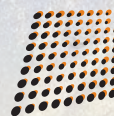


ATLAS-CAMPASPE MINERAL SANDS PROJECT

Preliminary Environmental Assessment

March 2012



BEMAX
RESOURCES LIMITED

ATLAS-CAMPASPE MINERAL SANDS PROJECT
PRELIMINARY ENVIRONMENTAL ASSESSMENT



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1 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

This document is a Preliminary Environmental Assessment for the proposed Atlas-Campaspe Mineral Sands Project (the Project). This document has been prepared to disseminate Project information to key State regulatory agencies, facilitate the discussion of issues that will need to be addressed during the environmental assessment process and initiate the preparation of the Director-General's Requirements (DGRs) under clause 3 of Schedule 2 of the New South Wales (NSW) *Environmental Planning and Assessment Regulation, 2000* (EP&A Regulation).

The remainder of this document is structured as follows:

- | | |
|-----------|--|
| Section 1 | Introduction – provides a background to the development of the Project and an overview of the proposed Project activities. |
| Section 2 | Local and Regional Context – summarises the local and regional context of the Project. |
| Section 3 | Project Description and Justification – provides a clear and concise description of the Project, indicates the types of activities that would be undertaken, includes a justification for the Project and summarises alternatives to the Project considered. |
| Section 4 | Planning Considerations – describes the permissibility of the Project and applicable statutory planning instruments and strategic planning documents. |
| Section 5 | Preliminary Environmental Assessment – identifies key environmental issues of particular relevance to the Project, provides an analysis of the likely nature and extent of potential impacts, and identifies the level and scope of environment impact assessment to be undertaken for the Environmental Impact Statement (EIS). |
| Section 6 | Stakeholder Consultation – outlines consultation (with the community, local councils and Government agencies) already undertaken and proposed to be carried out for the Project. |
| Section 7 | References – Lists documents referenced in Sections 1 to 6 |

1.2 BACKGROUND

The Project would comprise two components:

- the Atlas-Campaspe Mine (incorporating the Atlas and Campaspe open pits) - located approximately 80 kilometres (km) north of Balranald and 270 km south-west of Broken Hill in NSW (Figure 1); and
- the Ivanhoe Rail Facility - located approximately 135 km north-east of the Atlas-Campaspe Mine (Figure 1).

BEMAX Resources Limited's (Bemax) existing approved operations located in western NSW include (Figure 1):

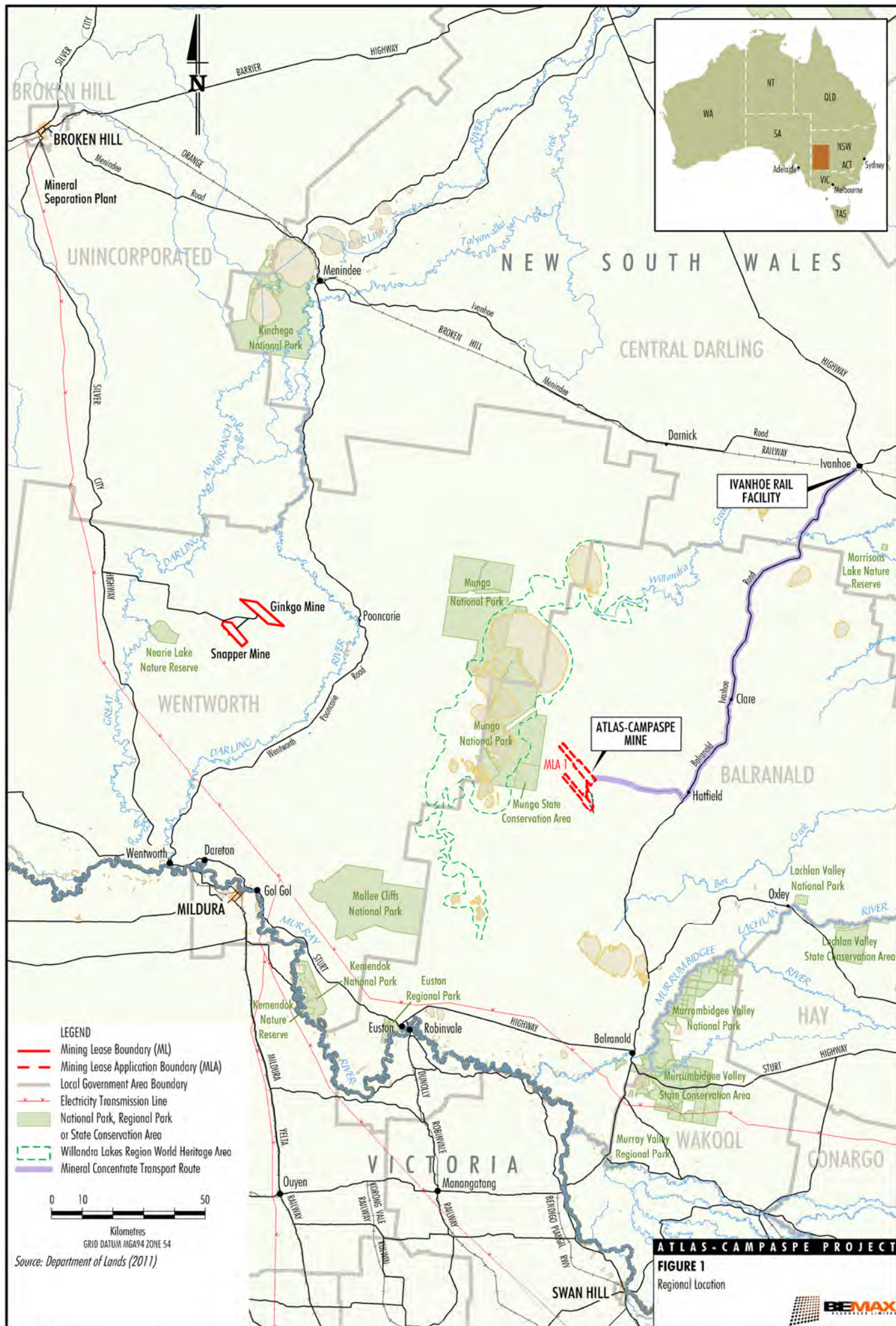
- the Ginkgo Mine located approximately 100 km to the west north-west of the Atlas-Campaspe Mine, which commenced operations in 2006;
- the Snapper Mine located approximately 105 km to the west north-west of the Atlas-Campaspe Mine, which commenced operations in 2010; and
- the Broken Hill Mineral Separation Plant (MSP) located approximately 270 km north-east of the Atlas-Campaspe Mine, which commenced operations in 2006.

