ATLAS-CAMPASPE
Mineral Sands Project
ENVIRONMENTAL IMPACT STATEMENT

APPENDIX O 〉 ENVIRONMENTAL RISK ASSESSMENT

CRISTAL Resource Strategies

ATLAS-CAMPASPE MINERAL SANDS PROJECT

ENVIRONMENTAL RISK ASSESSMENT

OCTOBER 2012
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1 INTRODUCTION

This document is an Environmental Risk Assessment (ERA) which identifies key risks associated with potential environmental issues which may arise as a result of the Atlas-Campaspe Mineral Sands Project (the Project).

The Project includes the development of a mineral sands mining operation (herein referred to as the Atlas-Campaspe Mine), together with the construction and operation of a rail loadout facility located near the township of Ivanhoe (herein referred to as the Ivanhoe Rail Facility).

The Project is being developed by Cristal Mining Australia Limited (Cristal Mining). The Project is located approximately 80 kilometres (km) north of Balranald and 270 km south-east of Broken Hill in New South Wales (NSW) (Figure 1). The proposed Ivanhoe Rail Facility is located approximately 135 km north-east of the Atlas-Campaspe Mine (Figure 1).

Product (mineral concentrate) from the operations at the proposed Atlas-Campaspe Mine would be trucked to the Ivanhoe Rail Facility for transfer to train wagons, which would then be railed to the existing Broken Hill Mineral Separation Plant (the MSP) (Figure 1). A description of the Project is provided in Section 2 of the Main Report of the Environmental Impact Statement (EIS).

1.1 SCOPE AND OBJECTIVES

The Director-General's Requirements (DGRs) for the Project stipulate:

> *... the EIS must include a:*
>
> *...*
>
> - *risk assessment of the potential environmental impacts of the development, identifying the key issues for further assessment;*

Consistent with the DGRs, the scope of the ERA was:

> *To conduct a risk assessment of the potential environmental impacts of the Project, identifying the key issues for further assessment.*

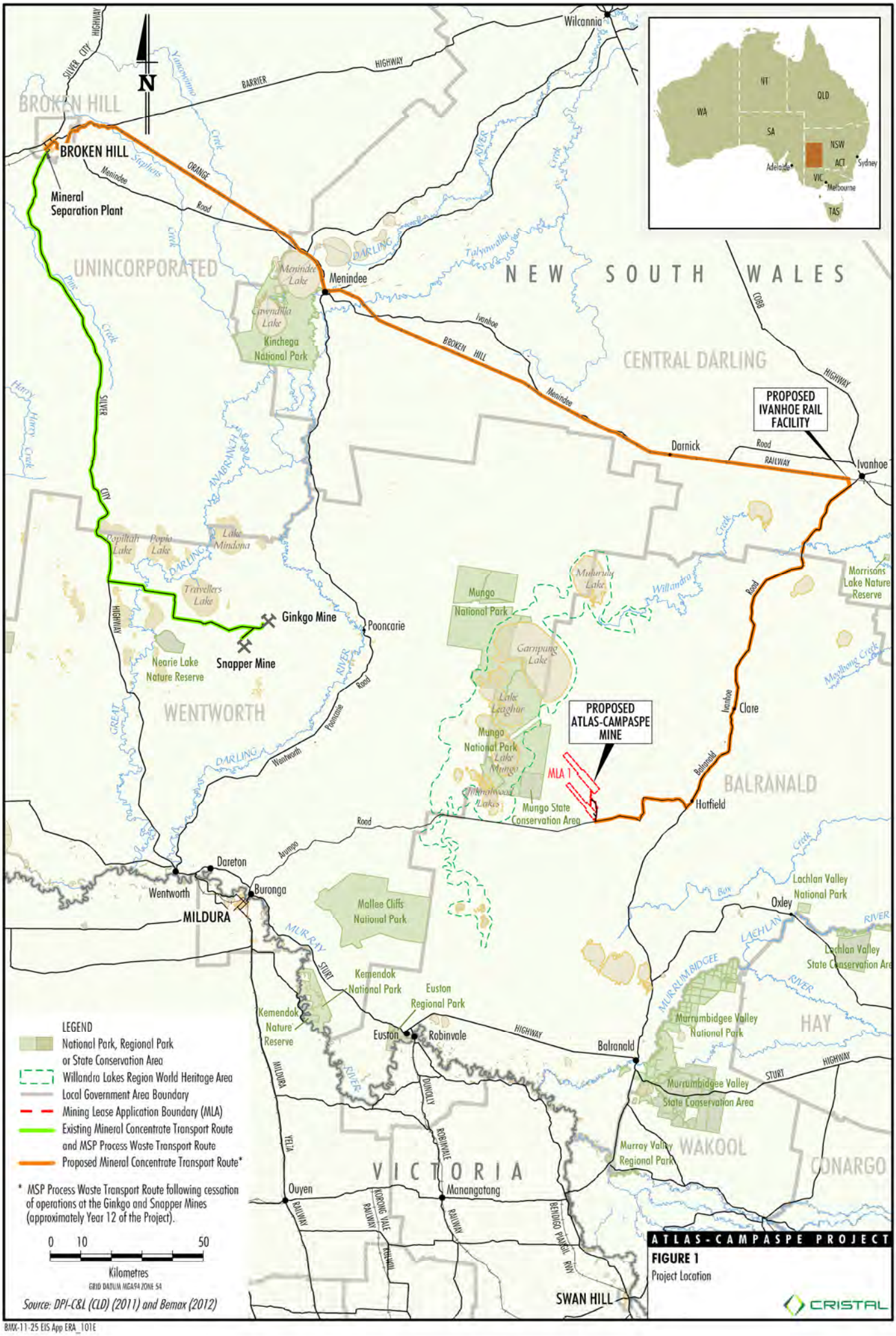
The primary objectives of this ERA were to:

