STATE SIGNIFICANT DEVELOPMENT

Atlas-Campaspe Mineral Sands Project (SSD_5012)

Secretary's
Environmental Assessment Report

June 2014

Cover Photo: Atlas-Campaspe EIS, 2013

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EXECUTIVE SUMMARY

Cristal Mining Australia Limited (Cristal) is seeking approval to construct and operate a new mineral sands mine 80 kilometres (km) north of Balranald in western NSW.

Cristal also owns and operates two other mineral sands mines and a mineral separation plant in the region – the Broken Hill Mineral Separation Plant and the Ginkgo and Snapper Mineral Sands Mines.

The proposed development – known as the Atlas-Campaspe Mineral Sands Project - would involve the extraction of 109 million tonnes (Mt) of mineral sands ore, at an extraction rate of 7.2 Mt per annum over a period of 20 years.

The development also involves the construction and operation of a rail load-out facility at Ivanhoe, approximately 135 km northeast of the mine site in the Central Darling local government area. Mineral concentrate from the mine would be trucked via public roads using large 'road trains' to the proposed rail facility, where it would be loaded onto trains and transported via the Orange to Broken Hill Railway to Cristal's existing mineral separation plant in Broken Hill.

The development would employ up to 200 employees during operation and up to 300 employees during construction.

The proposed development is 'State Significant Development' under Section 89C of the *Environmental Planning and Assessment Act 1979* (EP&A Act), and the Minister for Planning is the consent authority for the development application. However, under the delegation dated 27 February 2013, the Executive Director, Development Assessment Systems and Approvals may determine the application since there were no public objections, the local Councils did not object to the development, and no political donations have been reported.

The Department exhibited the Environmental Impact Statement (EIS) for the development from 11 June until 23 July 2013. A total of 30 submissions were received during the exhibition, including 15 submissions from government agencies and 15 submissions from the general public – all of which supported the development.

The Department has completed its assessment of the merits of the development, EIS, submissions and Cristal's Response to Submissions (RTS), in accordance with the requirements of the EP&A Act.

Key issues arising from the Department's assessment of the development relate to:

- clearing of 4,158 hectares (ha) of native vegetation, including 198 ha of endangered ecological communities (EECs); and
- increases in traffic on the local and regional roads, and the sub-standard condition of the existing roads for use by road trains.

The Department is confident that these impacts can be adequately mitigated, managed, and/or offset through implementation of a number of commitments made by Cristal and conditions recommended by the Department, including:

- a comprehensive biodiversity offset strategy, which includes 16,540 ha of native vegetation that is located adjacent to the Mungo National Park and Mungo State Conservation Area;
- two large vegetation management areas, which include 1,380 ha of native vegetation that is located adjacent to the mine;
- significant road upgrade, realignment and intersection works to accommodate the increased traffic volumes and use by road trains; and
- payment of road maintenance contributions to Balranald and Central Darling Shire Councils over the life of the development.

The Department has also assessed a range of other potential impacts associated with the development, but is satisfied that none of these impacts would be significant and can be managed through the implementation of the recommended conditions to achieve an acceptable level of environmental performance.

Importantly, the development would result in a range of substantial economic and social benefits, including:

- 300 construction and 200 operational jobs;
- capital investment of $198 million;
- $95 million in royalties for the NSW Government; and
- significant flow on benefits and economic multiplier effects across the this part of regional NSW.

The development would also allow access to a significant mineral sands resource (around 109 Mt) and produce up to 450,000 tonnes a year of mineral sands concentrate, which represents around 40% of current production in NSW.

Overall, the Department considers that the Atlas-Campaspe Mineral Sands Project represents a logical extension of Cristal's operations in the Murray Darling Basin, as it would ensure the extraction of a valuable mineral sands resource and maximise the use of Cristal's existing processing facilities in the region without any significant environmental impacts.

Consequently, on balance, the Department considers that the benefits of the development significantly outweigh its potential impacts and that it is in the public interest, and should be approved subject to the recommended conditions of consent.

1. INTRODUCTION

The proposed development – known as the Atlas-Campaspe Mineral Sands Project – is located approximately 80 km north of Balranald and 270 km southeast of Broken Hill in the Balranald Local Government Area (LGA) (see Figure 1). The proposed Ivanhoe Rail Facility is located approximately 135 km northeast of the mine, and 4.5 km to the southwest of the township of Ivanhoe in the Central Darling LGA.

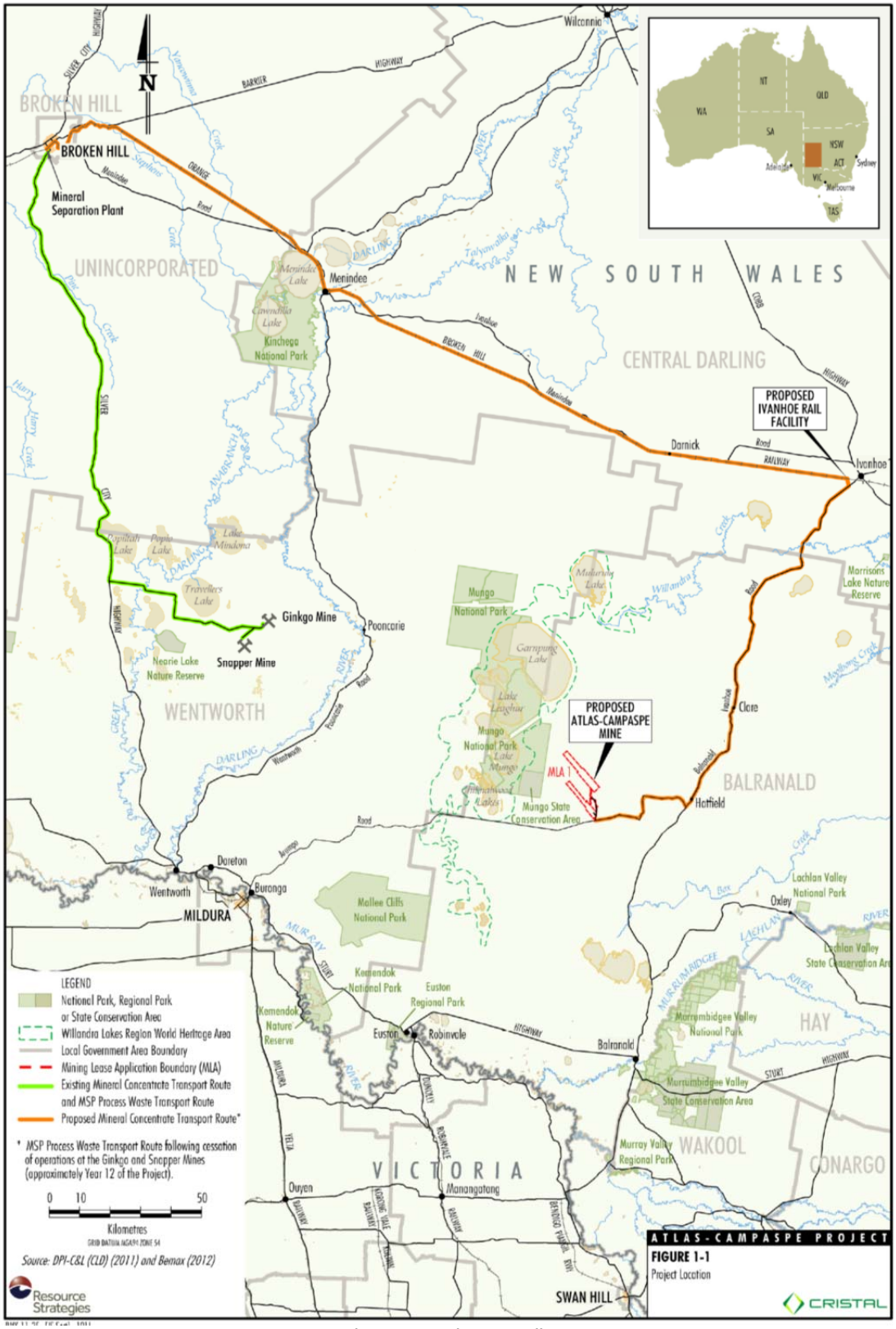

Figure 1: Project Locality

The proponent for the mine is Cristal Australia Limited (Cristal), which is a wholly-owned subsidiary of the National Titanium Dioxide Company Limited. Cristal also owns and operates two other mineral sands mines and a mineral separation plant in the region – the Broken Hill Mineral Separation Plant (MSP) and the Ginkgo and Snapper Mineral Sands Mines (approximately 100 km west of the Atlas-Campaspe mine).

The proposed development is located in the Murray Darling Basin in an area characterised by semi-arid woodlands and arid shrublands. The terrain in the area is generally flat and is located in the Benanee basin of the lower Murray River system which is made up of a number of undefined creeks, streams and ephemeral lakes that contribute negligible inflows to the Murray River. There are no permanent surface water features on the site, and groundwater in the area is generally located at least 20 metres below the surface and is highly saline with very few productive bores in the region.

The area is dominated by low intensity grazing (primarily sheep) typical of Western Lands lease holdings. A number of reserves and conservation areas are located between 5 and 10 km to the west of the mine, including the Willandra Lakes Region World Heritage Area, Mungo National Park, and the Mungo State Conservation Area (see Figure 1).

The nearest privately-owned dwelling is 7 km to the northeast of the site, and there are only 6 dwellings within 20 km of the site. Hatfield is the nearest settlement which only has a few dwellings and is located 30 km to the west of the site. The closest town is Balranald, which is located 80 km to the south and has a population of approximately 1,600 people. The closest township to the proposed rail facility is Ivanhoe, which has a population of approximately 200 people.

Access to the mine would be from the Balranald-Ivanhoe Road (a Regional Road) via a number of local unsealed roads, namely Link Road, Boree Plains-Gol Gol Road, Magenta Road and Hatfield-The Vale Road (see Figure 2). These roads would also be used to transport concentrate from the mine to the Ivanhoe Rail Facility where concentrate would be transported by rail to Cristal's Mineral Separation Plant in Broken Hill via the Orange-Broken Hill Railway.

The proposed development is situated within the Western Division of NSW which is administered by the Catchment and Lands Division of the NSW Department of Primary Industries (DPI) under the NSW *Western Lands Act 1901* and NSW *Crown Lands Act 1989*. Cristal currently has an Exploration Licence (EL 5359) over the proposed mining area, and would acquire relevant leases and/or enter into an agreement with leaseholders to gain access to the land for mining once it obtains planning approval.

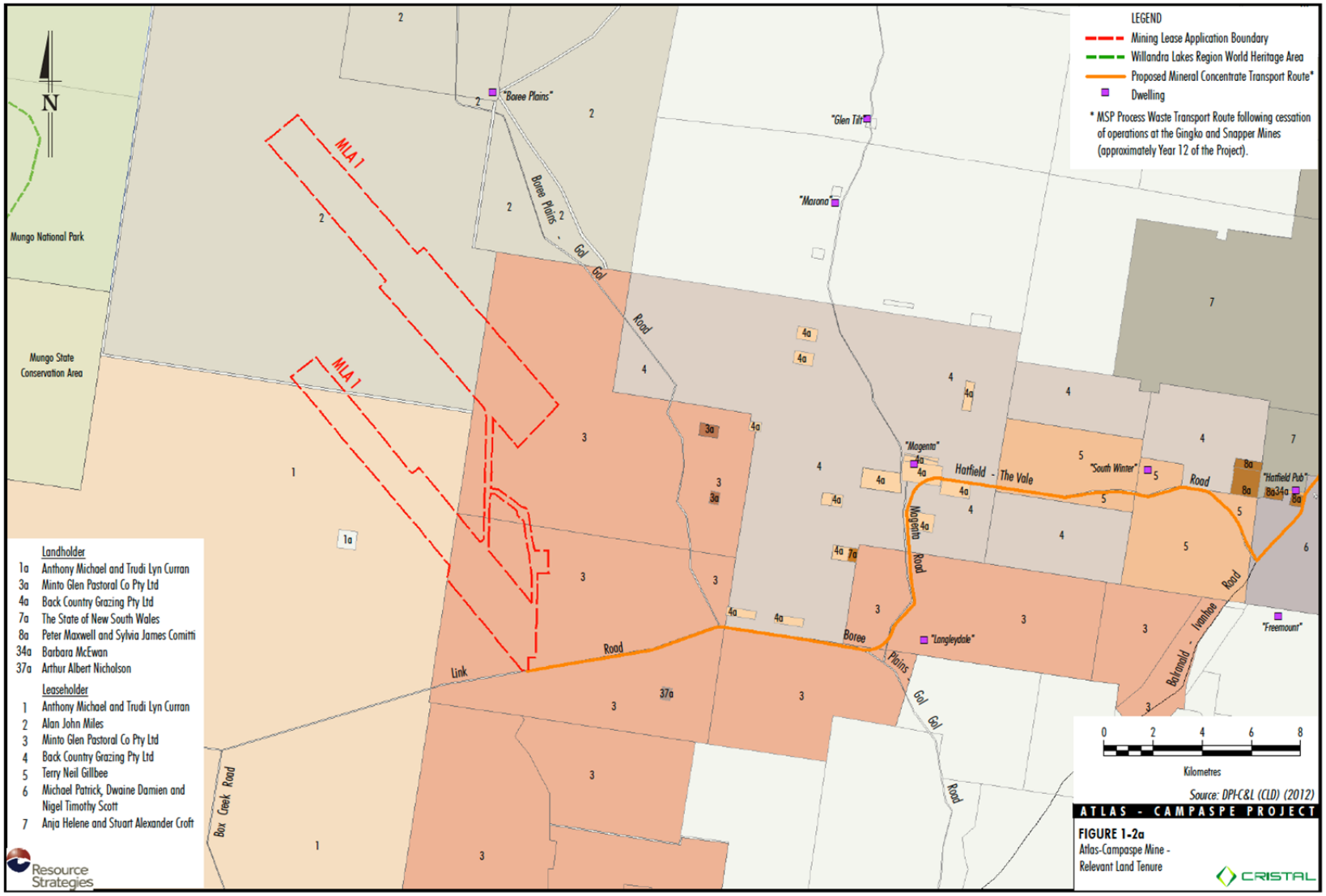

Figure 2: Land Tenure at the Atlas-Campaspe Site

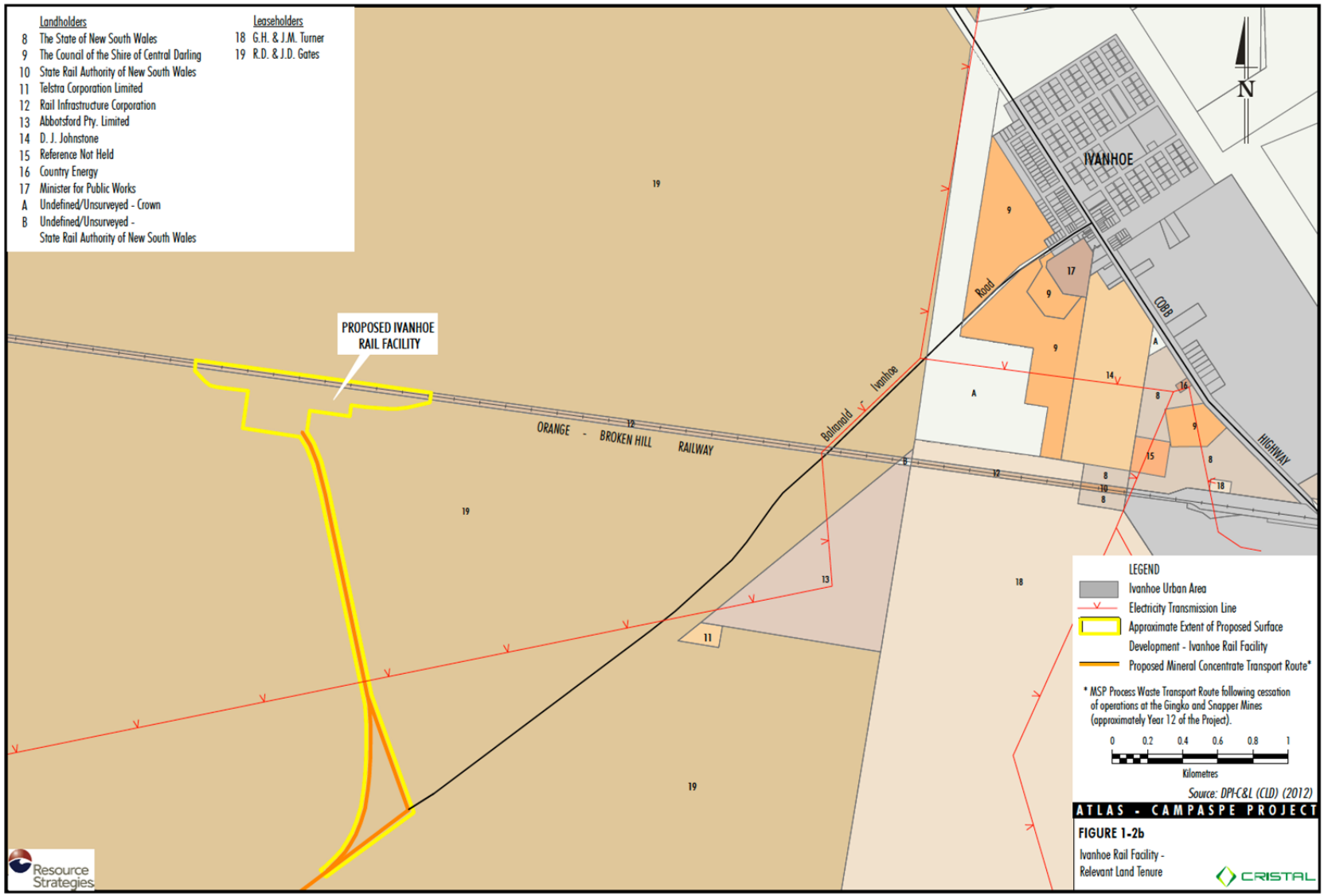

Figure 3: Land Tenure at the Ivanhoe Rail Facility

2. PROPOSED DEVELOPMENT

In summary, the proposed development involves (see Figures 4 to 7):

- developing and operating an open cut mineral sands mine across two mining domains (known as the Atlas and Campaspe mining domains) using conventional dry mining techniques;
- extracting and processing up to 109 Mt of ore at a rate of 7.2 Mt a year over a period of 20 years;
- constructing and operating associated mine infrastructure, including mineral processing and materials handling infrastructure;
- constructing and operating a rail load-out facility at Ivanhoe;
- transporting mineral concentrate by road to the rail load-out facility, then via rail to the existing MSP at Broken Hill for further processing;
- transporting and emplacing process waste from the MSP at the mine from Year 12 of the development (prior to this, waste from the MSP would continue to be transported to and emplaced at the existing Ginkgo and Snapper mines under their respective approvals); and
- progressively rehabilitating the site.