1.3 PROJECT OVERVIEW

The Project involves:

- the construction and operation of the Atlas-Campaspe Mine;
- the construction and operation of the Ivanhoe Rail Facility;
- the road transport of mineral concentrates from the Atlas-Campaspe Mine to the Ivanhoe Rail Facility;
- the rail transport of mineral concentrates from the Ivanhoe Rail Facility to the MSP; and
- the rail and road transport of backloaded waste material from the MSP to the Atlas-Campaspe Mine for disposal behind advancing mining operations (once operations at the Snapper and Ginkgo Mines have ceased).

Bemax is seeking approval from the NSW Minister for Planning and Infrastructure for a new Development Consent under Part 4 of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act) for the Project.



Separate approvals would be obtained for the:

- the processing of Project mineral concentrates at the MSP, after it is railed from the Ivanhoe Rail Facility;
- the disposal of MSP process waste generated from the processing of Project mineral concentrates at the Ginkgo and Snapper Mines; and
- any road upgrade works required along the mineral concentrate transport route (outside the Development Application Area).

Mining would be sequential, with mining of the Atlas open pit followed by mining of the Campaspe open pit, both within Mining Lease Application (MLA) 1. Major Project activities would include:

- clearance of vegetation and stripping soils on a campaign basis ahead of the advancing mine operation;
- overburden stripping and direct placement;
- assembly of the dry mining unit (DMU) and primary gravity concentration unit;
- mining of ore by conventional mobile equipment (i.e. dozers and/or front end loaders) depositing ore in the DMU¹;
- ore concentration in the primary gravity concentration unit to produce HMC;
- stockpiling of HMC;
- salt washing utilising desalinated water;
- supply of water from the borefield;
- supply of desalinated water from the reverse osmosis (RO) plant for HMC washing;
- HMC separation via the wet high intensity magnetic separation (WHIMS) circuit to produce three types of mineral concentrates (i.e. ilmenite-rich, leucoxene-rich and non-magnetic [rutile-rich and zircon-rich] concentrates);
- stockpiling of mineral concentrates;
- construction and operation of the Ivanhoe Rail Facility;
- transport of mineral concentrates to the Ivanhoe Rail Facility;
- placement of wastes from the primary gravity concentration unit (i.e. sand residues) at the rear of the active mining area as mining advances along the mine path;
- treatment of process water to remove fines material;
- the rail and road transport of backloaded waste material from the MSP to the Atlas-Campaspe Mine for disposal behind advancing mining operations (once operations at the Snapper and Ginkgo Mines have ceased);
- construction of initial sand residue dams;
- construction of initial overburden emplacements;
- construction of an accommodation camp;
- construction of internal and access roads;
- construction of ancillary facilities including a sewage treatment plant (STP), workshops, ablutions and administration facilities;
- replacement of overburden on top of the sand residues; and
- staged replacement of soils and progressive rehabilitation of the mine path behind the advancing mining operation.