1. Identify the key potential environmental issues associated with the Project.
2. Assess the level of risk for a selection of potential loss scenarios associated with the key potential environmental issues.

1.2 RISK ASSESSMENT PROCESS

The process for the risk assessment was based on the framework provided in:

- Australian Standard/New Zealand Standard (AS/NZS) International Organization for Standardization (ISO) 31000:2009 *Risk Management – Principles and Guidelines* (AS/NZS ISO 3100:2009) (Standards Australia/ Standards New Zealand, 2009);
- MDG1010 *Minerals Industry Safety and Health Risk Management Guideline* (NSW Department of Industry and Investment, 2011); and
- Handbook (HB) 203:2006 *Environmental Risk Management – Principles and Process* (Standards Australia/Standards New Zealand, 2006).



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1.3 RESOURCING, SCHEDULE AND ACCOUNTABILITIES

The following resources were allocated in order to effectively conduct the ERA workshop:

1. a team of personnel with suitable experience and knowledge of mining operations and environmental issues in the area associated with the Project; and
2. aerial photographs, drawings, the Project DGRs and other supporting information.

The ERA outcomes and associated accountabilities would be integrated into the final EIS document and overall Cristal Mining management system, so that they are effectively reviewed, implemented and monitored.

1.4 METHOD

The key steps in the process included:

1. Confirm the scope of the ERA.
2. List the key assumptions on which the ERA is based.
3. Review available data on the Project including reports, plans, maps and aerial photos (prior to the workshop).
4. Conduct a team-based risk assessment that:
   a) provided detailed descriptions of the tasks to be undertaken and the proposed method;
   b) identified hazards and assessed the level of risk; and
   c) developed a list of recommended controls to treat the risk (through prevention, monitoring, management and rehabilitation strategies).
5. Prepare a draft report in accordance with AS/NZS ISO 31000:2009 (Standards Australia/ Standards New Zealand, 2009) and MDG1010 *Minerals Industry Safety and Health Risk Management Guideline* (NSW Department of Industry and Investment, 2011) for review by ERA team members.
6. Incorporate comments from the ERA team.
7. Finalise the report.

Following report finalisation, the ERA outcomes and associated accountabilities would be integrated into the final EIS document and overall Cristal Mining management system, so that they are effectively reviewed, implemented and monitored.

1.5 RISK ASSESSMENT TEAM

The team met for the ERA workshop on 18 July 2012. A team based approach was utilised in order to have an appropriate mix of skills and experience to identify the potential environmental issues and potential loss scenarios. The ERA team included personnel from Cristal Mining, Resource Strategies and Australian Museum Business Services, including:

Cristal Mining

- Geology and Exploration Manager – Ray Roberts.
- Senior Environmental Advisor – Michael Priest.
- Senior Geologist – Tara Smith.

Resource Strategies

- Principal – Peter Cribb.
- Senior Environmental Manager – Lucas Burns.
- Senior Ecologist – Environmental Manager – James Gleeson.
- Environmental Manager – Joe Hickey.

Australian Museum Business Services

- Senior Project Manager Ecology – Glenn Muir.

2 ESTABLISH THE CONTEXT

2.1 PROJECT SUMMARY

The Project would involve two main development components (Figure 1):

1. Construction and development of infrastructure for mining operations at the Atlas and Campaspe deposits (the proposed Atlas-Campaspe Mine).
2. Construction and operation of the Ivanhoe Rail Facility (the proposed Ivanhoe Rail Facility).

The proposed life of the Project is approximately 20 years, commencing approximately 1 July 2013 or upon the grant of all required approvals.

The activities associated with the two main development components of the Project are summarised below.