The major components of the proposed development are summarised in Table 1 and described in detail in the Environmental Impact Statement (EIS) (see Appendix A).

Table 1: Key Components of the Atlas-Campaspe Mineral Sands Project

Aspect	***Description***
Project Life	• 20 years
Production Rate	• Extraction of up to 109 Mt of mineral sands (11.3 Mt at the Atlas deposit and 97.4 Mt at the Campaspe deposit) • Maximum ore production rate of 7. 2 Mt a year.
Mining Methods	• Conventional (non-dredge) dry mining methods using excavators and dozers.
Project Staging	• Mining would commence at the south eastern end of the Atlas deposit and progress in a north westerly direction (Years 2 to 5) • Mining of the Campaspe deposit would commence once mining within the Atlas deposit is complete • Mining in the Campaspe deposit would commence at the south eastern end and would progress in a north westerly direction during (Years 6 to 20).
Ore Processing and Stockpiling	• Initial processing of mineral sands ore would occur on-site via dry mining unit (DMU), a primary gravity concentration unit, heavy mineral concentrate (HMC) treatment facility, salt washing facility, reverse osmosis plant and a high intensity magnetic separation circuit • Mineral concentrate would then be stockpiled before being transported to the MSP.
Transportation	• A maximum of 450,000 tpa of mineral concentrate would be trucked 175 km to the Ivanhoe rail load-out facility using road trains. • 24 road train trips per day (i.e. 48 vehicle movements a day) • 24 hours per day, 7 days per week • Mineral concentrate would then be transferred to train wagons and railed to the MSP in Broken Hill via the Orange-Broken Hill Railway • Maximum of 1 train load of mineral concentrate per day • From Year 12 of the development, MSP process waste would be transported in sealed containers via rail to the rail load-out facility and back-loaded on trucks to the mine.
Process Waste	• 102.5 Mt of course rejects and sand residuals from minerals processing on the site, and 50,000 tpa of process waste from the MSP • Waste material would be combined and placed in waste containment cells within the backfilled mining voids.
Employment	• 300 employees during construction (average of 150) • 200 employees during operation.
Hours of Operation	• 24 hours per day, 7 days per week (construction, operation, processing and transportation).

Infrastructure	• Mineral processing infrastructure (see above) • Materials handling infrastructure including towers, stackers, stockpiles and laydown areas • On-site accommodation camp for up to 300 people • Process and potable water supply from a borefield comprising approximately 13 bores • Water management infrastructure including reverse osmosis plant, sewage treatment facility, off-path sand residual dams, process water storages and water disposal dams • Administration/office buildings, car parks, and workshop • Utilities including an electricity distribution station and 11 kV electricity transmission lines.
Road Works	• New unsealed two-lane access road off Link Road • Construction and upgrade of various sections of unsealed roads and intersections along the mineral concentrate transport route.
Rail Load-Out Facility	• Construction and operation of a rail siding, hardstand and stockpiling areas, and loading facilities • Site office, car parking, site access and internal haul road • Surface water management infrastructure • Extension to existing 11kV transmission line.
Rehabilitation & Final Voids	• Emplacement of overburden and process waste materials behind advancing mine path to create a final landform similar to natural ground levels with a maximum elevation of 20 metres above the natural ground level • Final landform would be rehabilitated with endemic native vegetation species suitable for either light intensity grazing or native conservation • 2 final voids: - Atlas – 10 to 15 metres deep - Campaspe – 15 to 20 metres deep • Final voids would be partially backfilled and slopes battered to integrate with surrounding landscape and would remain above groundwater table.
Biodiversity Offsets	• The development would result in the clearing of 4,158 hectares (ha) of remnant native vegetation • The biodiversity offset strategy proposed to compensate for this loss includes the establishment of more than 16,540 ha of suitable land adjacent to the site and the Mungo National Park • In addition, two Vegetation Management Areas (VMAs) totalling 1,380ha of land would be managed over the life of the development.
Capital Investment Value	• $198 million

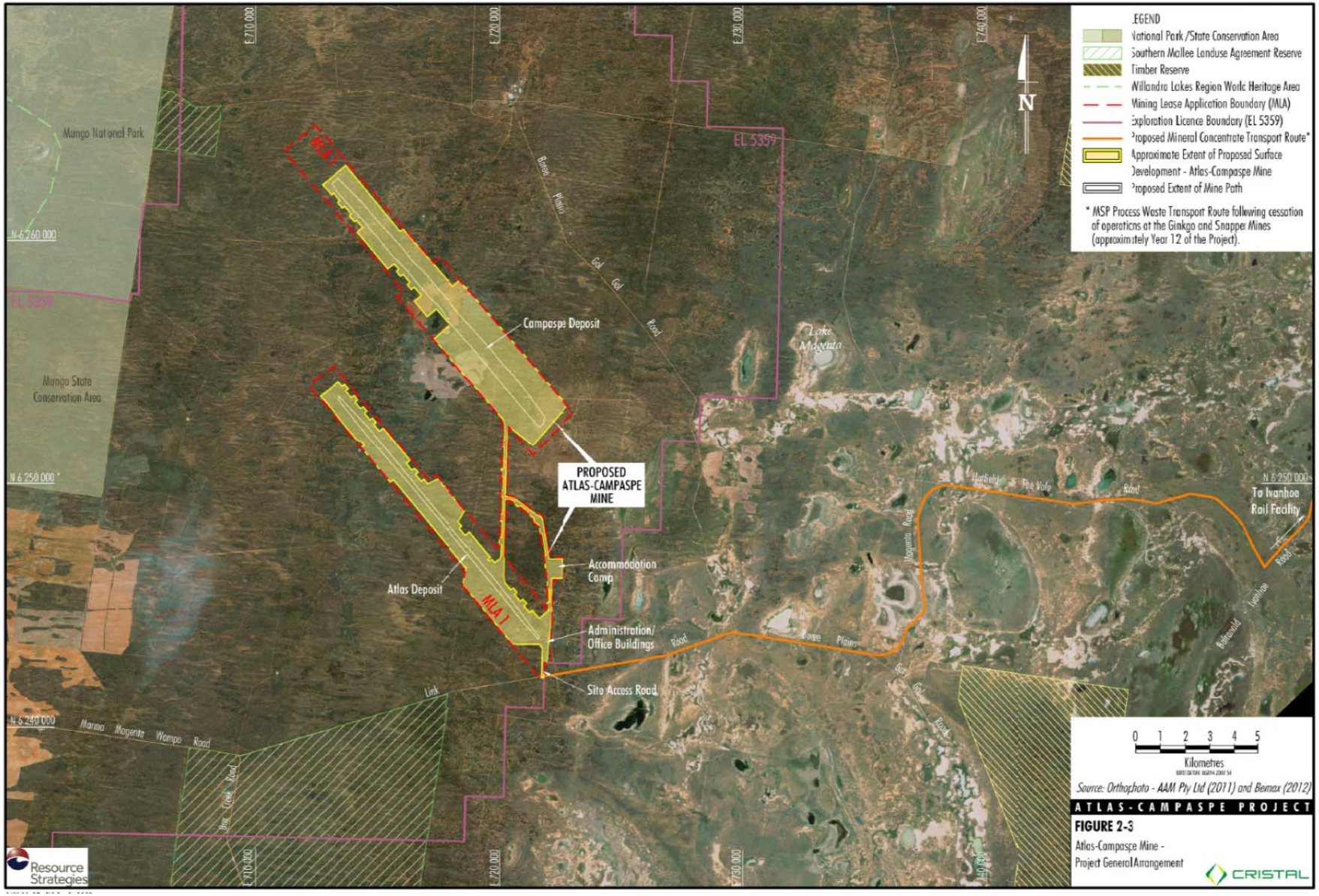

Figure 4: Conceptual Mine Plan for Atlas-Campaspe Mine

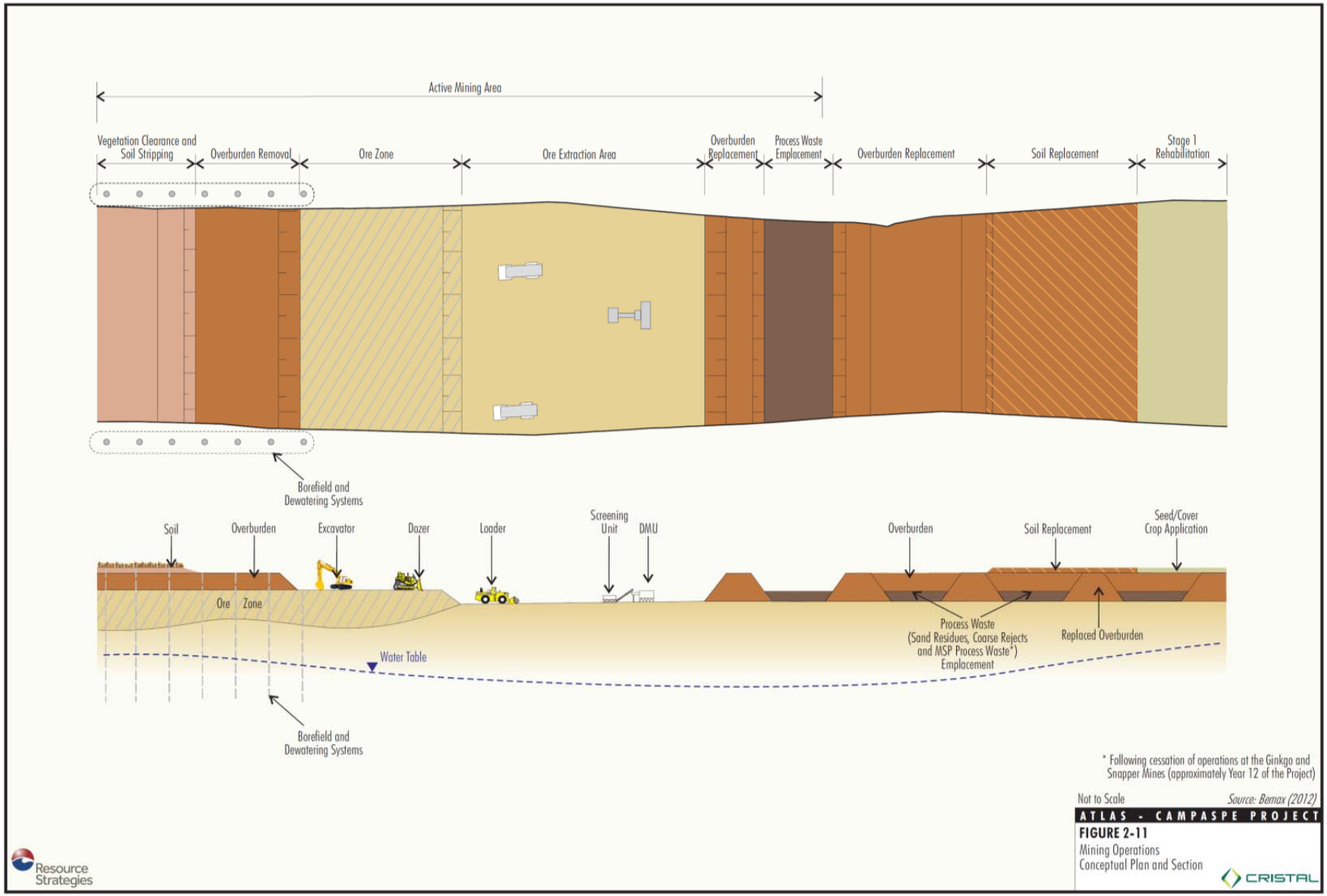

Figure 5: Conceptual Plan of Mining Methods

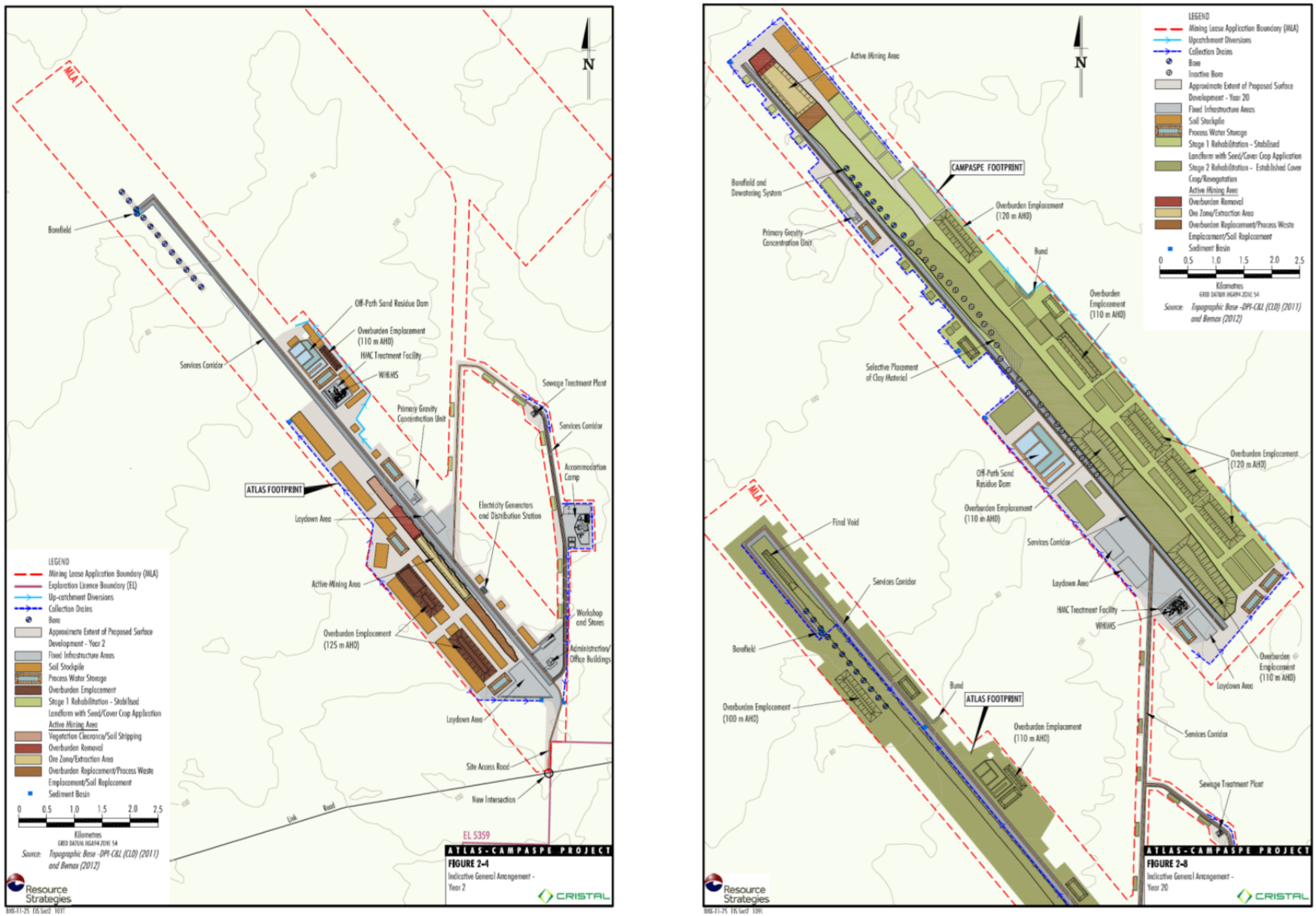

Figure 6: General Arrangement of Atlas-Campaspe Mine (Year 2 and 20)

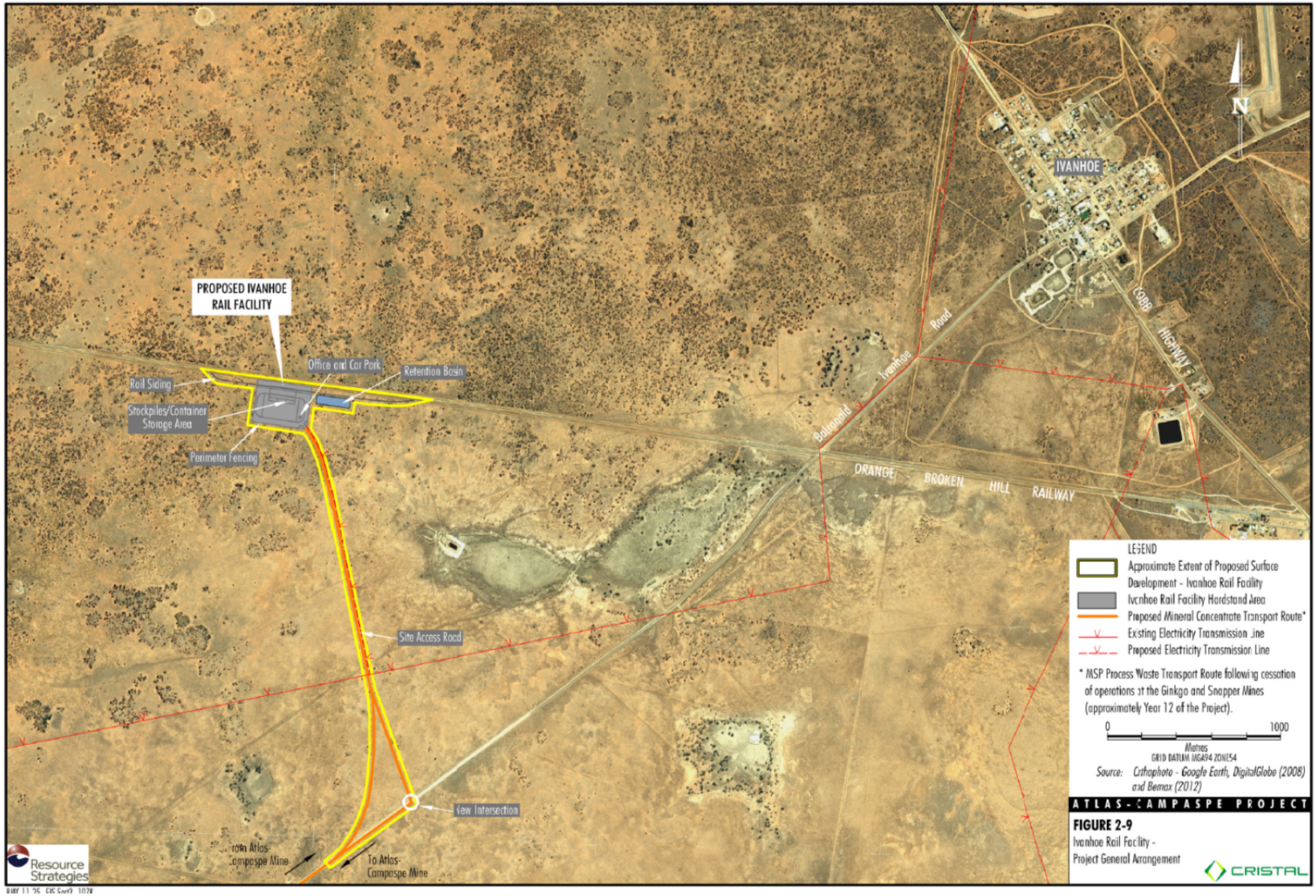

Figure 7: General Arrangement of the Ivanhoe Rail Facility

3. NEED FOR THE DEVELOPMENT

In considering the need for the development, the Department has considered a range of matters including:

- the significance of the resource to the region and NSW as a whole;
- the economic benefits of the development; and
- the extent to which the development has been designed to avoid, mitigate, and/or offset the impacts on the environment.