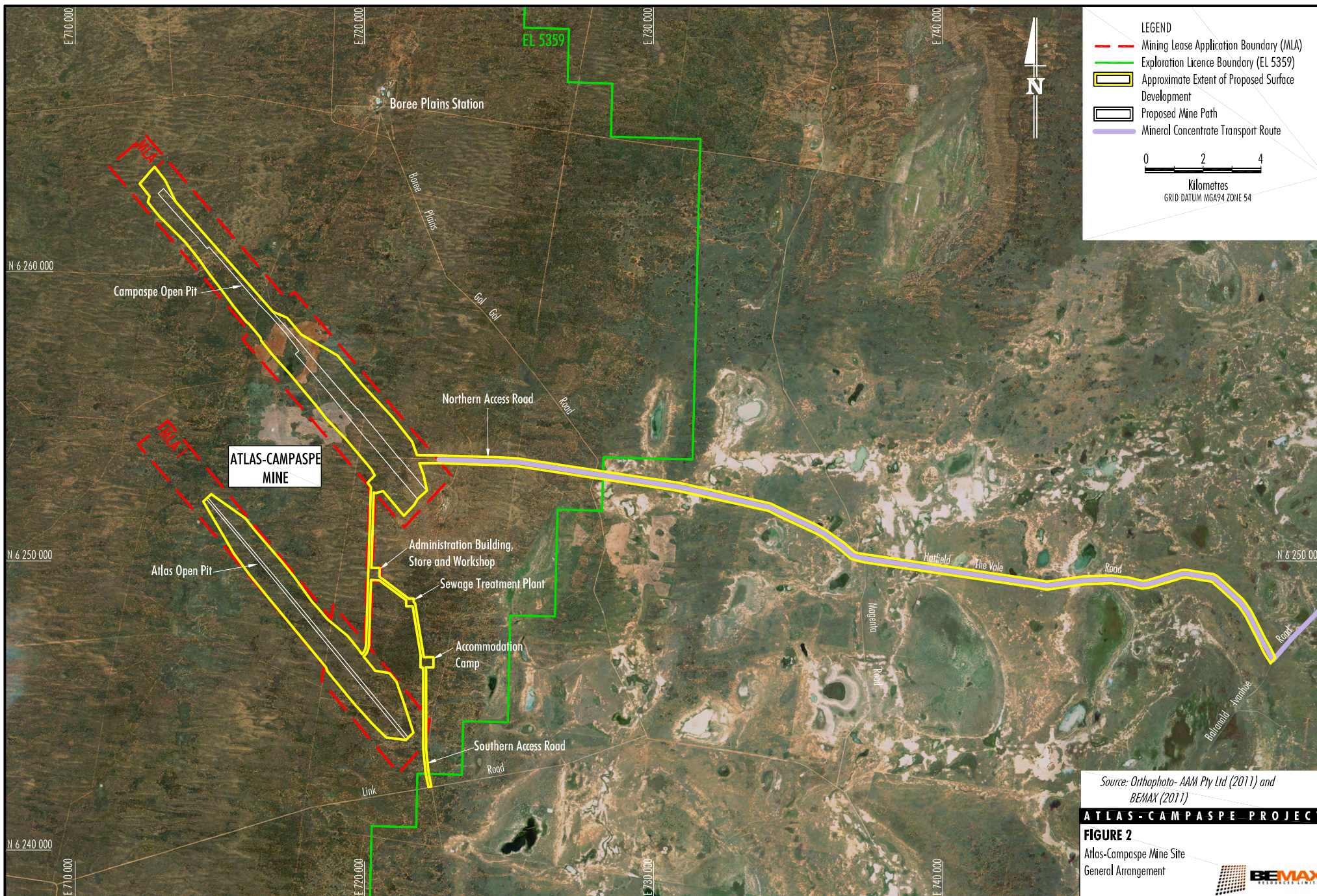
An indicative Atlas-Campaspe Mine general arrangement is shown on Figure 2 including locations of ancillary infrastructure. Figure 3 shows the indicative general arrangement for the Ivanhoe Rail Facility. Additional details of each of the main Project components are provided in Section 3.2.