Atlas-Campaspe Mine

- ongoing exploration activities;
- sequential development and operation of two separate mineral sands ore extraction areas within the Mining Lease Application 1 area;
- use of conventional mobile equipment to mine and place mineral sands ore into dry mining units[1] at a maximum ore production rate of up to 7.2 million tonnes per annum (Mtpa);
- mineral processing infrastructure including the primary gravity concentration unit, salt washing facility and a wet high intensity magnetic separation circuit;
- mineral concentrate stockpiles and materials handling infrastructure (e.g. towers and stackers);
- progressive backfilling of mine voids with overburden behind the advancing ore extraction areas or in overburden emplacements adjacent to the mine path;
- placement of sand residues and coarse rejects (and MSP process wastes[2]) following mineral processing to either the active mining area (behind the advancing ore extraction area) or in sand residue dams;
- development of a groundwater borefield at the Atlas deposit and localised dewatering systems (bores, spearfields and trenches) at both the Atlas and Campaspe deposits, including associated pump and pipeline systems;
- reverse osmosis plant to supply the salt washing facility and potable water;
- progressive development of water storage dams, sediment basins, pumps, pipelines and other water management equipment and structures;
- administration/office buildings, car parking facilities, workshop and stores;
- on-site accommodation camp;
- sewage treatment plant;
- diesel powered generators, electricity distribution station and associated internal electricity transmission lines;
- site access road, internal access roads and haul roads;

[1] Mining would use conventional open pit methods and would not involve dredge mining.

[2] Following cessation of operations at the Ginkgo and Snapper Mines (approximately Year 12 of the Project).

- roadworks along the proposed mineral concentrate transport route to the Ivanhoe Rail Facility;
- transport of mineral concentrates along the mineral concentrate transport route to the Ivanhoe Rail Facility;
- road transport of MSP process waste[3] in sealed storage containers from the Ivanhoe Rail Facility to the Atlas-Campaspe Mine for subsequent unloading, stockpiling and placement behind the advancing ore extraction areas;
- development of soil stockpiles and laydown areas;
- monitoring and rehabilitation; and
- other associated minor infrastructure, plant, equipment and activities.

Ivanhoe Rail Facility

- development of a rail siding for:
  - loading of train wagons with mineral concentrate for rail transport to the MSP via the Orange – Broken Hill railway; and
  - unloading of MSP process waste in sealed storage containers (transported via the Orange – Broken Hill railway) from train wagons[3];
- site access road and internal haul roads/pavements;
- hardstand areas for mineral concentrate and MSP process waste[3] unloading, stockpiling/sealed container storage and loading;
- a retention basin, drains, pumps, pipelines and other water management equipment and structures;
- site office, ablutions and car parking facilities;
- extension to existing 11 kilovolt powerline;
- monitoring, landscaping and rehabilitation; and
- other associated minor infrastructure, plant, equipment and activities.

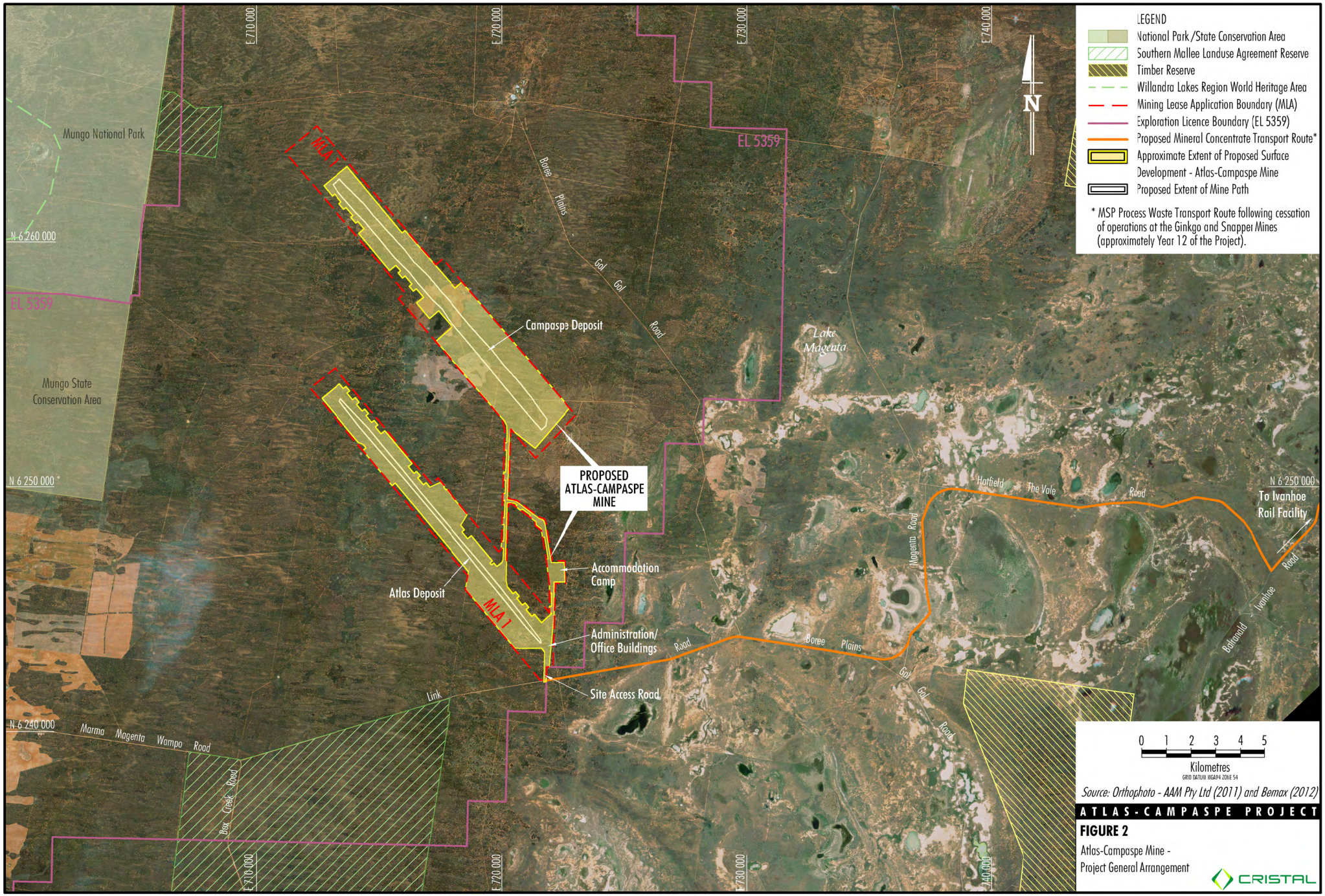
The Project general arrangements are shown on Figures 2 and 3.