3.1 Significance of the Resource

Historically mineral sands were extracted from deposits on the Central Coast and North Coast of NSW. However, these operations have ceased, and the primary economically recoverable mineral sands resources are located in far western NSW.

The only two operating mineral sands mines in NSW are Cristal's Ginkgo and Snapper mines near Pooncarie (100 km west of the Atlas-Campaspe site). Together, these mines produce around 1.2 Mt of mineral sands concentrate a year. The concentrates are further processed in Cristal's MSP in Broken Hill to produce ilmenite, rutile and zircon which are exported to produce a wide range of products including cosmetics, glass, and titanium.

The development would produce up to 450,000 tonnes a year of concentrate, which represents around 40% of current production in NSW. The development would also maximise the use of existing infrastructure, including rail links and the existing MSP in Broken Hill. This would avoid the need to develop separate facilities for processing the resource, and the associated additional investment and environmental impacts this would entail.

Given these considerations, the Department believes that the relative significance of the resource is high when compared to other mineral sands resources across the State.

3.2 Economic Benefits

The development would generate a range of significant economic benefits for the region and for NSW as a whole. These benefits include:

- 300 construction jobs;
- long term employment for 200 people during operations;
- direct capital investment of $198 million;
- $95 million in royalties for the NSW Government; and
- significant flow on benefits and economic multiplier effects across the this part of regional NSW.

The EA includes an economic impact assessment undertaken by Gillespie Economics. This assessment includes a benefit-cost analysis (BCA) for the development that considered a comprehensive range of matters including environmental, infrastructure and social impacts, the principles of ecologically sustainable development, and the cost of rehabilitating the site.

In summary, this BCA calculates that the development would have an overall net benefit to Australia of between $250 and $345 million (net present value).

The Department accepts that BCA is not a precise science and is dependent on valuing environmental and social externalities in monetary terms, which may vary from one expert to another. However, the Department is satisfied that the BCA has used reasonable inputs and that any criticisms of the BCA would not materially change the broad conclusion that the development would result in a net benefit to the community.

3.3 Mine Design

Cristal has designed the development in a manner that mitigates potential environmental impacts by:

- limiting the depth of extraction to remain above the groundwater table;
- backfilling the mining voids to create a final landform that integrates as much as practicable with the surrounding landscape;
- minimising the depth and extent of the final voids; and

- conserving over 16,500 ha of remnant native vegetation, to compensate for the 4,100 ha of native vegetation that would be cleared as a result of the development.

In consideration of the above, the Department is of the view that:
- the resource can be considered to be significant;
- the extraction of this resource would deliver substantial economic benefits for the region and NSW as a whole; and
- limited opportunities exist for further revisions to the mine plan that would materially reduce the potential environmental impacts of the proposal without significantly reducing resource recovery.

In summary, the Department considers that the Atlas-Campaspe Mineral Sands development represents a logical extension of Cristal's operations in the Murray Darling Basin, as it would ensure the extraction of a valuable mineral sands resource and maximise the use of Cristal's existing processing facilities in the region.

4. STATUTORY CONTEXT

4.1 State Significant Development

The proposed development is declared to be 'State Significant Development' (SSD) under Section 89C of the *Environmental Planning and Assessment Act 1979* (EP&A Act), as it is 'development for the purposes of mining that is mineral sands mining', which is specified under Clause 5 of Schedule 1 to the *State Environmental Planning Policy (State and Regional Development)* 2011. The rail facility also falls within Clause 5 as 'development for the purpose of mining related works that is ancillary to another State significant development', and is therefore also considered to be SSD.

Accordingly, the Minister for Planning is the consent authority for the entire development. However, under the delegation of 27 February 2013, the Executive Director, Development Assessment Systems and Approvals may determine the application since there were fewer than 25 public objections, the local Councils do not object to the development, and no political donations have been reported.

4.2 Permissibility

The proposed development is located in both the Balranald and Central Darling LGAs.

The Atlas-Campaspe mining domains and the proposed road works on the haulage route are located on land zoned RU1 Primary Production under the *Balranald Local Environmental Plan (LEP) 2010*. In the RU1 zone, 'Open cut mining' is permissible with consent, and 'roads' are permissible without consent.

The rail facility is located in the Central Darling LGA and is zoned RU1 Primary Production and SP2 Infrastructure under the *Central Darling LEP 2012*. The rail facility falls under the definition of 'freight transport', which is permissible with consent in the RU1 zone. Within the SP2 zone, 'rail infrastructure facilities' are also permissible with consent.

Consequently, all components of the development are permissible with development consent on all applicable land, and the Executive Director may approve the carrying out of the development.

4.3 Integrated and Other NSW Approvals

Under Section 89J of the EP&A Act, a number of approvals are not required to be separately obtained for the proposed development, these include:
- various approvals relating to heritage required under the *National Parks and Wildlife Act 1974* and the *Heritage Act 1997*;
- an authorisation under the *Native Vegetation Act 2003* for the clearing of native vegetation;
- bushfire safety authority under the *Rural Fires Act 1997*; and
- certain water-related approvals under the *Water Management Act 2000*.

Under Section 89K of the EP&A Act, a number of further approvals are required, but must be substantially consistent with the development consent for the proposed development. These include:

- mining lease under the *Mining Act 1992*;
- an Environment Protection Licence (EPL) under the *Protection of the Environment Operations Act 1997*;
- an approval for road works under Section 138 of the *Roads Act 1993*; and
- a licence under the *Pipelines Act 1967*.

Cristal needs to obtain other approvals for the development, which are not integrated into the SSD approval process, including:

- certain water licences from the NSW Office of Water (NOW) under both the *Water Management Act 2000* and *Water Act 1912*; and
- a Crown Lands Licence to authorise occupation of crown land under the *Crown Lands Act 1989*.

The Department has consulted with the relevant Government authorities responsible for these other approvals (see Section 5) and has considered the issues relating to these approvals in its assessment of the development (see Section 5 and Section 6).

4.4 Commonwealth Approvals

Cristal also requires approval from the Commonwealth Minister for the Environment under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) because the development is a 'controlled action' due to the potential to impact World Heritage properties (sections 12 and 15A), National Heritage places (sections 15B and 15C), listed threatened species and communities (sections 18 ad 18A) and listed migratory species (sections 20 and 20A).

The Commonwealth Department of the Environment (DoE) has accredited the assessment process for the Atlas-Campaspe Mineral Sands Project. This means that the assessment of both State and Commonwealth matters has been integrated into the NSW assessment process under the EP&A Act. Nevertheless, it is important to recognise that the Commonwealth Minister for the Environment maintains an independent approval role for the development under the EPBC Act, and is expected to undertake his determination following the determination of the application under NSW legislation.

4.5 Environmental Planning Instruments

Under Section 79C of the EP&A Act the consent authority is required to consider (among other matters) the provisions of relevant environmental planning instruments (EPIs), including any exhibited draft EPIs and development control plans.

The Department has considered the development against the relevant provisions of several EPIs (see Appendix B), as well as Cristal's consideration of these instruments in its EIS (see Attachment 6 of Volume 1 of the EIS). The key instruments include:

- *Balranald LEP 2010;*
- *Central Darling LEP 2012;*
- *SEPP No.33 – Hazardous and Offensive Development*;
- *SEPP No.44 – Koala Habitat Protection*;
- *SEPP No.55 – Remediation of Land*;
- *SEPP (State and Regional Development) 2011*;
- *SEPP (Infrastructure) 2007* (the Infrastructure SEPP); and
- *SEPP (Mining, Petroleum and Extractive Industries) 2007* (the Mining SEPP).

On 4 November 2013, the NSW Government amended the Mining SEPP to clarify the decision-making process for proposals for the mining of mineral resources, including mineral sands. The amendment introduced a clear statutory requirement that the consent authority must consider the significance of the resource, both to the State and the region where it is located, as part of its decision-making process. While the amendment made clear that the significance of the resource is an important factor in the decision-making process, it is not the only factor, and environmental, social and economic impacts continue to be significant considerations. The Department has considered the significance of the development's mineral sands resource in its assessment (see Section 3).

Based on its assessment of these instruments and its broader environmental assessment in Section 6, the Department is satisfied that the development can be undertaken in a manner that is consistent with the aims, objectives and provisions of these instruments.

4.6 Objects of the EP&A Act

The Minister must consider the objects of the EP&A Act when making decisions under the Act. The objects of most relevance to the Minister's decision on whether or not to approve the development are found in Section 5(a)(i),(ii),(vi) and (vii). They are:

To encourage:

(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment;

(ii) the promotion and co-ordination of the orderly and economic use and development of land;

(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats; and

(vii) ecologically sustainable development.

The Department is satisfied that the development encourages the proper use of resources (Object 5(a)(i)) and the promotion of orderly and economic use of land (Object 5(a)(ii)), particularly as the development is a permissible land use and the subject mineral sands resource is significant from a State and regional perspective.

The encouragement of environmental protection (Object 5(a)(vi)) is considered in detail in Section 6 of this report. Based on this consideration, the Department is satisfied that the impacts of the development can be mitigated and/or managed to ensure an acceptable level of environmental performance. In regard to biodiversity values, the Department acknowledges the development involves a significant area of clearing of remnant native vegetation and associated habitat. However, the Department is satisfied that the comprehensive biodiversity offset strategy and the rehabilitation strategy proposed as part of the development would maintain or improve the biodiversity values in the region in the medium to long term.

Finally, the Department has fully considered the encouragement of ecologically sustainable development (ESD) (Object 5(a)(vii)) throughout its assessment of the merits of the development application, and sought to integrate all significant economic and environmental considerations and avoid any serious or irreversible damage to the environment, based on an assessment of risk-weighted consequences. Cristal has also considered the development against the principles of ESD. Following its consideration, the Department is satisfied that the development can be carried out in a manner that is generally consistent with the principles of ESD.

5. CONSULTATION

Under Section 89F of the EP&A Act, the Department is required to publicly exhibit the EIS for the development for at least 30 days. After accepting the EIS, the Department:

- publicly exhibited the EIS for 6 weeks from 11 June 2013 until 23 July 2013 at the:
  - Department's Information Centre in Sydney;
  - Balranald Shire Council's offices;
  - Central Darling Shire Council's offices;
  - Broken Hill City Council's offices;
  - Nature Conservation Council's office, and
  - Department's website;
- notified relevant State and Commonwealth government authorities and the Balranald, Central Darling and Broken Hill Councils;
- notified relevant road and other public infrastructure authorities in accordance with the Mining SEPP and Infrastructure SEPP; and
- advertised in the Broken Hill Barrier Truth, Sunraysia Daily, and Riverine Grazier newspapers.

During the assessment process, the Department also made other documents publicly available on its website including:

- the development application;
- Secretary's assessment requirements;
- Cristal's EIS;
- community and agency submission received during the exhibition of the EIS; and

- Cristal's Response to Submissions (RTS).

The Department received a total of 30 submissions during the exhibition of the EIS, including 15 submissions from government agencies (including local Councils) and 15 public submissions. The Department also received correspondence from the Commonwealth Department of the Environment (DoE) as part of the accredited assessment process under the EPBC Act.

None of the public authorities or DoE objected to the development, but raised a number of concerns and made recommendations relevant to their regulatory responsibilities (see below). All the public submissions supported the development, citing employment and socio-economic benefits as the key reasons why the development should be approved.

In September 2013, Cristal submitted a detailed response to the issues raised in submissions (see Appendix D). The RTS was made publically available on the Department's website and was forwarded to agencies for further comment. The Department also consulted with key agencies about the recommended conditions of consent, and incorporated these comments where appropriate.

A summary of the issues raised in submissions is provided below, focusing on the residual issues where agencies have provided additional submissions to the Department. Full copies of the submissions are provided in Appendix C.

Office of Environment and Heritage (OEH) initially raised concerns about the adequacy of:

- the surveys to assess the condition of native vegetation on the site and the potential impacts on threatened species;
- the proposed management and monitoring measures for threatened species likely to be impacted by the mine; and
- the proposed biodiversity offsets.

In the RTS, Cristal provided additional information to address OEH's concerns, including updated vegetation mapping, further details about the management and monitoring measures for threatened species, and almost 1,400 ha of land - known as 'Vegetation Management Areas' - adjacent to the site that would be managed to enhance biodiversity values during the life of the development.

Following the receipt of this information and Cristal's commitment to the vegetation management areas (VMAs), OEH has confirmed it is generally satisfied that the biodiversity and cultural heritage impacts of the development have been adequately addressed. OEH also recommended a range of conditions of approval that have been incorporated into the development consent.

NSW Trade & Investment requested further information about the potential sterilisation of mineral resources in the biodiversity offsets and the VMAs. Additional information provided by Cristal confirms that the biodiversity offset areas would not be located in areas with valuable mineral resources, and that the VMAs would not sterilise minerals resources in the long term as they would only be managed during the life of the development. NSW Trade & Investment advised that it is satisfied with Cristal's response.

Department of Primary Industries (DPI) provided comments from a range of divisions, including the NSW Office of Water (NOW), Office of Agricultural Sustainability & Food Security (OAS&FS), Fisheries NSW, and Crown Lands.

NOW did not object to the development as it would be unlikely to result in any significant impacts on groundwater, and would meet the minimal impact considerations in the *Aquifer Interference Policy*. However, NOW advised that Cristal would need to obtain appropriate licences for the development under both the *Water Act 1912* and the *Water Management Act 2000*.

OAS&FS did not object to the development, and was satisfied that the development would have a minimal impact on agriculture in the long term provided the site is appropriately rehabilitated.

Crown Lands supported the development, but noted that Cristal would be required to obtain a range of Crown land licences for any activities outside the Mining Lease under the *Crown Lands Act 1989*.

Roads and Maritime Services (RMS) did not object to the development, but made a number of recommendations about the upgrade and maintenance of the road network along the proposed heavy vehicle haulage route. Cristal has agreed to implement RMS's recommendations, and the Department

has reflected these commitments in the conditions of consent. In recognition of the economic importance of the development to the region and the State, RMS is proposing to contribute $4.7 million towards sealing 40 km of the Balranald-Ivanhoe Road, subject to the development proceeding. This funding would be provided to Balranald and Central Darling Councils as the applicable road authorities.

Central Darling Shire Council (CDSC) and ***Balranald Shire Council (BSC)*** both support the development, and have agreed with Cristal in regard to the proposed road upgrade and maintenance contributions for the local and regional road network.

Department of Environment (DoE) initially raised a number of concerns in relation to the level of information provided for potential impacts on key threatened species under the EPBC Act. DoE also requested further information relating to avoidance and mitigation measures for certain Matters of National Environmental Significance (MNES).

Cristal subsequently provided a significant volume of additional information which addressed the majority of DoE's concerns. However, DoE remains concerned about the broad nature of many of the mitigation measures proposed to minimise impacts on key threatened species, but accepts that the most appropriate way to address this matter is through the preparation of a comprehensive Biodiversity Management Plan that must be submitted and approved by DoE prior to commencement of the development. The Department agrees with this approach, and has recommended conditions accordingly.

The ***Environment Protection Authority (EPA)***, ***Murray Catchment Management Authority***, ***Rural Fire Service***, ***Dams Safety Committee*** and the ***NSW Heritage Office*** all made submissions, but did not raise any concerns about the development.

6. ASSESSMENT

In its assessment of the merits of the development, the Department has considered:

- the EIS, RTS and additional information provided by Cristal;
- submissions from government agencies (including the Councils) and the general public;
- the provisions of the relevant EPIs, policies and guidelines; and
- relevant provisions of the EP&A Act.