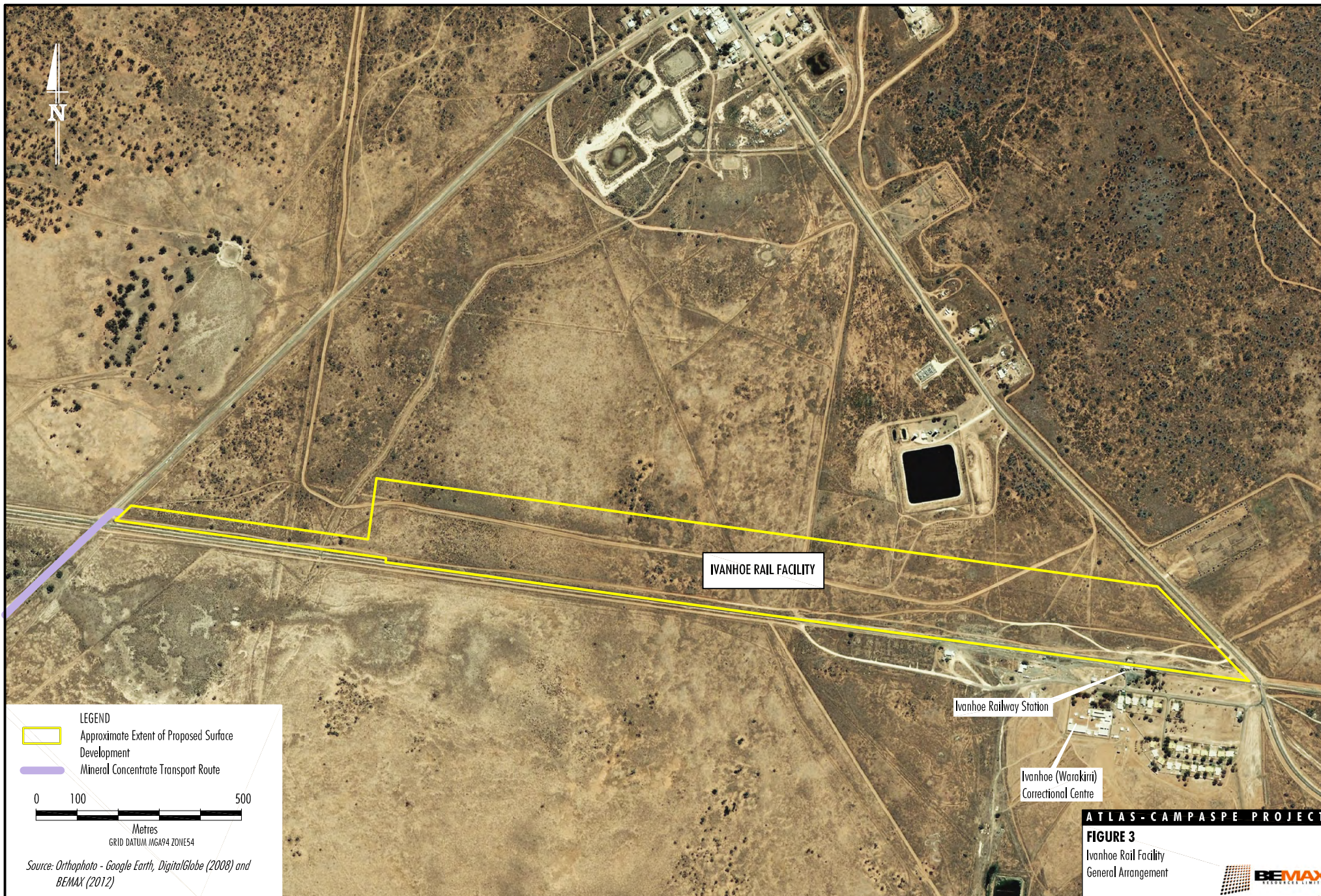
Mineral Concentrate Transport Route

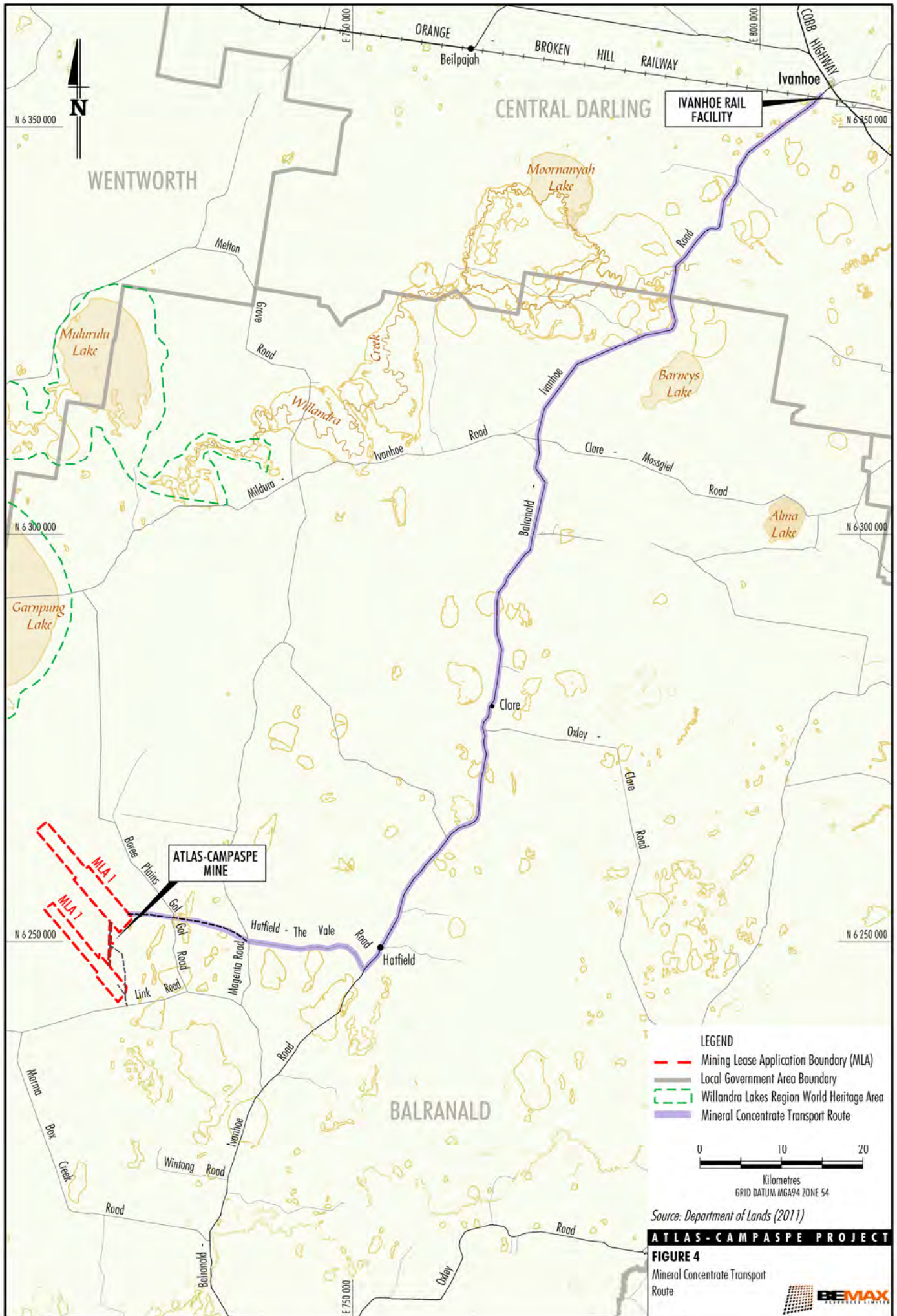
Mineral concentrate would be transported to the Ivanhoe Rail Facility via the mineral concentrate transport route (Figure 4).

Mineral concentrate transport would be undertaken using double road trains or other NSW Roads and Maritime Services (RMS)-approved vehicles.

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







2 LOCAL AND REGIONAL CONTEXT

2.1 LOCATION

The Atlas-Campaspe Mine is located in Exploration Licence (EL) 5359 approximately 30 km west of Hatfield in western NSW. The closest regional centres are Balranald and Mildura located approximately 80 km south and 113 km south-west, respectively.

The Development Application Area² for the Project is provided in Attachment A and the Schedule of Lands is provided in Attachment B.

The Development Application Area is located within the Central Darling and Balranald Local Government Areas (LGAs) (Figure 1).

2.2 LAND USE

Existing land use in the vicinity of the Atlas-Campaspe Mine generally consists of agricultural activities. The land in the vicinity of the Ivanhoe Rail Facility, to the north of the existing Orange-Broken Hill Railway, is currently vacant.