A detailed description of the Project is provided in Section 2 of the Main Report of the EIS.

2.2 RISK CRITERIA

The risk criteria utilised in the ERA may reduce the risk to As Low As Reasonably Practicable (ALARP) or lower. ALARP corresponds to the “moderate” risk ranking zones.

[3] Following cessation of operations at the Ginkgo and Snapper Mines (approximately Year 12 of the Project).



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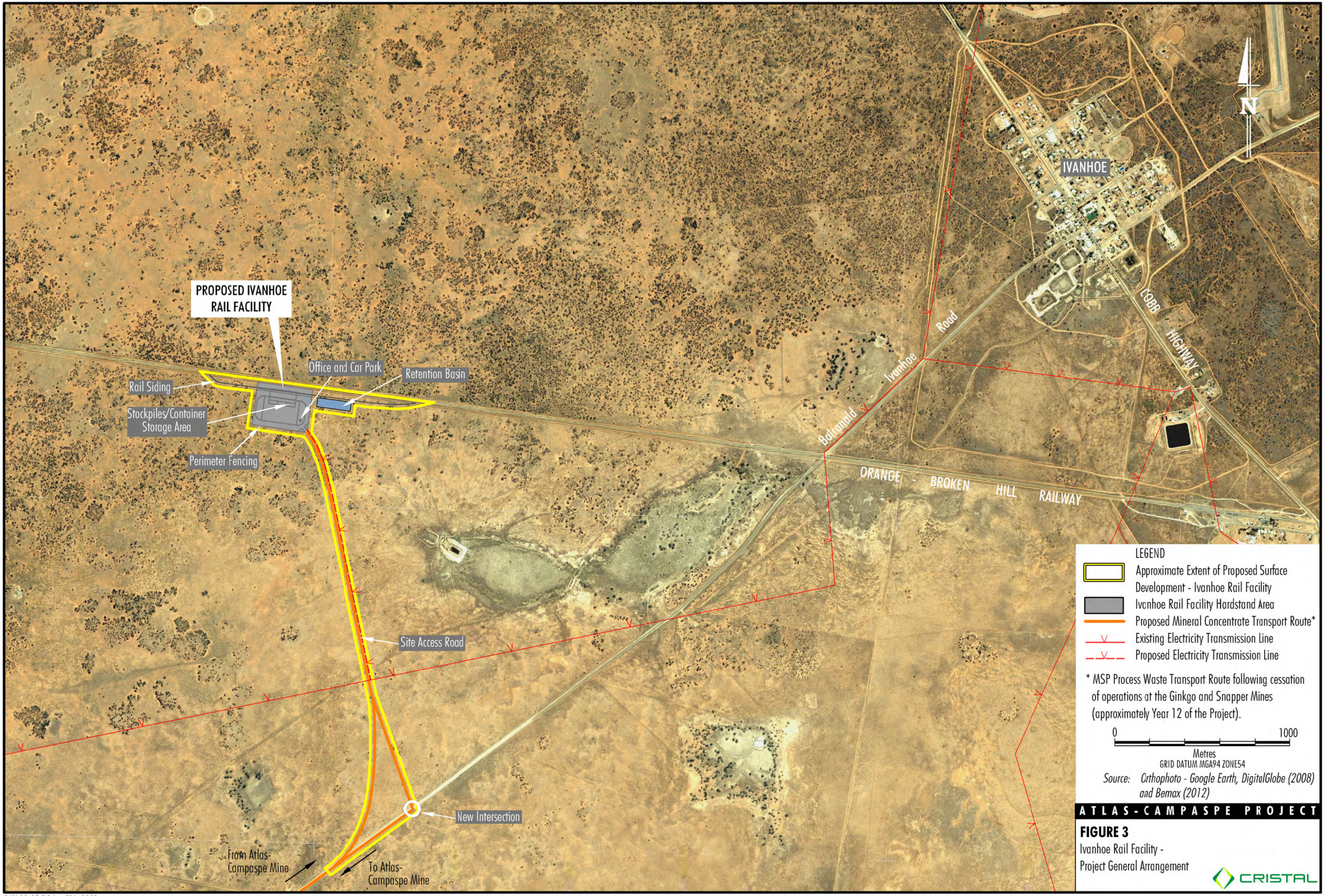