Based on this assessment, the Department considers the key issues to be the potential impacts on biodiversity and the local/regional road network. Consideration of these impacts (among others) is provided below, with consideration of other potential impacts associated with the development provided in Table 6.

6.1 Biodiversity

Introduction

Cristal engaged Australian Museum Business Services (AMBS) to prepare an Ecological Impact Assessment for the development. In response to issues raised by OEH, additional information on the condition of the existing vegetation, including vegetation mapping and the extent of specific vegetation communities was provided in the RTS.

Flora surveys and targeted searches were undertaken in 2011 and 2012 for the two development sites (Atlas-Campaspe mine and Ivanhoe Rail Facility) and the proposed offset area. The assessment mapped over 26,000 ha of native vegetation for the site and surrounding area. It is important to note that the vegetation communities in this part of NSW are generally sparsely vegetated and fragmented as a result of previous clearing, grazing activity, feral animals and fire history.

Avoidance and Mitigation

The flora and fauna assessments are based on a number of avoidance and mitigation measures that Cristal proposes to implement to minimise impacts on the biodiversity values as far as practicable.

These measures include:

- designing the development and the layout of the surface infrastructure to minimise clearing and impacts on threatened species;

- progressive clearing and rehabilitation of the site over the 20 year mine life to minimise the area of disturbance at any one time; and
- a range of management and mitigation measures to address impacts on key threatened species, including removal of livestock and control of pest species within the Mining Lease.

These measures would be supplemented by a comprehensive Biodiversity Offset Strategy and the Vegetation Management Areas, which are proposed to compensate for the residual biodiversity impacts of the development (as discussed below).

Flora Impacts

The flora assessment identified 14 arid and semi-arid native vegetation communities that would be impacted as a result of the development (see Table 2 and Figures 8, 9 and 10).

Table 2: Summary of Impacts on Vegetation Communities

Vegetation community	***Area to be cleared (ha)***
Semi-arid Woodlands	
Belah-Rosewood Woodland	2,035
Belah-Rosewood/Acacia Woodland	10
Black Box Woodland	50
Linear Dune Mallee	1,040
Mulga Woodland	5
Sandplain Mallee	535
Sandhill Pine Woodland **(EEC)**	3
Arid Shrublands	
Bluebrush Shrubland	70
Chenopod Shrubland Depressions	5
Scalded Chenopod Shrubland	5
Saltbush Shrubland	5
Yarran Shrubland (*Acacia melvillei Shrubland*) **(EEC)**	195
Disturbed areas/Shrubland complex	170
Native grasslands/sparse acacia	30
TOTAL	**4,158**

In total, the development would result in the clearing of 4,158 ha of native vegetation, including 2 endangered ecological communities (EECs - Sandhill Pine Woodland and Yarran Shrubland) and/or critically endangered ecological communities (CEECs) as defined under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environmental Protection and Biodiversity Conservation Act* 1999 (EPBC Act), respectively.

The flora assessment also identified 3 threatened flora species listed under both the TSC Act and the EPBC Act which would be impacted by the development, namely:

- Mossgiel Daisy (vulnerable);
- Winged Peppercress (endangered); and
- Cobar Greenhood Orchid (vulnerable).

No EECs or threatened species were identified on the Ivanhoe rail facility site.

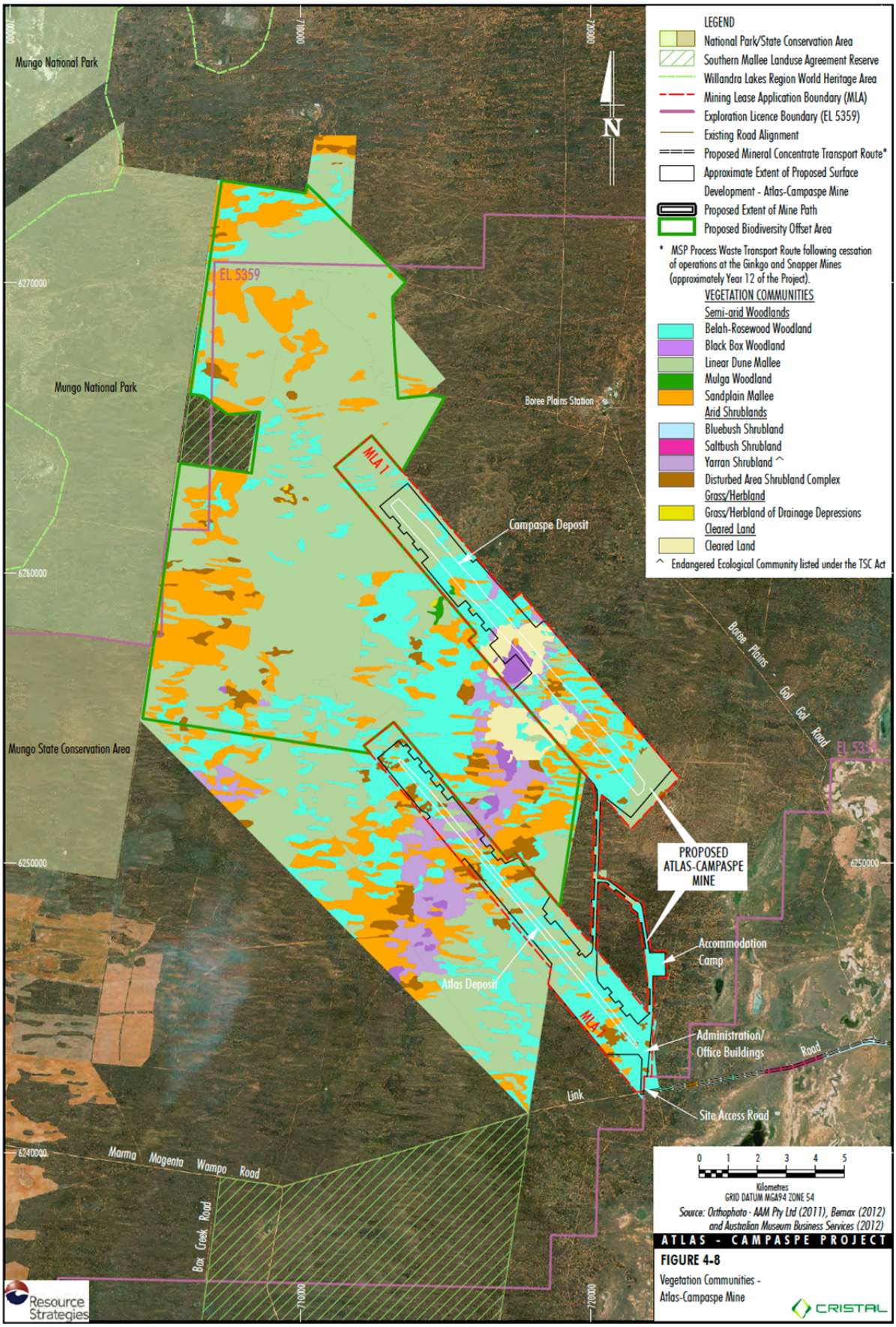

Figure 8: Vegetation Communities – Atlas-Campaspe Mine

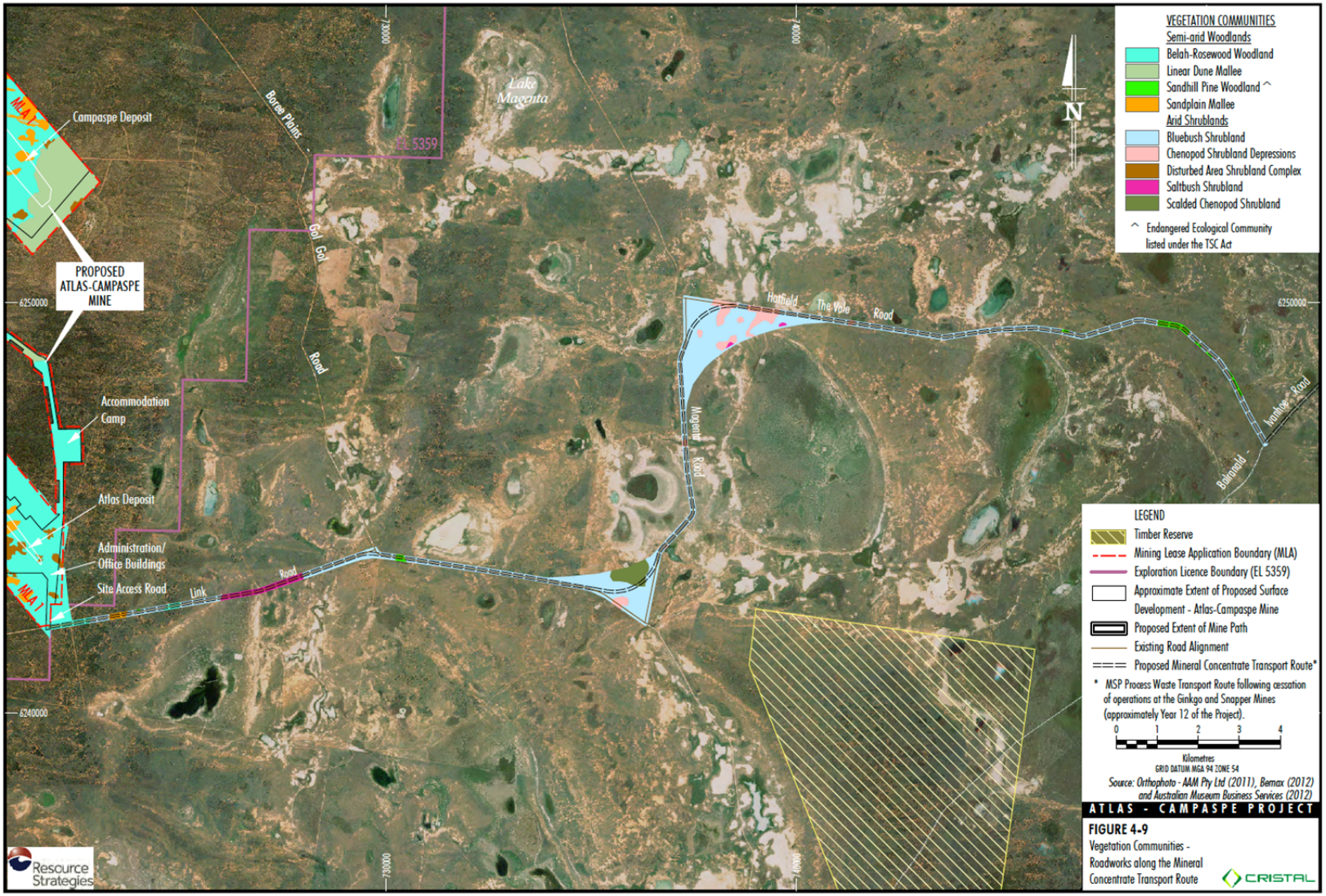

Figure 9: Vegetation Communities – Transport Route

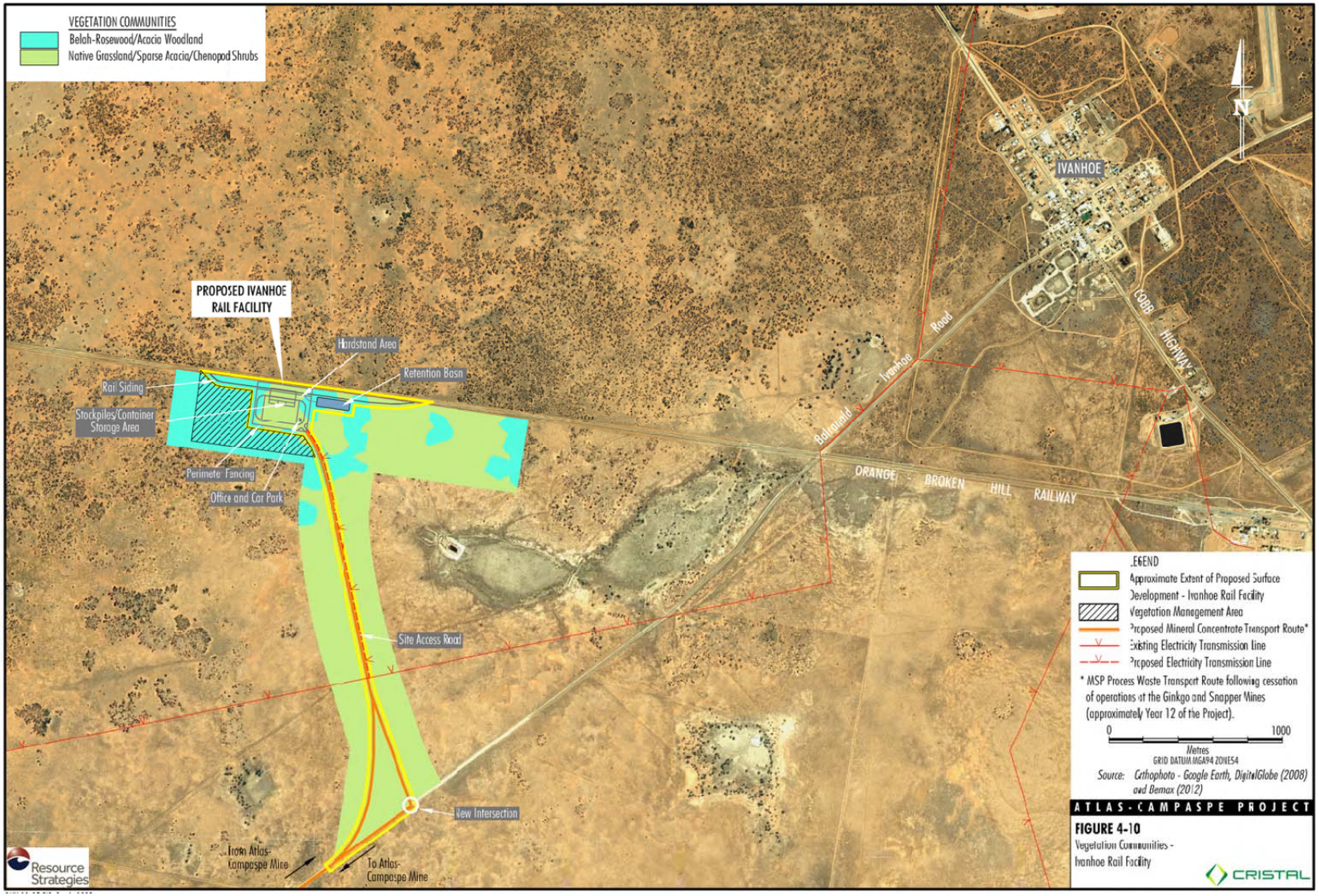

Figure 10: Vegetation Communities – Ivanhoe Rail Facility

Consideration of the significance of the impacts on EECs and threatened flora species (without mitigation) is provided in Table 3.

Table 3: Summary of impacts on threatened flora species and EECs

Species	***Significant impact***	***Summary of Impact***
Yarran Shrubland (EEC)	Yes	• Located on Atlas-Campaspe site • 195 ha to be cleared • Due to the extent of the EEC to be cleared, the impact is considered to be significant • Proposed offset area includes 390 ha of Yarran Shrubland EEC.
Sandhill Pine Woodland (EEC)	No	• Located along haulage route • Approximately 3 ha to be cleared • As only a small area of the EEC is to be cleared and there is wider occurrence of this community in the surrounding area the impact is not considered significant.
Winged Peppercress	No	• Located in Atlas-Campaspe site • 2 individual plants would be cleared • Development is unlikely to have a significant impact on this species as the individuals to be cleared are part of a broader population, with surveys at 4 other locations (3 within offset area) identifying 299 individual plants.
Cobar Greenhood Orchid	Yes	• Located in Atlas-Campaspe site • Due to the limited extent of the known population of this species, the impact is considered to be significant • 5 plants located within or close to the disturbance area, although the location of a stockpile was altered to avoid a known orchid location.
Mossgiel Daisy	No	• Located along haulage route • A large population was located along Magneta Road, although the haulage route was modified to avoid direct impacts • Development unlikely to have a significant impact.

However, the Department believes it is important to put the findings of the significance assessment in context.

In this regard, the Department notes that the Yarran Shrubland EEC on the site occurs as patches of heavily grazed vegetation and is generally in poor condition. Furthermore, the proposed offsets include 390 ha of Yarran Shrubland EEC, and through the removal of grazing and controlling feral animals in the offset area, there is a high potential for substantial areas of this EEC to regenerate to achieve an overall improvement in the region in the medium to long term.

In regard to the Cobar Greenhood Orchid, only 5 individuals were identified on the site, and only 3 of these would be directly disturbed by the development. However, as this population occurs outside the previously recorded range for this species, OEH considers that the removal of 3 individuals constitutes a significant impact on this species. However, it is important to note that the proposed offsets include almost 16,000 ha of land adjacent to the site, much of which contains potential habitat for these species based on known vegetation associations and soil characteristics. To support this, one of the 5 individuals identified in the surveys was located in the proposed offset area.

Cristal has also committed to the following mitigation and management measures:

- protection (fencing) and monitoring of the orchids that would not be directly disturbed by the mine;
- pre-clearance surveys targeting the Cobar Greenhood Orchid; and
- collection of topsoil around the orchids for reuse in rehabilitation.

Given these considerations, the Department believes it is reasonable to conclude that the proposed offsetting and mitigation measures have the potential to improve (or at least maintain) the local population of the orchid in the medium to long term.

In order to further assist in the management of specific threatened fauna species, OEH requested that the consent conditions include a requirement for Cristal to development comprehensive management and monitoring programs for specific species, including but not limited to, the Cobar Greenhood Orchid. The Department has incorporated a condition to this effect in the recommended conditions of consent as part of the comprehensive Biodiversity Management Plan for the development that must be prepared in consultation with OEH.