The Atlas-Campaspe Mine is proximal to the Willandra Lakes Region World Heritage Area (approximately 10 km to the west), Mungo National Park (approximately 5 km to the west) and a number of privately managed conservation reserves.

Additional land uses in the vicinity of the Ivanhoe Rail Facility include the Ivanhoe (Warakirri) Correctional Centre and some light industrial areas.

2.3 FLORA AND FAUNA

The land proximal to the Atlas-Campaspe Mine comprises vegetated linear and parabolic dunefields and sandplains. Small relict lake basins, claypans and other depressions occupy low lying areas within these dunefields and sandplains (Landscape, 2011).

The land proximal to Atlas-Campaspe Mine comprises the following vegetation communities (Australian Museum Business Services [AMBS], 2012):

- Mixed Belah – Rosewood Woodland;
- Mallee Woodland:
 - Linear Dune Mallee; and
 - Sandplain Mallee;
- Black Box Woodland;
- Yarran Shrubland;
- Mulga Woodland;
- Shrubland Complex of Disturbance Areas; and
- Grass/Herblands of Drainage Depressions.

It is expected that these vegetation communities may contain sufficient habitat for a number of fauna species.

The Ivanhoe Rail Facility area is generally flat with no notable topographic features. The area is largely cleared with sparse, scattered stands of vegetation.