ATLAS-CAMPASPE PROJECT

FIGURE 3

Ivanhoe Rail Facility - Project General Arrangement

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3 IDENTIFY RISKS

3.1 RISK IDENTIFICATION

3.1.1 Brainstorming

The brainstorming process is intended to allow for relatively unstructured generation of ideas and issues. To assist in the brainstorming process, all participants were provided with briefing material and a list of potential environmental issues potentially associated with the Project.

No filtering of ideas or issues was undertaken during the brainstorming process.

The issues identified during the brainstorming process are presented in Attachment A.

3.1.2 Modified HAZOP

During the modified Hazard and Operability (HAZOP) process, the Project general arrangements (Figures 2 and 3) were referred to, with consideration of the operational phases and potential issues that could arise.

Generic key words were used during this process to represent key environmental issue subject areas, and included:

- Flora.
- Fauna.
- Road Transport.
- Cultural Heritage.
- Hydrogeological.
- Surface Water.
- Agricultural Resources.
- Socio-economic.
- Noise.
- Air Quality.
- Mineral Concentrate/Waste Materials.
- Land Contamination.
- Preliminary Hazard Analysis.

3.1.3 Identification of Key Environmental Issue Types

The key potential environmental issues were identified through a voting system, whereby team members were assigned a number of votes to allocate to those issues they considered to be key environmental issues. Issues that received more than one vote were designated to be key environmental issues, and are shown in Table 1.

Table 1
Key Potential Environmental Issues

Subject Area	Issue Identified
Flora	Impacts to threatened flora species and communities due to vegetation clearance.
	Impacts to flora as a result of vegetation clearance.
Fauna	Impacts to threatened fauna due to loss of habitat associated with vegetation clearance.
Road Transport	Impacts of mineral concentrate transport traffic on the safety and performance of the road network.
Mineral Concentrate/Waste Materials	Sand residue dam storage failure.
Hydrogeological	Changes to groundwater gradients and consequential impacts on surface water features.
Surface Water	Changes to surface water flow regimes at the Atlas-Campaspe Mine and surrounding areas and as a consequence potential impacts on the Black Box Woodland and wetland.
Agricultural Resources	Permanent loss of agricultural lands (final void or rehabilitation failure).
Rehabilitation	Failure of rehabilitation at the Atlas-Campaspe Mine (e.g. excessive erosion of failure to re-establish vegetation).
	Failure to provide appropriate habitat structure and linkages for native species.

The key potential environmental issues identified in the ERA would be addressed in the EIS and the supporting specialist reports which are included as appendices to the EIS.

3.1.4 Probability and Maximum Reasonable Consequence

The key environmental issues identified were ranked for risk levels by the ERA team. A tabular analysis was used for this risk ranking process, and was based on the probability and consequence of a loss scenario occurring as decided by the ERA team.

Tables 2 to 5 present the ERA matrix tools that were utilised for ranking risks.

Table 2
Probability Table

Rank	Likelihood	Descriptor
A	Almost Certain	Happens often.
B	Likely	Could easily happen.
C	Possible	Could happen and has occurred elsewhere.
D	Unlikely	Hasn't happened yet but could.
E	Rare	Conceivable, but only in extreme circumstances.

Table 3
Consequence Table – Environment

Ref	Severity	Comment
1	Extreme environmental harm	e.g. widespread catastrophic impact on environmental values of an area.
2	Major environmental harm	e.g. widespread substantial impact on environmental values of an area.
3	Serious environmental harm	e.g. widespread and considerable impact on environmental values of an area.
4	Material environmental harm	e.g. localised and considerable impact on environmental values of an area.
5	Minimal environmental harm	e.g. minor impact on environmental values of an area.