OEH also raised concerns about 45 ha of Black Box Woodland to the south of the Campaspe deposit, which could experience temporary and localised impacts from reduced surface water flows as a result of the development. To address this matter, OEH has recommended that surface water flows be re-established as soon as practicable as the mine is progressively rehabilitated. The Department agrees with this recommendation, and has included a rehabilitation objective in the conditions requiring Cristal to maintain overland surface water flows to this community and monitor and report on the effectiveness of these measures.

Finally, the Department is satisfied that the development would not have any direct impact on the vegetation communities in the Willandra Lakes World Heritage Area, the Mungo National Park and the Mungo State Conservation Area. The proposed development is well removed from these areas (10 km from the World Heritage Area and around 5 km from the National Park/State Conservation Area) and the biodiversity offset (as described below) would provide a substantial buffer between these areas and the mine.

Fauna Impacts

The fauna surveys identified some 228 fauna species at the mine site and an additional 67 fauna species at the Ivanhoe rail facility. Of these species, 16 are listed as vulnerable, endangered or migratory under the TSC Act and/or the EBPC Act. These 16 species included 10 birds, 4 bats, 1 reptile and 1 marsupial.

The fauna assessment indicates that the proposed development is unlikely to significantly impact the vast majority of these species, principally because alternative habitat for these species exists in areas surrounding the site and/or the species are highly mobile and capable of dispersing throughout the landscape. OEH agrees with this assessment.

However, the assessment indicates that 3 of the threatened species could potentially be significantly impacted by the development, namely:

- the Malleefowl;
- Western Pygmy-possum; and
- Corben's long-eared bat.

Although Cristal has modified the extraction area footprint to avoid two Malleefowl breeding mounds, the assessment indicated that the removal of around 1,575 ha of good quality habitat for this bird and indirect impacts of the development (such as noise, light and dust) could significantly impact the breeding and occurrence of the Malleefowl in the area.

The fauna assessment indicates that the impact on the Western Pygmy-possum may also be locally significant, particularly given its preference for Belah-Rosewood Woodland (of which 2,035 ha would be cleared as a result of the development).

The impact of the development on the Corben's long-eared Bat is also considered significant due to the high density of this species in the disturbance footprint and the progressive removal of 3,863 ha of potential habitat for this species.

The Department notes the there is limited opportunity to further avoid key habitat for these species without significant implications for resource recovery. However, Cristal is proposing to implement a number of specific management, mitigation and monitoring measures to reduce the residual impacts on these threatened fauna species, including:

- Implementing a detailed vegetation clearance protocol in accordance with best practice;
- establishing a nest box program in the mine revegetation area for the Corben's long-eared bat and Western Pygmy possum;
- implementing a management and monitoring program for the Malleefowl and its mounds (in accordance with the *NHT National Manual for the Malleefowl Monitoring System 2007)*; and importantly,

- restricting clearing of trees and shrubs to late summer and early autumn to avoid the period when Malleefowl mounds are most active.

The Department and OEH support these measures and the Department has recommended that they be outlined in the Threatened Species Management Plan to be prepared as part of the Biodiversity Management Plan for the development.

Cristal is also proposing a significant biodiversity offset that provides suitable habitat for the Malleefowl, Western Pygmy-possum and the Corben's long-eared Bat (as well as other threatened species), which would assist to reduce potential impacts on these species at the regional level.

Overall, the Department and OEH are satisfied that the potential impacts on fauna species are able to be avoided, mitigated and/or offset to an extent that the development could be considered to at least maintain biodiversity values in the area over the medium to long term.

Biodiversity Offset Strategy

Cristal has developed a comprehensive biodiversity offset strategy to compensate for the 4,158 ha of native vegetation to would be cleared as a result of the development (see Figure 11). The proposed offset covers an area of 16,270 ha of native vegetation and incudes an additional 270 ha of cleared land, which Cristal proposes to regenerate with communities such as the Yarran Shrubland EEC (see Table 4).

The biodiversity offset would result in offset ratios of almost 4:1 for native vegetation and 2:1 for EECs.

Table 4: Vegetation Communities in the Biodiversity Offset Area

Vegetation clearance	Area to be cleared (ha)	Proposed offset area (ha)
Belah-Rosewood Woodland	2,035	2,560
Belah-Rosewood/Acacia Woodland	10	0
Black Box Woodland	50	90
Linear Dune Mallee	1,040	9,640
Mulga Woodland	5	25
Sandplain Mallee	535	3,125
Sandhill Pine Woodland (EEC)	3	0
Bluebrush Shrubland	70	0
Chenopod Shrubland Depressions	5	0
Scalded Chenopod Shrubland	5	0
Saltbush Shrubland	5	0
Yarran Shrubland (*Acacia melvillei Shrubland*) (EEC)	195	390
Disturbed areas/Shrubland complex	170	430
Native grasslands/sparse acacia	30	0
Total existing native vegetation	**4,158**	**16,270**
Cleared land	305	270
Overall Total	**4,463**	**16,540**

Importantly, all of the threatened flora species that would be directly impacted by the development have been recorded in the offset area, and all but two of the threatened fauna species (birds) recorded in the disturbance footprint have been recorded in the offset area. Furthermore, as shown on Figure 11, the proposed biodiversity offset area represents a significant opportunity to improve regional biodiversity connectivity as it adjoins the Mungo National Park and Mungo State Conservation Area.

Nonetheless, OEH initially raised concerns about the biodiversity offset strategy including:

- the adequacy of the location and size of the offsets, particularly the potential edge effects on the offset area between the Atlas and Campaspe deposits;
- insufficient area of the Belah-Rosewood Woodland within the offsets;
- the adequacy of the specific management and monitoring provisions for threatened species, particularly the Cobar Greenhood Orchid and the Malleefowl; and
- long term protection of the offsets.

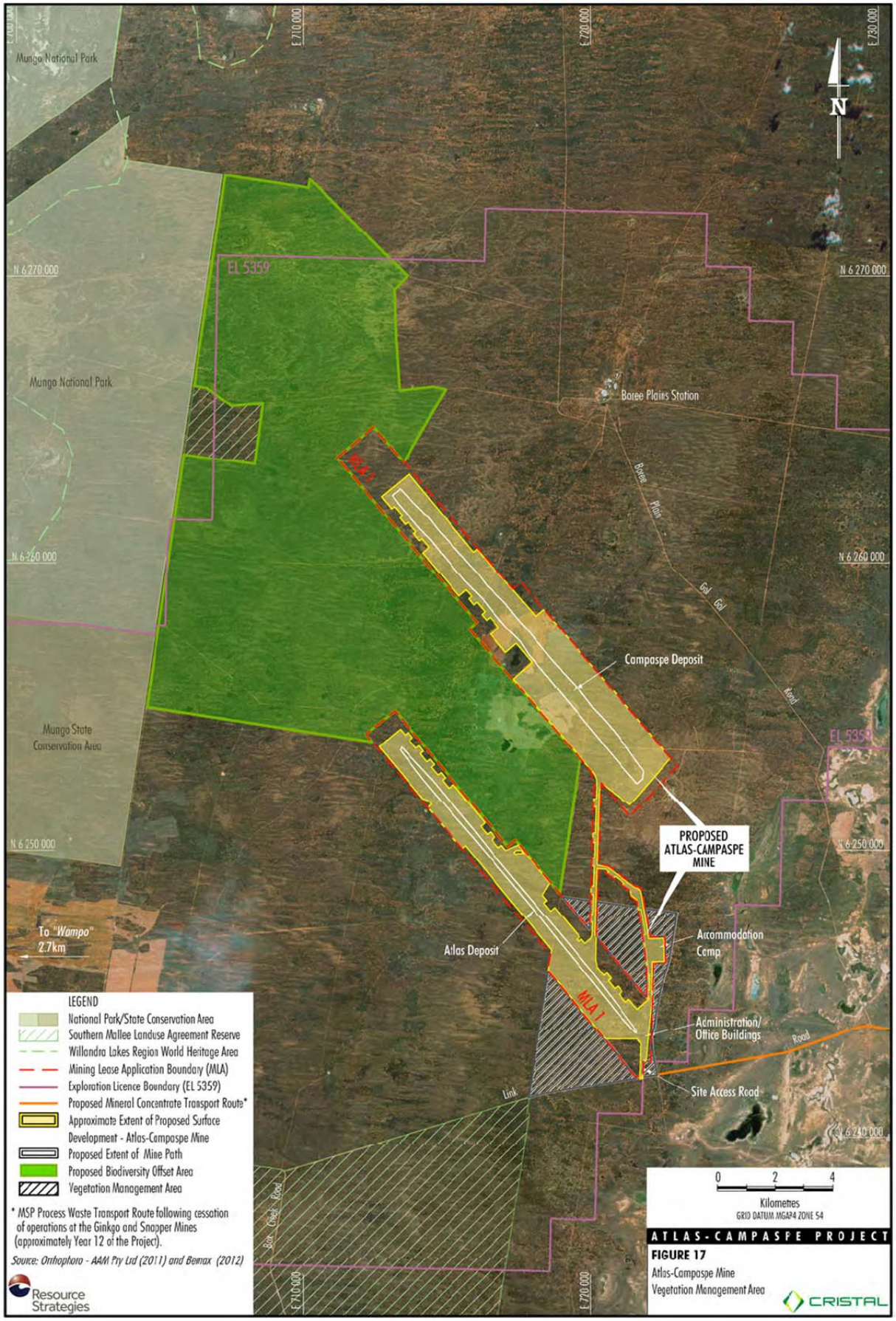

Figure 11: Proposed Biodiversity Offsets and Vegetation Management Areas

In response, Cristal indicated that the configuration of the offset (in particular the strip of land between the extraction areas) was specifically chosen to form an important component of the offset that ensures the vegetation types that would be disturbed by the development are adequately represented. The Department also notes that the strip of offset land between the extraction areas is relatively wide (greater than 4 km) and with progressive rehabilitation of the open cut areas, the vast majority of this land is unlikely to be significantly affected by edge effects.

To address OEHs concerns in relation to the quantum of Belah-Rosewood Woodland contained in the offset, Cristal proposed the inclusion of two Vegetation Management Areas (VMAs). The first VMA covers an area of 15 ha and is located at the rail facility near Ivanhoe (see Figure 10). The second VMA covers an area of 1,380 ha adjacent to the mine (see Figure 11).

Both VMAs contain significant areas of Belah-Rose Woodland, which Cristal has proposed to manage over the life of the development by:

- mapping and condition assessment of vegetation communities;
- controlling weeds and feral pests, including the engagement of appropriately qualified contractors for fox and goat control;
- excluding livestock grazing and goats; and
- managing bushfire risk.

It is important to note that the VMAs would not have the same long term protection as the biodiversity offset area, as the VMAs would only be managed over of the life of the development (i.e. 20 years).

However, both OEH and the Department consider that proactive management of these areas for a period of 20 years (in a similar manner to the offset areas) would yield significant biodiversity outcomes, particularly in creating significant areas of additional habitat for threatened species.

In regard to long term security of the offsets, Cristal has commenced negotiations with current leaseholders (Boree Plains and Wampo Stations) to lease the relevant parts of these stations and apply for a 'change in lease purpose' to 'conservation' under the *Western Lands Act 1901*. The same mechanism is also being used to secure the offsets for Cristal's Snapper and Gingko mineral sands mines. Cristal has also proposed protection of the offset area through inclusion in the National Park Estate. However, at this stage OEH has not confirmed whether it would be willing to progress this option.

Nevertheless, the Department is satisfied there are a number of suitable mechanisms available to provide long term protection to the offset areas, but that it may take some time for the preferred mechanism to be finalised. Accordingly, the Department has included a requirement for Cristal to make suitable arrangements for the long term protection of the offset areas within 12 months of the consent in consultation with OEH.

Finally, the DoE has advised it is generally satisfied that the proposed offsets would adequately offset the impacts of the development on key threatened species under the EPBC Act (i.e. Cobar Greenhood Orchid, Winged Peppercress, Malleefowl and South-eastern Long-eared Bat), subject to the provision of further detail about the specific management and monitoring measures for these species. DoE has agreed that this information should be provided in the Biodiversity Management Plan for the development prior to commencing construction on the site. The Department has incorporated DoE's requirements in the recommended conditions of consent.

Conclusion

The Department acknowledges that the development would require clearing of over 4,000 ha of native vegetation which includes habitat for a number of threatened species. However, the Department notes that much of the vegetation to be cleared is in poor condition, and is satisfied that Cristal has investigated all reasonable and feasible measures to avoid and/or minimise the biodiversity impacts of the development.

The Department is also satisfied that the implementation of the biodiversity offset strategy, coupled with the VMAs, would adequately offset any residual impacts associated with this clearing and improve (or at least maintain) the conservation values in the region in the medium to long term.

To ensure this occurs, the Department has recommended that Cristal be required to:

- prepare and implement a comprehensive Biodiversity Management Plan in consultation with OEH and DoE, including a Vegetation Clearance Protocol and a Threatened Species Management Protocol;
- provide suitable habitat for the threatened fauna species confirmed and identified as being potentially present in the disturbance areas;
- provide for the long term conservation of the proposed offset area within 12 months;
- manage the VMAs over the life of the development; and
- lodge a substantial conservation and biodiversity bond to ensure that the offset areas are established and maintained to the satisfaction of the Secretary.

6.2 Traffic and Transport

Introduction

Cristal engaged GTA Consultants to prepare a Road Transport Assessment for the development. The assessment was prepared in accordance with the RTA's *Guide to Traffic to Traffic Generating Developments* and *Road Design Guide* and included a Road Safety Audit for the Balranald-Ivanhoe Road.

In response to issues raised by RMS and both Councils, Cristal also undertook a *Pavement Condition Assessment* for the Balranald-Ivanhoe Road, which was used to inform discussions in relation to the road maintenance agreements. A copy of the Pavement Condition Report is provided at Appendix E of this report.

Existing Road Network

The existing road network in the vicinity of the mine and rail facility is shown in Figure 12. The state roads in the vicinity of the sites include the Sturt Highway (SH14), which runs generally in a east-west direction to the south of the proposed development, the Cobb Highway (SH21), which provides a south-east to north-west link between the Victorian border and Wilcannia, and the Silver City Highway (SH22), which runs in a north-south direction to the west of the development.

The key regional road in the vicinity of the site is the Balranald-Ivanhoe Road (MR 67), which provides access between the Sturt Highway in Balranald to the Cobb Highway at Ivanhoe. It is a two-lane road and has a sealed surface for a length of 103 km to the north of Balranald. North of this point, the road includes sections of unsealed (for a length of 37 km). The road is an approved route for road trains (Type 1) and is maintained by both Balranald and Central Darling Shire Councils.

The remainder of the roads in the vicinity of the sites are local roads, which are also managed by the Councils. These include Hatfield-The Vale Road, Magenta Road, Link Road and Boree Plains-Gol Gol Road. These roads are unsealed with poor road surfaces that do not allow for wet weather access or for two large vehicles to pass at speed.

Recent traffic counts on the roads in the vicinity of the sites indicate that existing daily traffic volumes were very low and that there is negligible growth in traffic movements. Balranald-Ivanhoe Road is the busiest of the surrounding roads, with traffic volumes of up to 50 vehicles/day. Most of the vehicles on this road are light vehicles, with a small proportion (up to 7%) comprising road trains. The local roads currently experience very low daily traffic counts (up to 20 vehicles/day).

Traffic Impacts

The key impacts on the road network as a result of this development relate to vehicle movements from employees/contractors and road train movements associated with the transportation of mineral concentrate from the mine to the rail facility.

The maximum workforce is predicted to be about 300 during construction and 200 during operation. The majority of employees would work on a shift basis and reside in the accommodation camp, with only 22% of workers traveling to and from the site each day.

The transportation of mineral concentrate would require a maximum of 24 road train trips (48 movements) over a 24 hour period, 7 days per week.

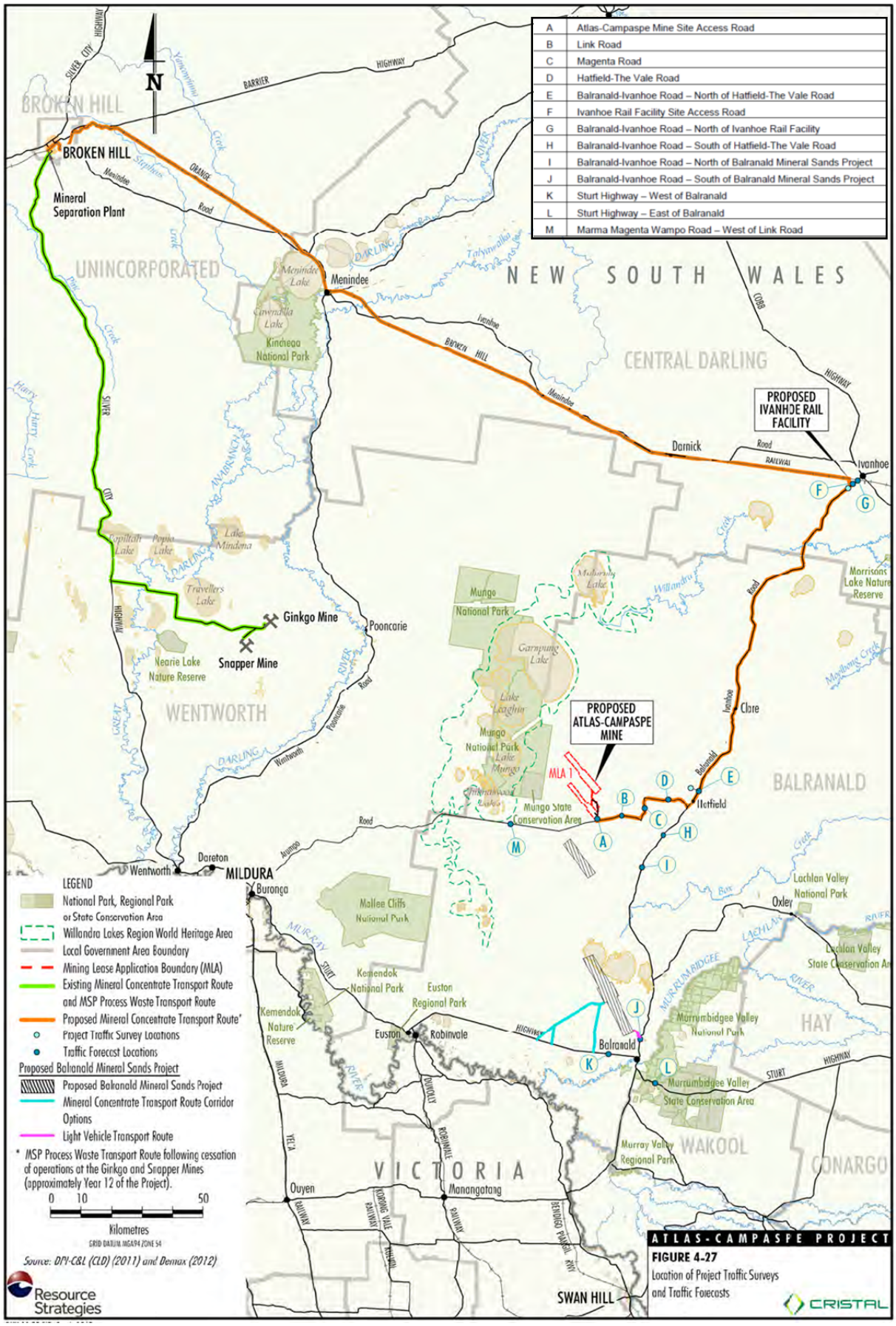

Figure 12: Existing Road Network (including proposed Haulage Route)

A comparison of the existing and predicted traffic volumes on the local and regional roads during both construction and operations of the development is shown in Table 5.