The possible effects of the Project on the flora and fauna species within and surrounding the Development Application Area would be investigated as a component of the EIS.

2.4 HYDROGEOLOGY

The Development Application Area lies within the Murray Basin. The Murray Basin is a lowlying saucer-shaped basin defined by flat lying Cainozoic sediment which extends over an area of 320,000 square kilometres in NSW, Victoria and South Australia (Bemax, 2010).

The Atlas-Campaspe Mine lies within the Lower Murray Darling Porous Rock Groundwater Source (NSW Office of Water [NOW], 2012a) as well as the Lower Murray-Darling Unregulated Water Source (NOW, 2012b).

Preliminary investigations indicate that the Atlas deposit is located predominantly above the watertable, while the Campaspe deposit falls beneath the watertable in the middle portion of the deposit due to faulting. Any groundwater which reports to the open pit as a result of mining activities beneath the watertable is proposed to be removed using in-pit sumps and utilised to supplement the water supply requirement of the DMU (Section 3.2).

² Note the Development Application Area may be subject to change following further environmental assessment and mine planning studies conducted for the EIS.

Groundwater extracted as part of the Project is expected to be highly saline (approximately 30,000 microsiemens per centimetre).

Operations at the Ivanhoe Rail Facility are expected to have no interaction with the existing hydrogeological systems.

2.5 ABORIGINAL CULTURAL HERITAGE

The Australian Heritage Information Management System (AHIMS) database lists no Aboriginal cultural heritage places or objects having been located previously in the Development Application Area.

Some of the earliest evidence of human occupation of Australia comes from south-western NSW (Bowler *et al.*, 1970, 2003; Thorne *et al.*, 1999; Cupper and Duncan 2006; Olley *et al.*, 2006). Stone artefacts found at Lake Mungo, in the Mungo National Park, approximately 5 km to the west of the Atlas-Campaspe Mine, have been dated to between 46,000 to 50,000 years ago (Bowler *et al.*, 2003).

Upon preliminary review, the Atlas-Campaspe Mine area has substantially different topographical and hydrological features when compared to Mungo National Park and the Willandra Lakes Region World Heritage Area to the west. For example, the extensive ephemeral drainage systems associated with these conservation areas are absent from the Atlas-Campaspe Mine area. Some differences between the Aboriginal heritage features of the Atlas-Campaspe Mine area when compared to the conservation areas to the west are expected insofar as Aboriginal cultural heritage features are associated with topographical and hydrological features.

Types of Aboriginal cultural heritage sites which have been previously recorded in the Willandra Lakes region and wider south-western NSW, and which therefore might be expected to occur in the Atlas-Campaspe Mine area include (Landscape, 2011):

- stone artefact scatters;
- hearths (consisting of lumps of burnt clay or stone cobble hearth stones);
- freshwater shell middens (i.e. deposits of shell and other food remains accumulated by Aboriginal people as food refuse);
- earth mounds (which may have been used by Aboriginal people as cooking ovens or as campsites);
- quarry sites (i.e. locations where Aboriginal people obtained raw material for their stone tools or ochre for their art and decoration);
- modified trees (resulting from slabs of bark having been cut from trees or cuts having been made for toe holds);
- stone arrangements, ceremonial rings and ceremony and dreaming sites; and
- burial grounds.

2.6 ENVIRONMENTALLY SENSITIVE AREAS

The *State Environmental Planning Policy (State and Regional Development) 2011* [State and Regional Development SEPP]) defines environmentally sensitive areas of State significance as:

- (a) coastal waters of the State, or
- (b) land to which State Environmental Planning Policy No 14—Coastal Wetlands or State Environmental Planning Policy No 26—Littoral Rainforests applies, or
- (c) land reserved as an aquatic reserve under the Fisheries Management Act 1994 or as a marine park under the Marine Parks Act 1997, or
- (d) a declared Ramsar wetland within the meaning of the Environment Protection and Biodiversity Conservation Act 1999 of the Commonwealth, or
- (e) a declared World Heritage property within the meaning of the Environment Protection and Biodiversity Conservation Act 1999 of the Commonwealth, or
- (f) land identified in an environmental planning instrument as being of high Aboriginal cultural significance or high biodiversity significance, or
- (g) land reserved as a state conservation area under the National Parks and Wildlife Act 1974, or
- (h) land, places, buildings or structures listed on the State Heritage Register under the Heritage Act 1977, or
- (i) land reserved or dedicated under the Crown Lands Act 1989 for the preservation of flora, fauna, geological formations or for other environmental protection purposes, or
- (j) land identified as being critical habitat under the Threatened Species Conservation Act 1995 or Part 7A of the Fisheries Management Act 1994

Preliminary investigations of environmentally sensitive areas of the state have indicated that none of the above listed areas are located within the Development Application Area.