Table 4
Consequence Table – Asset Infrastructure

Ref	Asset/Infrastructure
1	More than $1B loss or production delay
2	$100M to $1B loss or production delay
3	$5M to $100M loss or production delay
4	$250k to $5M loss or production delay
5	Less than $250k loss or production delay

B = billion; M = million; k = thousand.

Table 5
Risk Ranking Table

Consequence (C)	Probability (P)					
		A	B	C	D	E
	1	1 (H)	2 (H)	4 (H)	7 (M)	11 (M)
	2	3 (H)	5 (H)	8 (M)	12 (M)	16 (L)
	3	6 (H)	9 (M)	13 (M)	17 (L)	20 (L)
	4	10 (M)	14 (M)	18 (L)	21 (L)	23 (L)
	5	15 (M)	19 (L)	22 (L)	24 (L)	25 (L)

Notes:
L = Low; M = Medium; H = High

Risk Numbering:

1 – Highest Risk

25 – Lowest Risk

Legend:
Risk Levels:

	Tolerable
	ALARP
	Intolerable

4 ANALYSE RISKS

Using the ERA matrix tools (Tables 2 to 5), risk ranking was undertaken by the team on loss scenarios based on the key potential environmental issues (Table 6).

The risk rankings provided in Table 6 indicate that the loss scenarios were ranked in the “Medium” (ALARP) and “Low” (tolerable) range.

Table 6
Risk Ranking Results

Study Area	Issue	Proposed Controls	Probability	Consequence	Risk
Flora	Impacts to threatened flora species and communities due to vegetation clearance.	• Vegetation clearance protocol - including Cobar Greenhood Orchid survey. • Biodiversity offset. • Vegetation clearance permit. • Post mining rehabilitation. • On-site seed farming. • Use of Threatened Species seed(s)/cuttings to supply internal seed farm (where possible). • Mine planning to avoid disturbance (where possible) - Black Box, Mossgiel Daisy. • Sealing of a 2 km long section of mineral concentrate transport route in the region of the 'Mossgiel Daisy'. • Weed management. • Feral fauna species management (i.e. feral goats). • De-stocking and general management of offset area (e.g. fire management, control of feral animals, reduced grazing pressure). • Management of Cobar Greenhood Orchid - Vegetation clearance protocol to include translocation, cuttings, etc. • Three strip soil clearance method (allowing for seed bank maintenance). • Yarran Shrubland development in offset area to be enhanced via de-stocking and as the subject of rehabilitation trials in pre-cleared agricultural areas within the offset area (if required). • Potential habitat for the Cobar Greenhood Orchid in proposed offset area.	A	4	10 (Medium)
	Impact to flora as a result of vegetation clearance.	• Vegetation clearance protocol. • Biodiversity offset. • Vegetation clearance permit. • Post-mining rehabilitation. • On-site seed farming. • Weed management. • Feral fauna species management (i.e. feral goats). • De-stocking and general management of offset area (e.g. fire management, control of feral animals, reduced grazing pressure). • Three strip soil clearance method (allowing for seed bank maintenance).	A	4	10 (Medium)

Table 6 (Continued)
Risk Ranking Results

Study Area	Issue	Proposed Controls	Probability	Consequence	Risk
Fauna	Impacts to threatened known/unknown fauna species due to loss of habitat associated with vegetation clearance.	• Vegetation clearance protocol, including bat relocation. • Biodiversity offset. • Vegetation clearance permit. • Post mining rehabilitation with habitat re-establishment and enhancement (e.g. nest boxes). • Weed management. • Feral fauna species management (i.e. feral goats). • De-stocking and general management of offset area (e.g. fire management, control of feral animals, reduced grazing pressure). • Threatened species management protocol (specific to known/identified species). • Development of additional threatened species management protocol (if new species are discovered).	A	4	10 (Medium)
Road Transport	Impacts of mineral concentrate transport traffic on the safety and performance of the road network.	• Driver training. • Commitment to upgrade safety deficiencies on Balranald-Ivanhoe Road (as per results of the Road Safety Audit). • Mineral Concentrate and MSP Process Waste Transport Management Plan. • Roadworks on mineral concentrate transport route, including realignments. • Transport code of conduct - including consideration of time of day (i.e. school buses, etc.). • Signage. • Speed limits (dependent on time of day). • Community awareness meeting for traffic volumes.	C	2	8 (Medium)
Mineral Concentrate/Waste Materials	Sand residue dam storage failure.	• Geotechnical studies. • Mine planning in consideration of geotechnical studies. • Dam management/construction (i.e. minimum freeboard of 1 metre). • Incorporation of on-site containment embankments (in case of failure). • Compliance with Dam Safety Committee requirements.	D	4	21 (Low)
Hydrogeological	Changes to groundwater gradients resulting in impacts on surface water features.		E	5	25 (Low)

