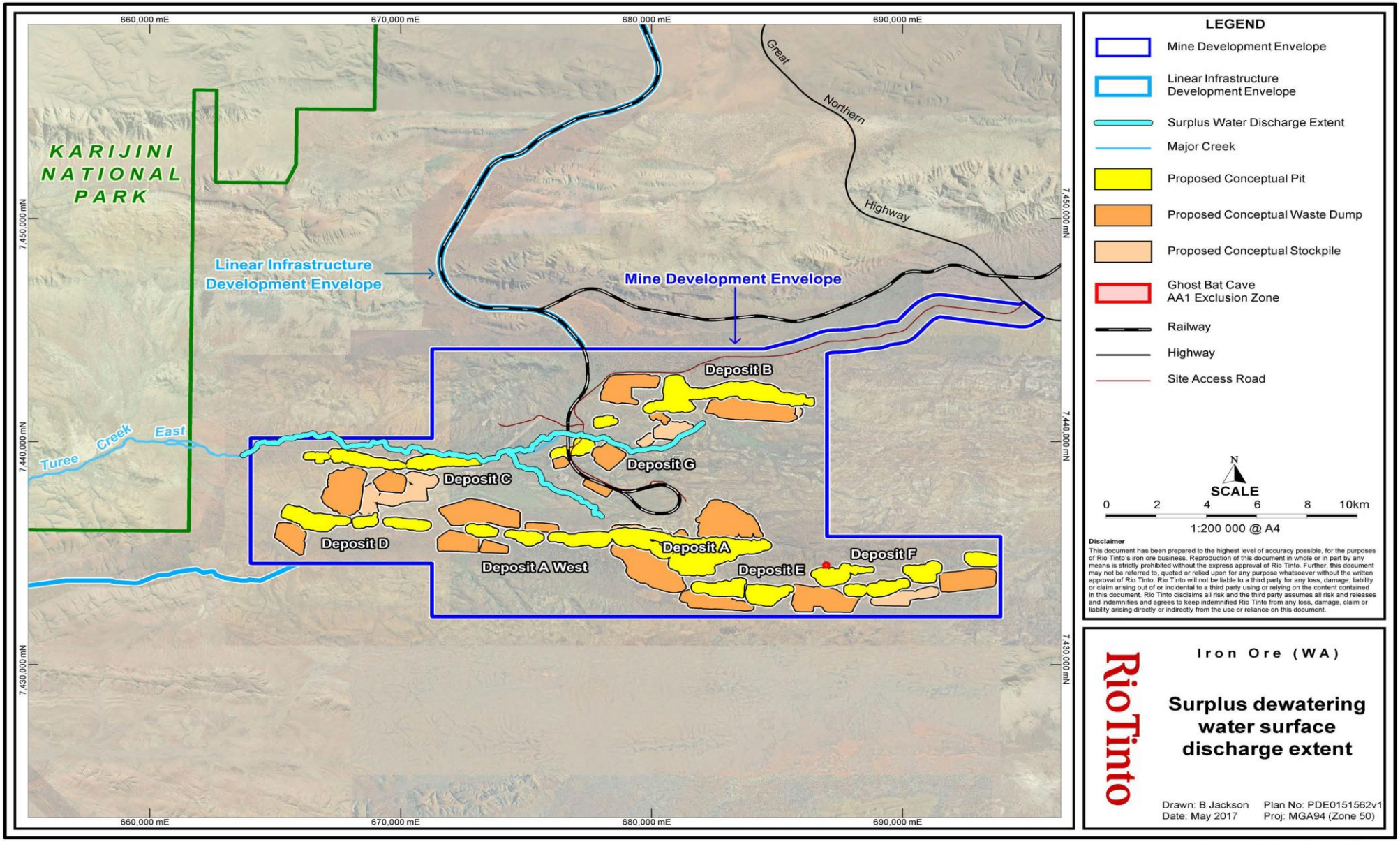

Figure 4 – Surplus dewatering water surface discharge extent