Table 5: Predicted traffic volumes

Road	Existing		Predicted Construction		Predicted Operation	
	Light	Heavy	Light	Heavy	Light	Heavy (MCT)
Local roads (Hatfield-The Vale Road, Magenta Road, Link Road and Boree Plains-Gol Gol Road)	13	7	241	17	169	17 (48)
Balranald-Ivanhoe Road (north of Hatfield-The Vale intersection)	29	15	128	19	87	22 (48)
Balranald-Ivanhoe Road (south of Hatfield-The Vale intersection)	29	15	220	25	159	28 (0)
MCT – Material Concentrate Transport via road trains						

During construction, the development is expected to result in an additional 238 vehicles/day on local roads, an additional 103 vehicles/day on Balranald-Ivanhoe Road (north of the Hatfield-The Vale intersection) and an additional 201 vehicles/day on Balranald-Ivanhoe Road (south of the Hatfield-The Vale intersection).

During operation, the development would result in an additional 214 vehicles/day on local roads, including 48 road trains transporting material concentrate and waste from the MSP (after Year 12). Balranald-Ivanhoe Road would experience around 113 additional vehicles/day north of the Hatfield-The Vale intersection and 143 vehicles/day on south of the Hatfield-The Vale intersection.

Due to the very low existing traffic volumes on the surrounding network, the predicted traffic volumes are considered significant.

Road Upgrades

Cristal has proposed a range of road works along the proposed mineral concentrate route (see Figure 13) to accommodate the predicted traffic volumes and allow for transportation of mineral concentration in road trains. As shown in Figure 13, the upgrade, realignment and intersection works include:

- upgrade of intersection with Hatfield-The Vale Road and Balranald-Ivanhoe Road;
- road widening and drainage works along Hatfield-The Vale Road (14.5 km), Magenta Road (2 km and 1 km), Boree Plains-Gol Gol Road (5.5 km), and Link Road (8 km);
- constructing new unsealed roads between Hatfield-The Vale Road and Magenta Road (2 km) and Magenta Road and Boree Plains-Gol Gol Road (2 km);
- sealing and drainage works along Magenta Road (2 km); and
- constructing new intersections at Hatfield-The Vale Road and Magenta Road; Magenta Road and Boree Plains-Gol Gol Road; Link Road and the site access road; and the rail facility access road and Balranald-Ivanhoe Road.

Cristal has agreed to pay the full costs of these road upgrade and intersection works. RMS, BSC and CDSC are satisfied that these works are necessary and required prior to the transportation of concentrate associated with the development. The Department has recommended a condition to reflect this and to ensure that the works are undertaken to the satisfaction of the relevant Council and RMS.

In relation to the 37 km section of partially unsealed road along Balranald-Ivanhoe Road, RMS has indicated that, given the nature of the proposed development and its economic importance to the region, the State government will allocate $4.7 million over a 5 year period as a contribution towards sealing this section of road. This funding is contingent on the approval of this development. RMS has indicated that the Councils would be responsible for managing the sealing of this section of road.

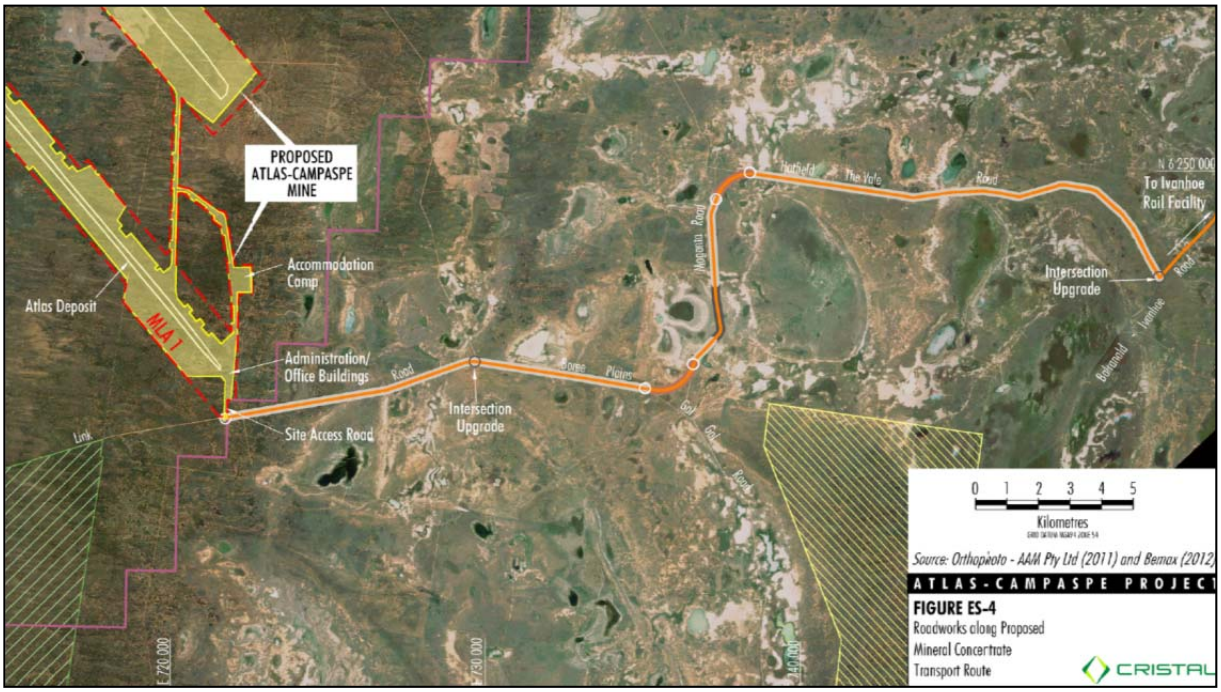

Figure 13: Road upgrade and intersection works

Road Works

In addition to the road and intersection upgrades, the Road Safety Audit in the EIS identified a range of road safety deficiencies along Balranald-Ivanhoe Road. These included safety issues associated with unprotected watercourses, inconsistent guideposts, poor line marking, lack of curve guidance, lack of raised pavement markers and unprotected headwalls. The audit ranked the deficiencies into high, medium and low risk and recommended that the high risks should be addressed as a matter of priority.

Cristal, CDSC and BSC have agreed that the issues identified along Balranald-Ivanhoe Road are required to ensure the safety of existing and proposed road users. Consequently, each party has agreed to pay 33% of the costs to rectify these issues. In addition, in response to a request from RMS, the Councils (as the relevant road authority) have agreed to rectify the high priority risks prior to the haulage of any concentrate from the development. The Department has recommended a condition requiring Cristal to pay its share of the costs to rectify the high-risk deficiencies within 3 months of this work being completed by the respective Councils.

All parties have agreed to rectify the other medium and low risk deficiencies as part of ongoing maintenance works along Balranald-Ivanhoe Road (as discussed below).

BSC raised safety concerns about the use of the haulage route during significant rain events/flooding and indicated that it reserves the right to close local roads when deemed impassable or unsafe. Cristal agreed to cease transportation operations when adverse weather affects the safety of the haulage route on local roads. The Department has recommended a condition requiring a Road Transport Protocol, which reflects this requirement, to be included in the Transport Management Plan for the development.

RMS also requested that Cristal address measures to manage potential fatigue of workers travelling to and from the development site following long shifts. The Department understands that the majority of the workforce would utilise the proposed accommodation camp at the mine, and that this would reduce the number of worker trips to and from the mine. However, the Department is aware that workers often travel over large distances at the start and end of each roster period and that these trips often occur just prior to or after long work shifts. Consequently, the Department has recommended that Cristal also incorporate measures to manage fatigue of workers during these long trips in the Transport Management Plan for the development.

Road Maintenance

Cristal has undertaken extensive negotiations with RMS, BSC and CDSC in order to address concerns in relation to ongoing road maintenance costs along the haulage route, including Balranald-Ivanhoe Road as well as the local roads that would be used for access to and from the development.

The *Pavement Condition Assessment* for the Balranald-Ivanhoe Road (see Appendix E) estimated costs for the maintenance activities including reseals, light and heavy patching and stabilisation works over a 20 year period to reflect the estimated life of the development. These costs were then applied to the proportional length of roads within each of the LGAs.

It is important to note that the assessment assumed that the 37 km of partially unsealed road along the Balranald-Ivanhoe Road had been sealed.

The assessment estimated that over the life of the development, $1.29 million of incremental road maintenance costs would be incurred in the Central Darling LGA and $8.41 million of incremental road maintenance costs would be incurred in the Balranald LGA as a result of the development. Cristal has proposed that these incremental road maintenance costs be paid to the respective Councils in annual contributions based on an agreed rate of dry tonne of mineral concentrate transported. Cristal proposes that this equates to $0.21/dry tonne to CDSC and $1.36/dry tonne to BSC. The different rates are justified because of the poorer condition and longer length of the haulage route within the Balranald LGA.

Both BSC and CDSC have advised the Department that they support the methodology used to calculate the maintenance contributions and that they agree to the proposed funding arrangements. The Department has recommended conditions that reflect the agreed road maintenance contributions.

Both Councils raised concerns about ongoing maintenance requirements and funding for other local roads (other than those on the haulage route) that could be used by contractors and/or employees associated with the development. To ensure that the development does not impact other local roads, Cristal committed to ensuring its employees only use the haulage route for access to and from the site, and the Department has reflected this restriction in the recommended conditions.

Rail Traffic

The development would require a maximum of 3 return train trips per week to transport mineral concentrate from the proposed rail facility to the existing Broken Hill MSP. Cristal proposes that not more than one train would be loaded and transported to the MSP in any 24 hour period.

ARTC confirmed that there is sufficient capacity to accommodate the proposed train trips on the rail network, and that the proposed increase in train trips would not have a material effect on any other services that operate on the network.

The Department is satisfied that the additional train trips are minor and can be readily accommodated on the existing network.

Conclusion

The Department acknowledges that the increase in traffic on the haulage route would be significant. However, with the implementation of the proposed road and intersection upgrades, the Department is satisfied that the increase in traffic can be accommodated safely on the local and regional road network. It is also satisfied that the proposed road maintenance contributions would ensure that Council has sufficient funding available to maintain and/or repair any damage to roads along the haulage route as a result of the development.

To ensure this is the case, the Department has recommended a suite of conditions requiring Cristal to:

- complete the upgrade, realignment and intersection works for the local roads along the haulage route prior to operations to allow safe use of the roads by road trains;
- rectify any ‘high risk’ deficiencies identified in the Road Safety Audit prior to any mineral concentrate being transported;
- rectify any medium and low risk deficiencies are part of the relevant road authorities ongoing road maintenance program;
- pay annual road maintenance contributions to both BSC and CDSC for the life of the development;
- prohibit the use of development-related traffic using local roads to access the site other than roads that form part of the haulage route, except in emergencies; and
- prepare a comprehensive Transport Management Plan including a Road Transport Protocol.

6.3 Water Resources

Introduction
The development has the potential to affect existing water resources in the vicinity of the mine due to the:

- extraction of groundwater from the proposed borefield;
- in-pit dewatering;
- infiltration of water through process wastes; and
- alterations of surface water flow regimes.

Cristal engaged GEO-ENG to prepare a Hydrogeological and Water Supply Assessment for the development. This assessment was peer reviewed by Heritage Computing (Dr Noel Merrick). Dr Merrick concurs with the report's conclusions and the proposed management, mitigation and monitoring measures. Evans & Peck was engaged to prepare a Surface Water Assessment for the development.

Water Balance
GEO-ENG indicates that the total water supply requirement for the development would be up to 115 litres per second (L/s) during mining of the Atlas deposit and up to 180 L/s during mining of the Campaspe deposit.

This demand would be met by extracting groundwater from a borefield located within the Atlas mine and dewatering of the mine path within both deposits. At full development, up to 13 production bores are proposed to be installed with each producing up to 50 L/s. GEO-ENG indicates that a maximum dewatering rate of 300 L/s would occur in year 4 for the Atlas deposit and 160L/s in Year 12 for the Campaspe deposit. On an annual basis, the maximum groundwater take for the development would be 6,528 ML in Year 11.

The *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Groundwater Sources 2011* (WSP) applies to the Altas-Campaspe mine as well as Cristal's Gingko and Snapper mines. The Water Sharing Plan allows licences held by Cristal to be traded between these mines. Cristal currently holds combined entitlements allowing extraction of up to 21,442 ML a year of groundwater. However, the maximum cumulative groundwater take from all of its operations within the porous rock water source would be 19,442 ML a year.

Consequently, both the Department and NOW are satisfied with the water supply arrangements and that Cristal has sufficient water entitlements for all stages of the development. Nonetheless, in accordance with standard conditioning of mines in NSW, the Department has recommended that Cristal be required to ensure that it has sufficient water entitlements for all stages of the development, and if necessary, adjust the scale of operations to match its available licences and allocation.

Surface Water
The site is located in a semi-arid climate and any surface runoff is highly ephemeral. The mine site contains no defined watercourses other than a few minor drainage lines that drain from the south-eastern end of the Campaspe deposit towards a relic lake depression. The landforms comprise gentle slopes and numerous closed depressions which temporarily pond after significant rainfall.

Evans & Peck indicate that the landforms and the semi-arid climate combine to provide conditions in which the risk of off-site surface water impacts is minimal. Nonetheless, Cristal proposes to implement a range of standard best practice erosion and sedimentation control measures during construction and operations to minimise any risk of contamination of water resources.

The assessment also indicates that there are likely to be some minor changes in hydraulic properties on the site, with localised changes in water flow direction and reduced infiltration rates. In these areas, Cristal has committed to placing clay materials in low-lying portions of the re-profiled landform to reinstate the water holding capacity of the substrate, thereby minimising the risk of significant surface ponding.

Cristal indicates that water is not proposed to be extracted from a regulated surface water source within the Benanee basin or any unregulated water sources such as rivers and lakes. All runoff captured within the site would be either within harvestable rights or would be excluded works under the *Water Management Regulation 2011*. Therefore, no surface water licences are required for the development.

The Department and NOW are satisfied that the potential impact of the proposed development on surface water systems would be limited due to the arid environment and the distance of the operations from any significant surface water resources. Nevertheless, the Department has recommended that a Surface Water Management Plan be prepared and implemented for the development to ensure any localised impacts are appropriately managed and monitored.

Groundwater

Groundwater in the area is contained in shallow unconsolidated geological layers and generally ranges from 10 to 30 metres below the surface. As the groundwater is saline, there is no significant demand for this source in the region with the relevant aquifers generally under allocated.

GEO-ENG indicates that 7 registered groundwater bores are located within 20 km of the mine site. Three of these are managed by NOW for monitoring purposes and only 1 of the remaining 4 bores is a potentially active privately-owned bore (located 7 km northeast of the mine). The lack of active bores in the region is reflective of the poor quality of the groundwater resource in the region.

The average depth to groundwater in the vicinity of the Atlas and Campaspe mines is 20 metres. The majority of the ore bodies in both deposits are located above the groundwater table. However, there are substantial sections of the mine path where the groundwater table is located below the ore body (2.9 km in Atlas deposit and 7.4 km in the Campaspe deposit).

Cristal proposes to install localised dewatering systems to dewater the ore body where it lies below the groundwater table. The dewatering would require the installation of bores, spear points and in-pit sumps. Modelling predicts some minor drawdown as a result of localised dewatering and extraction of groundwater from the borefield. A maximum drawdown of 1 metre is predicted 2 km from the Atlas deposit (Year 5) and a maximum drawdown of 1 metre is predicted 2.9 km from the Campaspe deposit (Year 20) (see Figure 14).

GEO-ENG indicates that the predicted drawdowns would not affect any privately-owned bores. Nonetheless, in accordance with contemporary practice for mines in NSW, the Department has recommended a condition requiring Cristal to provide compensatory water supplies to any landowner whose water entitlements are adversely affected by the development.