Table 6 (Continued)
Risk Ranking Results

Study Area	Issue	Proposed Controls	Probability	Consequence	Risk
Surface Water	Changes to surface water flow regimes at the Atlas-Campaspe Mine and surrounding areas and as a consequence potential impacts on the Black Box Woodland and wetland.	• Avoidance of current low lying areas where possible through mine planning. • Rehabilitation to mimic current low-lying area to include clay liner(s). • Minimise disturbance to catchment area.	A	4	10 (Medium)
Agricultural Resources	Permanent loss of agricultural lands (final void or rehabilitation failure).	• Mining Lease and offset sterilised to agricultural production. • Potential for sub-lease of Cristal Mining owned property for agricultural use. • Final landform to be considered appropriate for final land use (in accordance with Division of Resources and Energy requirements).	A	5	15 (Medium)
Rehabilitation	Failure of rehabilitation at the Atlas-Campaspe Mine.	• Rehabilitation trials - including landforms, vegetation types and growth medium. • Maintenance of toe drain at the base of overburden emplacements (post rehabilitation) to catch incident rainfall which feeds a catch dam. • Local endemic seed collection/seed farming. • Characterisation of topsoil and subsoil pre-mining. • Soil management/storage procedure. • Geotechnical controls/basis for landform design. • Landform design stability modelling. • Laser profiling of overburden emplacements to minimise erosion/failure associated with tunnelling. • Terracing and topsoiling of overburden emplacements to prevent landform degradation/failure (including tunnelling). • Adequate cover over sodic material during rehabilitation. • Progressive rehabilitation (including progressive planning). • Rehabilitation requirements considered in mine planning (e.g. material movements).	D	5	24 (Low)
Rehabilitation	Failure to provide appropriate habitat structure and linkages for native species.	• Rehabilitation efforts aim to return suitable habitat using endemic species. • Revegetation efforts for vegetation targeted to post mining landform type. • Mine planning for the final landform to aim to mimic pre-mine floristic linkages. • Rehabilitation trials to include 'like for like' soil and vegetation types.	C	5	22 (Low)

5 MONITOR AND REVIEW

The risk assessment process conducted by the team was consistent with AS/NZS ISO 31000:2009 (Standards Australia/Standards New Zealand, 2009), HB 203:2006 (Standards Australia/Standards New Zealand, 2006) and MDG1010 (NSW Department of Industry and Investment, 2011).

Detailed assessment of the key potential environmental issues discussed in this report, would be included in the sections in the Main Report of the EIS or in the specialist reports included as appendices (Table 7).

Table 7
Key Potential Environmental Issues to be Further Addressed in the EIS

Subject Area	Issue Identified	EIS Appendix/Section
Flora	Impacts to threatened flora species and communities due to vegetation clearance.	Appendix A and Section 4
Flora	Impact to flora as a result of vegetation clearance.	Appendix A and Section 4
Fauna	Impacts to threatened known/unknown fauna species due to loss of habitat associated with vegetation clearance.	Appendix B and Section 4
Road Transport	Impacts of mineral concentrate transport traffic on the safety and performance of the road network.	Appendix D and Section 4
Mineral Concentrate/ Waste Materials	Sand residue dams storage failure.	Section 2
Hydrogeological	Changes to groundwater gradients and consequential impacts on surface water features.	Appendix F and Section 4
Surface Water	Changes to surface water flow regimes at the Atlas-Campaspe Mine and surrounding areas and as a consequence potential impacts on the Black Box Woodland and wetland.	Appendices A and G and Section 4
Agricultural Resources	Permanent loss of agricultural lands (final void or rehabilitation failure).	Appendix H and Section 4
Rehabilitation	Failure of rehabilitation at the Atlas-Campaspe Mine.	Section 5
Rehabilitation	Failure to provide appropriate habitat structure and linkages for native species.	Section 5

6 REFERENCES

NSW Department of Industry and Investment (2011) MDG1010 *Minerals Industry Safety and Health Risk Management Guideline*.

Standards Australia/Standards New Zealand (2006) HB 203:2006 *Environmental Risk Management – Principles and Process*.

Standards Australia/Standards New Zealand (2009) AS/NZS ISO 31000:2009 *Risk Management – Principles and Guidelines*.