Notwithstanding the above, preliminary investigations of environmentally sensitive areas of the state have indicated the Atlas-Campaspe Mine does not contain lands which are explicitly defined as having high biodiversity significance, however the area does contain lands defined as *High Conservation Value Native Vegetation* as defined by the Balranald LEP.

Notwithstanding the above, further investigations into the environmentally sensitive areas of the state would be conducted as part of the EIS.

3 PROJECT DESCRIPTION AND JUSTIFICATION

3.1 PROPONENT

Bemax is the proponent for the Project. The contact details for Bemax are:

Bemax Resources Limited
PO Box 4032
MILDURA VIC 3502

Telephone: (03) 5025 7575

Further information about the proponent and its operations can be found at:

<http://www.bemax.com.au/>

3.2 PROJECT DESCRIPTION

The Project is a proposed mineral sands mining operation and associated supporting infrastructure with an operational life of approximately 15 years.

An indicative Atlas-Campaspe Mine general arrangement is shown on Figure 2 including locations of ancillary infrastructure. Figure 3 shows the indicative general arrangement for the Ivanhoe Rail Facility.

Table 1 provides a summary of activities associated with the Project. Additional details of each of the main Project components are discussed below.

Mineral Resource

The Project would involve the mining of the Atlas and Campaspe deposits.

The Atlas deposit is a continuous body of mineralisation approximately 15 km long and up to 150 metres (m) wide with an average thickness of 6 m. The Atlas deposit is located beneath an average of 26 m of overburden. The overburden is shallowest at the south-east end and deepens to the north-west.

The Campaspe deposit is a continuous body of mineralisation which is approximately 19 km long with an average width and thickness of 420 m and 12 m, respectively. The Campaspe mineral deposit is located beneath between 10 m (at the southern end) and 40 m (at the northern end) of overburden.

Mining Operations

Conventional (non-dredge) mining methods would be utilised at the Project, both for overburden removal and for ore extraction. The mining method would typically involve the following sequence of activities:

- separate removal of topsoil and subsoil using scrapers;
- removal of overburden ahead of mining using conventional heavy equipment (i.e. dozers and/or loaders); and
- removal of ore using conventional mobile equipment (i.e. dozers and/or loaders).

Ore removed using conventional mobile equipment would be placed in the DMU where the ore is slurried and then pumped to the primary gravity concentration unit.

Topsoil and subsoil stockpiles would be established adjacent to the mine path. Soils stored in these areas would be reclaimed as necessary during the mine life for use in progressive rehabilitation.

Table 1
Overview of the Project

Project Development Component	Summary Description
Proponent	Bemax
Tenement Status	Bemax would apply for MLA 1 which covers a portion of Exploration Licence (EL 5359). ¹
Mining	Approximately 100 million tonnes (Mt) of ore over the life of mine using conventional mobile equipment (i.e. dozers and/or loaders).
Mineral Concentration	Mineral concentration would be undertaken in a primary gravity concentration unit to produce HMC. HMC would then be separated through the WHIMS circuit. The WHIMS circuit would separate the HMC into ilmenite-rich, leucoxene-rich, non-magnetic concentrates (containing zircon and rutile) and waste products.
Mineral Concentrate Transport	Double road train or other RMS-approved vehicles (e.g. AB-triples) would be used for transportation of material concentrate between the Atlas-Campaspe Mine and the Ivanhoe Rail Facility via the mineral concentrate transport route. Rail transport of mineral concentrate from the Ivanhoe Rail Facility to the MSP.
Life of Mine	Approximately 15 years.
Infrastructure Components	Major Project components would comprise: <ul style="list-style-type: none"> • DMU and primary gravity concentration unit for primary minerals separation. • Borefield. • Salt washing facility. • RO plant for salt washing facility and potable water. • WHIMS circuit. • Administration and workshop buildings (including ablutions). • Accommodation camp. • A waste water (including sewage) treatment plant. • Internal Project roads. • Project access roads². • Soil and mineral concentrate stockpiles. • Fuel and consumables storage facilities. • Initial sand residue dams. • Ivanhoe Rail Facility. • Initial overburden emplacements.
Overburden Replacement	During the initial stages of each mine path, overburden would be placed in an initial overburden emplacement located off-path. Once mining has progressed sufficiently, overburden would be replaced within the mine void behind the advancing mining operation by conventional load and haul methods utilising trucks and excavators.
Sand Residue Management	Sand residues from the primary gravity concentration unit would be placed in a sand residue dam during the initial months of operation. For the remainder of the mine life sand residues would be placed in the mine void, behind the advancing mining operation.
Waste Management	Once the Ginkgo and Snapper Mine operations cease, MSP waste would be transported back to the Atlas-Campaspe Mine site for disposal.
Water Supply	Atlas-Campaspe Mine water demand would be met by supply from a borefield located at the north-western end of the Atlas open pit. Ivanhoe Rail Facility potable water demand would be met by connection to the Ivanhoe town supply.
Electricity Distribution	Power at the Atlas-Campaspe Mine would be produced by 1,500 kilovolt-ampere (KVA) generators. Power would be distributed across the site by a 22 kilovolt (kV) electricity transmissions line. Each operating area would then have a relocatable step-down substation located adjacent to the working area. The Ivanhoe Rail Facility would be connected to the local electricity network.
Rehabilitation Works	Progressive rehabilitation would be undertaken as mining advances. Rehabilitation trials would be undertaken to assess the effectiveness of rehabilitation techniques and the success of different plant species over the life of the Project.