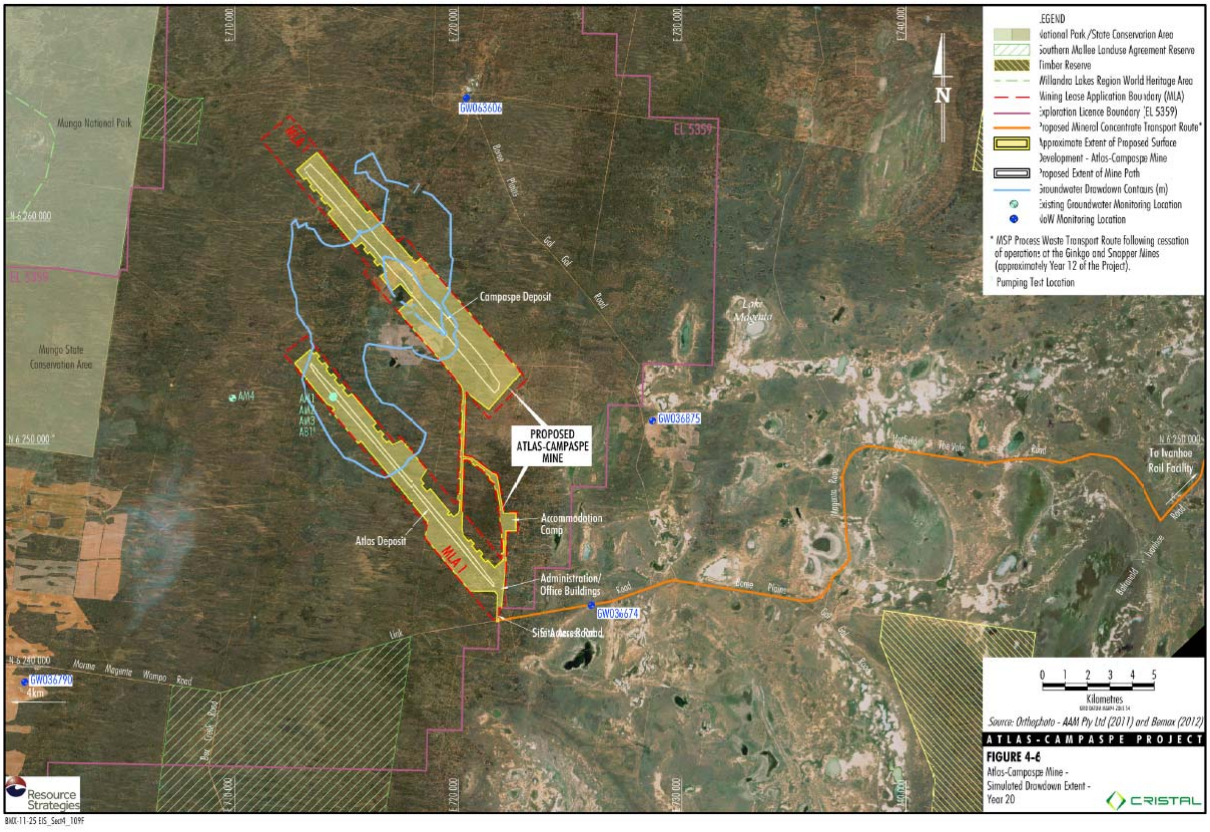

Figure 14: Maximum extent of groundwater drawdown (Years 5 and 20)

GEO-ENG also indicates that the predicted drawdown would not extend to the Willandra Lakes Region World Heritage Area or Mungo National Park, and that there are no high priority groundwater dependent ecosystems (GDEs) within the Western Murray Porous Rock Groundwater Source. It is further considered unlikely that there would be any GDEs at the mine site as the groundwater table is relative deep (20 metres) and there is no evidence of any perched water tables. Consequently, the Department is satisfied that the proposed development does not pose any risk to water resources associated with the World Heritage Area, Mungo National Park, or GDEs.

The water balance indicates that there may be some excess water as the mine progresses, particularly when the ore body lies below the groundwater table. Excess water would be stored in water disposal dams which are designed to allow water seepage into the underlying groundwater system via infiltration. On average, about 140 L/s of excess water would be returned to the deep underlying groundwater system over the life of the development.

This relatively small increase in potential infiltration would add fresher water to the saline groundwater aquifer. NOW and the Department accept that given the existing higher salinities of the deep groundwater aquifer and relatively minor volumes of recharge via infiltration, there would be no appreciable change in groundwater salinity as a consequence of mining.

Finally, Cristal is proposing that a final void would remain at the north western extent of both the Atlas and Campaspe footprints (see Figure 15 below). NOW raised concerns about ongoing groundwater take from the voids from capillary rise. In response, Cristal confirmed that the minimum depth to the groundwater table from the base of the Atlas and Campaspe final voids would be 5.3 metres and 11.8 metres, respectively. This is significantly more than the typical capillary rise in sand (which is 1 metre) and would prevent direct evaporation from the groundwater aquifer. NOW is satisfied that the design of the voids would prevent the potential for ongoing groundwater take.

NOW has confirmed that the groundwater impacts meet the Level 1 minimal impact considerations as specified under the *Aquifer Interference Policy* for less productive groundwater sources and that the impact is therefore considered acceptable. However, NOW recommended that Cristal be required to install additional monitoring bores prior to the commencement of operation, and proposed that these bores be used for model calibration, predictions of mine inflow and review of groundwater drawdown impacts.

In response, Cristal indicated that it proposes to install 5 additional bores in the vicinity of the site to monitoring drawdown and confirm groundwater impact predictions. Cristal proposes that the final location of these bores would be determined in consultation with NOW.

The Department and NOW are satisfied with the proposed groundwater monitoring program and the Department has recommended that it be detailed in a comprehensive Groundwater Management Plan.

Given the limited drawdown, the small number of groundwater users in the area, and the measures proposed by Cristal, the Department and NOW are satisfied that the proposed development would not result in any significant or permanent impacts on groundwater resources in the area.

Conclusion

The Department is satisfied that the proposed development is unlikely to significantly impact local and regional surface water and groundwater resources, and that the development can be suitably managed to ensure an acceptable level is environmental performance.

To ensure this occurs, Department has recommended that Cristal be required to:

- obtain sufficient water licences for the development;
- provide compensatory water supply to any landowner whose water supply is adversely affected by the development;
- ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of mining operations on site to match its available water supply;
- prepare a detailed Surface Water Management Plan for the development, which includes:
  - baseline data;
  - detailed description of the water management system;
  - detailed performance criteria and trigger levels;
  - a program to monitor and report on the surface water impacts of the development; and

  - a contingency plan to respond to any unpredicted impacts;
- prepare a detailed Groundwater Management Plan for the development, which includes:
  - baseline data on groundwater levels, yield and quality in the region, and privately-owned groundwater bores, that could be affected by the development;
  - groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts;
  - a program to monitor and report on the impacts of the development;
  - a program to validate the groundwater model for the development; and
  - a plan to respond to any exceedances of the groundwater assessment criteria.

6.4 Rehabilitation

Cristal proposes to restore the disturbed area to a self-sustaining ecosystem that is characteristic of vegetation communities cleared by the development (see Figure 15). Post-mining it is proposed that the rehabilitated sites would be used for either light intensity grazing or for nature conservation purposes.

The final landform has been divided into four key domains for rehabilitation purposes; off-path overburden emplacements; mine paths; final voids; and infrastructure and facilities areas.

The off-path overburden emplacements would be stabilised and constructed to a maximum height of 20 metres with batters of 1:7 slope and revegetated. Revegetation would commence within 12 months of the mining areas becoming available for rehabilitation, with revegetation occurring annually during late autumn/early winter.

The mine path would be progressively backfilled with overburden as mining advances and would include the encapsulated cells of MSP process waste material. The Atlas and Campaspe deposits would include overburden emplacements of 10 metres in height, with the remainder of the mine path being level with the existing ground level (with the exception of the final void). The overburden emplacements would be used to cover the MSP process waste cells.

Following mining, a final void would remain in each of the deposits. The final voids would be relatively shallow with a maximum depth of approximately 15-20 metres and a width ranging from 730 to 1,050 metres (see Figure 16). The final voids would be partially backfilled with overburden material with the depth of the voids remaining above the groundwater table.

All the surface facilities would be dismantled and decommissioned once mining operations are complete. Water management infrastructure including water storage dams, water disposal dams and off-path sand residue dams would be rehabilitated once no longer required. As the sand residue dams would contain saline material, the rehabilitation of these dams would be a similar process to that of the mine path overburden emplacements that would contain MSP process waste to minimise the potential for seepage. All groundwater bores would be decommissioned once mining operations are complete, unless otherwise agreed with the landowner/leaseholder.

Both the Department and NSW Trade & Investment are generally satisfied with the rehabilitation and final landform proposed by Cristal, and believe that the both conservation and light grazing activities are in keeping with the surrounding landscape. Both agencies agree that the precise final land use activity can be determined later in the life of the development.

To ensure the outcomes outlined in the EIS are achieved, the Department has imposed a range of rehabilitation objectives and a requirement for Cristal to prepare and implement a detailed Rehabilitation Management Plan (in consultation with NSW Trade & Investment) that must demonstrate how the rehabilitation objectives would be achieved.

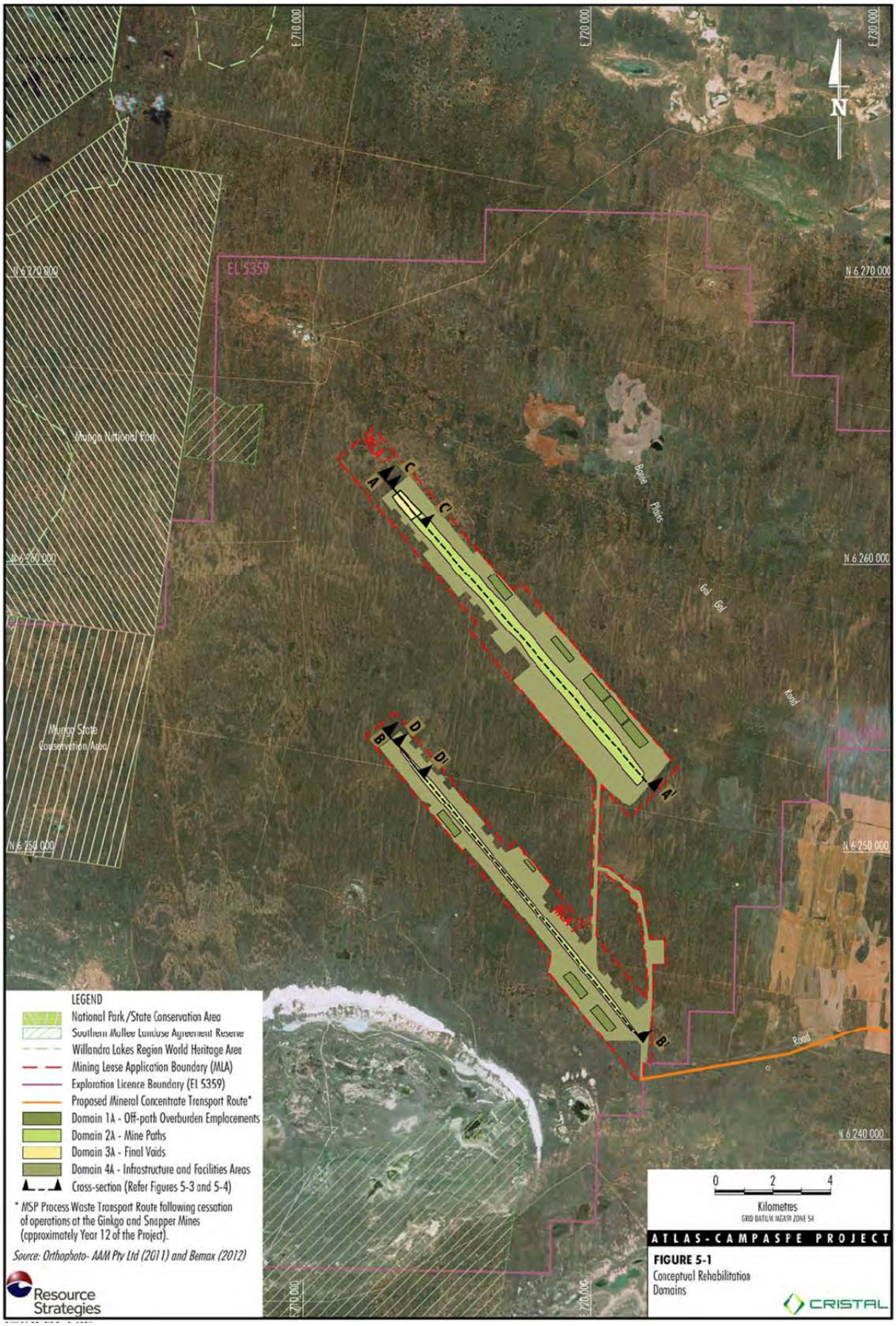

Figure 15: Conceptual rehabilitation plan

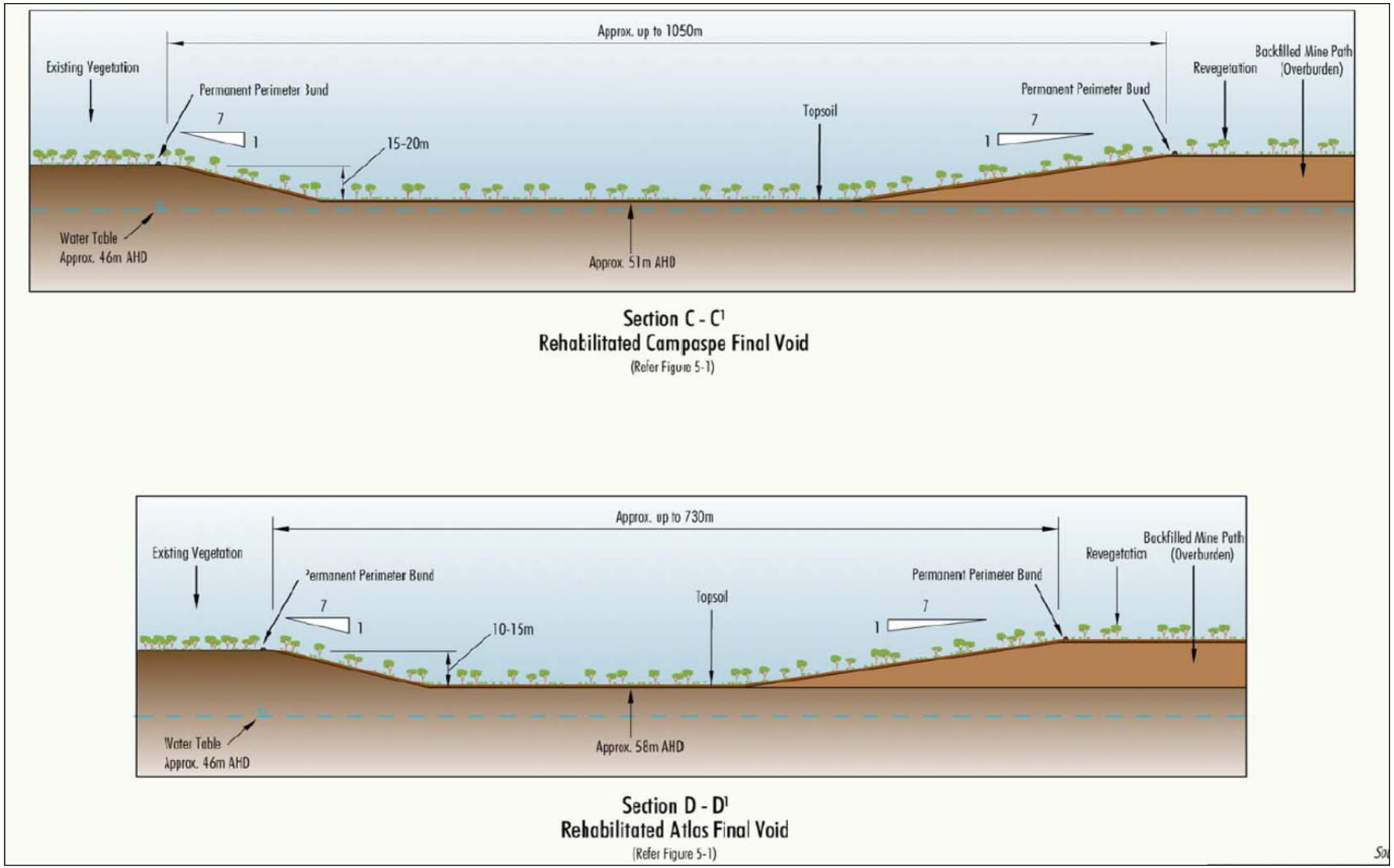

Figure 16: Cross-sections of Final Voids

6.5 Other Issues

Other impacts are not predicted to be significant, and the Department is satisfied that they can be controlled, mitigated or managed through appropriate conditions of consent. These impacts are addressed in Table 6 below.