ATTACHMENT A

ISSUE IDENTIFICATION RESULTS

Table A-1
Issue Identification Results

Subject Area	Issue Identified
Flora	Impacts to threatened flora species and communities due to vegetation clearance.
	Impact to flora as a result of vegetation clearance.
	Impacts on the Cobar Greenhood Orchid.
	Impacts on surface water (soil moisture) as opposed to groundwater aquifers or overland flows.
	Flora habitat fragmentation.
	Mortality of individual flora species.
	Introduction of feral species and increase in grazing presence.
	Impacts to native flora due to increased bushfire occurrence/intensity.
	Indirect impacts (e.g. dust, noise, lights, weeds and other edge effects) to threatened flora species and communities.
	Impacts on surface water flow regimes in the Project area (e.g. low lying areas) resulting in impacts to dependant flora.
	Impacts to groundwater dependant ecosystems.
	Positive impacts associated with the biodiversity offset.
Fauna	Impacts to threatened fauna due to loss of habitat associated with vegetation clearance.
	Impacts on surface water flow regimes in the Project area (e.g. low lying areas) resulting in impacts to fauna species.
	Indirect impacts (e.g. dust, noise, lights, weeds and other edge effects) to threatened fauna species.
	Impacts to threatened fauna species due to habitat fragmentation.
	Impacts associated with the biodiversity offset less than expected.
	Increased predation by and placement of feral animals.
	Fauna mortality on roadways (“road strike”).
	Mortality of individuals considered slow moving (e.g. Jewelled Gecko and Mallee Worm Lizard).
	Fauna related impacts as a result of potential loss of Black Box Woodland.
Road Transport	Impacts of mineral concentrate transport traffic on the safety and performance of the road network.
	Impacts of Project-related traffic on the safety and performance of the road network.
	Impacts from the movement of material (dirt/dust/mineral concentrates) from the Ivanhoe Rail Facility or Atlas-Campaspe Mine on to the road network.
Mineral Concentrate/ Waste Materials	Sand residue dams storage failure.
	Potential impact of handling/spillage of mineral with elevated radioactivity.
	Land contamination associated with hydrocarbon storage.
	Impacts associated with the storage, transport, handling and disposal of process waste materials.
Hydrogeological	Changes to groundwater gradients and consequential impacts on surface water features.
	Impacts on perched freshwater lenses.
	Impacts on freshwater lenses perched on saline aquifers.
	Drawdown impacts on Willandra Lakes Region World Heritage Area.
	Changes to groundwater quality.
	Impacts on groundwater users.
	Impacts to groundwater dependent ecosystems.

Table A-1 (Continued)
Issue Identification Results

Subject Area	Issue Identified
Surface Water	Changes to surface water flow regimes at the Atlas-Campaspe Mine and surrounding areas and as a consequence potential impacts on the Black Box Woodland and wetland.
	Short-term and long-term impacts on surface water quality in the Project area and surrounds (including low-lying areas) as a result of Project disturbance.
	Saline runoff from dust suppression.
	Impacts on surface water flow regime in the Project area and surrounds.
	Capture of saline runoff and diversion of overland flow to site water system (relevant to the mineral concentrate transport route).
	Impacts on water quality and flow regime in the Project area (including low lying wetland areas) as a result of Project disturbance.
	Impacts on surface water as a result of the sewage treatment system.
	Impacts from increased erosion and sedimentation during construction and operations.
Agricultural Resources	Permanent loss of agricultural lands (final void or rehabilitation failure).
	Impacts to agricultural lands due to surface disturbance.
	Dust impacts on pasture production.
Rehabilitation	Failure of rehabilitation at the Atlas-Campaspe Mine.
	Failure to provide appropriate habitat structure and linkages for native species.
	Unstable landforms in the long-term.
	Vegetation fails to establish.
	Suitable overburden and soil structure not available for rehabilitation.
	Lack of appropriate seed for rehabilitation.
	Selective handling of rehabilitation materials (saline water).
	Soil structure/content loss/failure.
Socio-economic	Distribution of economic impacts associated with the Project outside of local government areas.
	Lifestyle changes to neighbouring communities.
	Impacts on community infrastructure in Balranald and Ivanhoe due to increased population as a result of the Project.
	Positive economic impacts associated with the Project.
	Loss of employment from nearby agricultural areas to the Project.
Cultural Heritage	Impacts to Aboriginal Cultural Heritage items due to surface disturbance.
	Impacts to Aboriginal Cultural Heritage values of Mungo National Park.
	Impacts on non-Aboriginal Cultural Heritage items.
Noise	Noise impacts from the Atlas-Campaspe Mine on nearby receptors.
	Noise impacts from the Ivanhoe Rail Facility on nearby receptors.
	Noise impacts from the road transport of mineral concentrate on nearby receptors.
	Noise impacts from the rail transport of mineral concentrate on nearby receptors.
Air Quality	Air quality impacts from the Atlas-Campaspe Mine on nearby receptors.
	Air quality impacts from the Ivanhoe Rail Facility on nearby receptors.
	Air quality impacts from the road transport of mineral concentrate on nearby receptors.
	Impacts from greenhouse gas emissions.