Table 6: Assessment of Other Issues

Issue	Assessment	Conclusion/Recommended Conditions
Noise	• The EIS includes a Noise Impact Assessment (NIA), prepared by Wilkinson Murray in accordance with the *NSW Industrial Noise Policy.* • The NIA predicted noise associated with the construction and operation of the mine site and the rail facility, as well as with the road and rail transportation of mineral concentrate. • The closest privately owned residence to the mine site is located 7 km to the northeast. The closest residence to the rail facility is located 4.5 km to the west. • The construction and operational noise levels are predicted to be ***well below*** the project-specific noise criteria of 35 dB(A) for all receivers during the day, evening and night-time periods. • The operational noise levels are also well below the amenity criteria of 50 dB(A) at the Mungo National Park and the State Conservation Area. • No exceedances of the sleep disturbance criterion and no cumulative noise impacts are predicted. • Similarly, traffic noise levels at receptors located along the transport haulage route are predicted to be well below the relevant traffic noise criteria. • The development would generate an additional 6 train movements a week along the Orange-Broken Hill Railway line. The NIA indicates that this would result in a maximum peak noise increase of 0.7 dB(A), which is less than the EPA's 2 dB(A) requirement for investigating further noise mitigation measures as specified in the *Rail Infrastructure Noise Guideline* (EPA 2013).	• Given the remoteness of the mine and the rail facility, and the fact that the noise generated would be well below the applicable criteria, the Department is satisfied that the development would not result in any significant noise impacts on residents in the area. • Nonetheless, the Department has recommended conditions requiring Cristal to implement all reasonable and feasible measures to minimise noise, and prepare a Noise Management Plan for the development.
Air Quality	• The EIS includes an Air Quality & Greenhouse Gas Assessment, prepared by Katestone Environmental Pty Ltd in accordance with the EPA's *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*. • The assessment modelled potential dust impacts at the mine and rail facility, as well as potential impacts associated with the transportation of mineral concentrate. • Cristal proposes to implement standard dust mitigation and management measures at the mine, including the use of water carts, watering during topsoil removal, restricting activities during adverse weather conditions, minimising the areas to be disturbed and progressive rehabilitation. Cristal also proposes to cover concentrate trucks travelling on the haulage route. • With these measures in place the modelling results indicate that the particulate matter (PM_{10}), total suspended particulates and dust	• Both the Department and the EPA are satisfied that Cristal has adequately demonstrated that the development would not significantly impact local or regional air quality, and would comply with relevant EPA air quality criteria at all sensitive receivers. • The Department has recommended conditions requiring Cristal to implement all reasonable and feasible measures to minimise dust, and prepare an Air Quality Management Plan for the development.

Issue	Assessment	Conclusion/Recommended Conditions
	deposition levels are predicted to *well below* the EPA criteria under the worst case operating scenarios.	
Aboriginal Heritage	• The EIS includes an Aboriginal & Cultural Heritage Assessment, prepared by Niche Environment & Heritage in accordance with relevant OEH guidelines. • The assessment identified 100 Aboriginal sites within the mine and IRF development areas, along the haulage route and in the surrounding areas. These comprised stone artefacts, a scarred tree, hearths and middens. • Cristal modified the Campaspe deposit and rail facility disturbance footprints and realigned parts of the road upgrades to avoid several of these sites. • However, the assessment indicates that the development would still potentially disturb 28 of the identified sites, including 6 that are located within the mine footprint and 22 that are located along the haulage route. • Of these, 22 have been assessed as being of low significance, 3 of moderate significance and 3 of high significance. • The sites of high significance comprise large artefact scatters and hearth sites. However, these sites would only be partially disturbed by the development, and the Aboriginal representatives involved in the assessment have not objected to these impacts provided appropriate salvage occurs. • To this end, Cristal proposes to implement a range of measures to mitigate the impact of the development on Aboriginal heritage, including: - maintaining records of known sites; - further avoidance of sites, where practicable; - marking known sites outside of the disturbance footprint to reduce the risk of accidental disturbance; and - conducting baseline recording and salvaging sites for safekeeping, in consultation with the Aboriginal community. • The assessment indicates that the development would not impact the natural or cultural heritage values of the Willandra Lakes World Heritage Area, primarily due to its location 10 km from the mine site.	• OEH has indicated that it is satisfied with the level of assessment and consultation undertaken in relation to Aboriginal heritage and the mitigation and management measures proposed. • The Department has recommended a condition requiring a Heritage Management Plan to be developed in consultation with the Aboriginal communities and OEH.
Non-Indigenous Heritage	• The EIS includes an Aboriginal & Cultural Heritage Assessment, prepared by Niche Environment & Heritage in accordance with the relevant guidelines. • The assessment indicates that there are no registered state or regional heritage items within the development area. • However, two potential local heritage items were discovered during surveys, including a survey marker (comprising of a tree with engravings of an arrow and initials) and the remains of a domestic dwelling. • Both items considered to be of local heritage significance. • Neither of these heritage items would be impacted by the development.	• The Department is satisfied that the development would not impact on any items with non-indigenous heritage significance. • The Department has recommended a condition requiring a Heritage Management Plan to be developed.

Issue	Assessment	Conclusion/Recommended Conditions
Visual	• The development would result in both temporary and permanent changes to the landscape. Temporary changes are associated with stockpiles, workshop facilities, the accommodation camp and sediment dams. Permanent changes include overburden emplacements (up to 20 metres in height) and final voids. • The EIS indicates that due to the distance of the development from private residences (i.e. at least 7 km from the mine site and 4.5 km from the rail facility), views and visual impacts from these residences would be negligible. • The rail facility and mine would be visible to users of the surrounding road networks, but these views would be temporary and short duration. • The EIS includes a comprehensive assessment of potential visual impacts of the development on the Willandra Lakes World Heritage Area, including assessment using a 3D digital terrain model. The assessment concludes that potential visual impact on the World Heritage Area would be low because the: - it is generally situated at lower elevations than the mine; - intervening topography and existing vegetation shields views towards the mine; - distances of 10 km between the World Heritage Area and the mine provides a substantial visual buffer; and - there would only be relatively minor changes to landforms associated with the mine (i.e. up to 20 metres above natural ground level). • OEH raised concerns about the impacts from night lighting from the mine on the users of the Mungo National Park and World Heritage Area. • To address this issue, Cristal proposes to minimise night-lighting impacts by using directional lighting, light shrouds and reflectors.	• The Department is satisfied with the level of assessment undertaken in relation to visual and lighting impacts. • The Department believes the visual impacts of the development would be minor. • Nonetheless, the Department believes Cristal should be required to implement all reasonable and feasible measures to minimise lighting and night-glow impacts of the development. • The Department has recommended conditions accordingly.
Agriculture	• The EIS includes an Agricultural Impact Statement, which was prepared in accordance with the *Guidelines for Agricultural Impact Statements 2012.* • Existing land use in the vicinity of the mine site and rail facility is dominated by agricultural activities, predominantly low intensity grazing (sheep) and limited cropping. • These areas were mapped as Class 6 Land and Soil Capability due to a number of soil constraints to agricultural production, the low annual rainfall and the lack of irrigation water sources in the area. • The 16,540 ha of land proposed for the biodiversity offset is primarily used for grazing. • In the event that the final land use of the development area is nature conservation, the development (including the biodiversity offset area) would result in the sterilisation of 21,018 ha of agricultural land in the long term.	• The Department is satisfied that Cristal has adequately demonstrated that the development would have minimal impacts on agricultural resources and agricultural enterprises in the vicinity of the mine. • The Department has recommended a rehabilitation objective that requires the land to be either conserved or returned to beneficial agricultural uses post-mining.

Issue	Assessment	Conclusion/Recommended Conditions
	• Due to the overall low productivity on this land, both Department and OAS&FS agree that this is an acceptable loss of agricultural production, given the other conservations benefits that would ensue. • OAS&FS raised concerns about impacts of the development on the regional road network, which is relied upon by agricultural businesses in the area. • However, as stated in Section 6.2 above, the Department is satisfied that the proposed road upgrade works and the ongoing road maintenance contributions would adequately address these concerns.	
Greenhouse Gases	• The EIS includes Air Quality & Greenhouse Gas Assessment, prepared by Katestone Environmental Pty Ltd. • The assessment predicts that the development would generate around 0.045 $MtCO_2$-e of Scope 1 and 0.42 $MtCO_2$-e of Scope 2 and 3 emissions over the life of the mine. • Katestone indicates that this level of emissions is equivalent to 0.008% of Australia's annual emissions. • The assessment concludes that, on a comparative basis, the total GHG emissions from the development represent a very small proportion of Australia's current emissions, and when considered in isolation, the development would have a negligible contribution to global warming/climate change. • Cristal has committed to a range of measures to reduce GHG emissions from the development, including improving energy use and efficiency.	• The Department accepts that the GHG emissions generated by the development would be minor. • However, the Department has recommended a condition requiring Cristal to implement measures to minimise GHG emissions generated by the development.
Waste	The development would generate the following waste streams: - general waste and waste from workshop related activities; - sewage and wastewater from on-site facilities; - sand residues and course reject materials from on-site processing; - brine from the RO plant; and - MSP process waste. • General waste would be disposed of at waste depots operated by the respective Councils, and Cristal would be required to pay applicable user charges. • Both Councils and the EPA are satisfied with Cristal's proposal to treat sewage and wastewater from the mine's facilities in an on-site sewage treatment plant and via an on-site septic system at the rail facility. • Cristal engaged Radiation Advice & Solutions to undertake a Mineral Concentrate and Process Waste Material Assessment of the MSP process waste. The assessment indicated that the process waste from the MSP is likely to be classified as "hazardous" accordance with the *Waste Classification Guidelines Part 3: Waste Containing Radioactive Material* (DECC, 2008b) and a "radioactive substance" under the *NSW Radiation Control Act 1990*.	• The Department is satisfied that similar arrangements to transport and emplace MSP process waste have been effective at both the Ginkgo and Snapper mines, and the Department has recommended conditions to ensure these measures are adopted at the new development. • In addition, consistent with the existing approvals for the Ginkgo and Snapper mines, the Department has recommended that a Radiation Management Plan be prepared prior to the transportation of any waste from the MSP. • Subject to the implementation of this plan, the Department is satisfied that risks associated with the transportation and disposal of waste products can be appropriately and safely managed.

Issue	Assessment	Conclusion/Recommended Conditions
	• To minimise any potential adverse impacts associated with the transport and storage of this waste, Cristal propose to: - transport the waste in accordance with the *Code of Practice for the Safe Transport of Radioactive Material, ARPANSA 2008*; and - emplace the waste in cells within the overburden which are above the groundwater level, no closer than 10 metres from the ground surface and covered with 10 metres of overburden.	
Hazards and Risk	• A Preliminary Hazard Analysis (PHA) and Environmental Risk Assessment were undertaken by Cristal. • The PHA concluded that in accordance with the relevant guidelines, that residual risk levels are tolerable with respect to the surrounding development and do not preclude approval of the development.	• The Department is satisfied that identified hazards and risks identified in the PHA and risk assessment can be appropriately mitigated and managed for the development.
Socio Economic	• The EA includes a Social-Economic Assessment, which was undertaken by Gillespie Economics. • The assessment indicates that the development has the potential to increase the population of the region by up to 119, with corresponding increased demand for housing, schools, health and community infrastructure. Cumulative impacts with other resource development projects would increase the population of the region by up to 249. • The assessment indicates that this increase in population would partially offset some the population decline that the region has been experiencing and hence impacts on community infrastructure would be negligible. • The Benefit Cost Analysis (BCA) of the development indicated that it would have total net production benefits of $639 million (M), with $251 of these accruing in Australia. The BCA included the major environmental, cultural and social impacts of the development. • The development is also estimated to contribute: - direct and indirect employment opportunities, include 300 construction and 200 operational jobs; - a capital investment value of $198 million; - $279 million in annual direct and indirect regional output or business turnover; and - significant royalties and payroll tax to the State of NSW. • Cristal has also agreed to pay CDSC and BSC appropriate road maintenance contributions.	• The Department is satisfied that the development would have a positive socio-economic impact on the locality and region. • The Department is satisfied that the majority of the workforce would reside in the accommodation camp and that the development would have negligible impacts on local services. • Consequently, both Councils accept that additional community contributions are not warranted in this case. • The Department is satisfied that the road maintenance arrangements under the recommended conditions would adequately cover the impacts of the development on the local and regional road network.

7. RECOMMENDED CONDITIONS

The Department has prepared recommended conditions of consent for the proposed development (see Appendix F). These conditions are required to:

- prevent, minimise, and/or offset adverse impacts of the development;
- ensure standards and performance measures for acceptable environmental performance,
- ensure regular monitoring and reporting; and

- provide for the ongoing environmental management of the development.

The conditions recommended by government agencies and Councils have been incorporated where appropriate. The Councils and Cristal have reviewed and accepted the Department's recommended conditions.

8. CONCLUSION

The Department has assessed the merits of the development application, EIS, submissions on the development and Cristal's Response to Submissions, in accordance with the requirements of the EP&A Act.

Key issues arising from the Department's assessment of the development relate to:
- clearing of 4,158 hectares (ha) of native vegetation, including 198 ha of endangered ecological communities (EECs); and
- significant increases in traffic on local and regional roads, and the sub-standard condition of the existing roads for use by road trains.

The Department is confident that these impacts can be adequately mitigated, managed, offset and/or compensated through implementation of a number of commitments made by Cristal and conditions recommended by the Department, including:
- a comprehensive biodiversity offset strategy, which includes 16,540 ha of native vegetation that is located adjacent to the Mungo National Park and Mungo State Conservation Area;
- two large vegetation management areas, which include 1,380 ha of native vegetation that is located adjacent to the mine;
- significant road upgrade, realignment and intersection works to accommodate the increased traffic volumes and facilitate the safe use of road trains on the road network; and
- ongoing payment of road maintenance contributions by Cristal to the Balranald and Central Darling Shire Councils throughout the life of the development.

The Department has recommended a range of stringent conditions to ensure these measures are effectively implemented.

The Department also notes that the development has a number of significant economic and social benefits, including:
- direct and indirect employment, including 300 construction and 200 operational jobs;
- capital investment of $198 million;
- $95 million in royalties for the NSW Government; and
- significant flow on benefits and economic multiplier effects across the this part of regional NSW.

The development would also allow access to a significant mineral sands resource (around 109 Mt) and produce up to 450,000 tonnes a year of mineral sands concentrate, which represents around 40% of current production in NSW.

Overall, the Department considers that the Atlas-Campaspe Mineral Sands Project represents a logical extension of Cristal's operations in the Murray Darling Basin, as it would ensure the extraction of a valuable mineral sands resource and maximise the use of Cristal's existing processing facilities in the region without any significant environmental impacts that cannot be suitably mitigated, managed or compensated for.

Consequently, on balance, the Department considers that the benefits of the development significantly outweigh its potential impacts and that it is in the public interest, and should be approved subject to the recommended conditions of consent.

9. RECOMMENDATION

It is RECOMMENDED that the Executive Director, as delegate for the Minister:

- **considers** the findings and recommendations of this report;
- **approves** the development application, subject to conditions; and
- **signs** the attached instrument of consent (see Appendix F).

Michael 6.6.14

Mike Young
Manager
Mining Projects

6/6/14

David Kitto
Director
Mining Projects

6.6.14

Chris Wilson
Executive Director
Development Assessment Systems and Approvals

APPENDIX A
ENVIRONMENTAL IMPACT STATEMENT

Refer to the following Department of Planning & Environment website link:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5012

APPENDIX B
ENVIRONMENTAL PLANNING INSTRUMENTS

SEPP (State and Regional Development) 2011
The proposed development is 'State Significant Development' as it meets the definition of 'development for the purpose of mineral sands mining' under Clause 5 of Schedule 1 of the *State Environmental Planning Policy (State and Regional Development) 2011*.

SEPP No.33 – Hazardous and Offensive Development
The development is classified as a potentially hazardous development and a Preliminary Hazard Analysis (PHA) was undertaken as required by SEPP 33. The PHA demonstrated that the development would meet all the applicable criteria if the appropriate controls were implemented. Consequently, the Department is satisfied that the proposal is generally consistent with the aims, objectives, and requirements of SEPP 33.

SEPP No.44 – Koala Habitat Protection
This SEPP applies to the Central Darling LGA. The Department is satisfied that the development (i.e. the Ivanhoe Rail Facility) does not contain potential koala habitat and therefore is unlikely to affect koala habitat, and the development is generally consistent with the aims, objectives and requirements of SEPP 44.

SEPP No.55 – Remediation of Land
A preliminary investigation was conducted for the development and concluded that no further investigation was required. The Department is satisfied that the development area does not have a significant risk of contamination given its historical land-use, and that the development is generally consistent with the aims, objectives, and provisions of SEPP 55.

SEPP (Infrastructure) 2007
The Infrastructure SEPP requires the consent authority to notify relevant public authorities about developments that may affect public infrastructure on public land. In accordance with clause 104 of the Infrastructure SEPP, the Department referred the application to RMS, ARTC, Balranald and Central Darling Shire Councils. None of these agencies or Council's objected to the development and any recommendations made by these authorities have been considered by the Department and incorporated into the development consent were appropriate. This satisfied the requirements of the Infrastructure SEPP.

SEPP (Mining, Petroleum Production and Extractive Industries) 2007
Under clause 7 of the Mining SEPP, the development is permissible with consent. Part 3 of the Mining SEPP lists a number of matters that a consent authority must consider before determining an application for consent for development for the purposes of mining, including:

- the significance of the resource;
- certain non-discretionary development standards in relation to noise, air quality, blasting and aquifer interference;
- compatibility with other land uses;
- natural resource management and environmental management;
- resource recovery;
- transport; and
- rehabilitation.

The Department has considered all of these matters in its assessment report. Based on its assessment of the development, the Department is satisfied that the development is able to be managed in a manner that is generally consistent with the aims, objectives and provisions of the SEPP.

Central Darling LEP 2012
The zoning and permissibility of the development under the Central Darling LEP is addressed in Section 4.2 of this report. The development is permissible with consent in the RU1 and SP2 zones. There are no other provisions of the LEP that substantially govern the development, and the Department is satisfied that the development can be managed in a manner that is generally consistent with the aims, objectives and provisions of the LEP.

Balranald LEP 2010
The zoning and permissibility of the development under the Balranald LEP is addressed in Section 3.2 of this report. The development is permissible with consent in the RU1 zone. There are no other provisions of the LEP that substantially govern the development, and the Department is satisfied that the development can be managed in a manner that is generally consistent with the aims, objectives and provisions of the LEP.

APPENDIX C
SUBMISSIONS

Refer to the following Department of Planning & Environment website link:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5012

APPENDIX D
RESPONSE TO SUBMISSIONS

Refer to the following Department of Planning & Environment website link:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5012

APPENDIX E
ROAD CONDITION ASSESSMENT

APPENDIX F
RECOMMENDED CONDITIONS OF CONSENT