Table 1 (Continued)
Overview of the Project

Project Development Component	Summary Description
Proposed Timing	Construction is proposed to begin in 2013.
Employment	An average construction workforce of approximately 150 workers. An operational workforce of approximately 100 employees.

¹ Note the Development Application Area may be subject to change following further environmental assessment and mine planning studies conducted for the EIS.

Overburden and Process Waste Emplacements

Overburden would be placed in off path overburden emplacements during the initial phases of mining of each open pit until operations have progressed sufficiently along the path that it can be returned on path behind the mining operation. Once mining has progressed sufficiently to allow the replacement of overburden in the mine path, overburden would be replaced in the void to form a series of walls. The void formed by these walls would be filled with slurried sand residues from the primary gravity concentration unit before being capped with overburden.

Sand residues from the primary gravity concentration unit would be placed in a sand residue dam during the initial months of operation at the Atlas-Campaspe Mine. For the remainder of the mine life sand residues would be placed in the mine void, behind the advancing mining operation (as outlined above).

Final Voids

Due to initial off path placement of overburden, a final void is expected to remain at the north-western most extent of each mine path.

Processing and Transport

Dry Mining Unit

A single DMU is proposed for the life of the Project. The DMU would initially be located within the Atlas open pit and following the cessation of mining of the Atlas open pit, would be relocated to the Campaspe open pit.

The DMU would be located within the open pit and consist of a hopper into which ore is fed by mobile equipment. The ore would pass through a trommel and screens before being slurried and pumped to the primary gravity concentration unit.

The total mining rate would be approximately 500 tonnes per hour (tph) during mining at the Atlas open pit. The total mining rate would be increased to approximately 1000 tph during mining at the Campaspe open pit.

Primary Gravity Concentration Unit

The ore slurry from the DMU would be passed through a screen above a surge bin which would reject coarse material (>3 millimetres). The ore slurry would be transferred to the primary gravity concentration circuit by pumps located in the bottom of the surge bin.

The ore slurry would undergo separation of valuable minerals from sand residues through twin conventional gravity concentration circuits to produce HMC of approximately 94% heavy minerals. This mineral concentrate would be processed further in the WHIMS circuit.

Salt Washing Facility

The use of saline groundwater as an on-site water source would result in the HMC, which is pumped from the primary gravity concentration unit, having a high salt content. Residual salt in the HMC would inhibit the efficiency of subsequent separation which, in part, involves electrostatic separation.

The mineral concentrate would therefore be washed with desalinated water prior to further processing in the WHIMS. The salt washing facility would be relocatable and positioned adjacent to the mine path. The salt washing facility would utilise desalinated wash water provided by the RO plant.

WHIMS Circuit

Following salt washing the HMC would undergo separation into its three product components (ilmenite-rich, leucoxene-rich and non-magnetic concentrates) in the WHIMS circuit. The WHIMS circuit achieves primary gravity separation of magnetic and non-magnetic materials using high intensity magnets.

A single WHIMS circuit is proposed for construction at the Atlas-Campaspe Mine. The WHIMS circuit would first be located at the south-eastern end of the Atlas open pit, before being relocated to the south-eastern end of the Campaspe open pit at the cessation of operations at the Atlas open pit.

Following separation, the three products would undergo dewatering in cyclones before being stockpiled for transport to the MSP via the Ivanhoe Rail Facility.

Product Transport

The ilmenite-rich, leucoxene-rich and non-magnetic concentrates stockpiled at Atlas-Campaspe Mine would be transported to the Ivanhoe Rail Facility via the mineral concentrate transport route (Figure 4).

Mineral concentrates stockpiled at the Ivanhoe Rail Facility would be railed to the MSP via the Orange-Broken Hill Railway. An average of three, with a maximum of four, trains per week is expected.

Ivanhoe Rail Facility

The Ivanhoe Rail Facility would consist of the following (Figure 3):

- rail siding;
- hardstand area;
- truck unloading facilities;
- mineral concentrate stockpiles;
- site office and ablution facilities;
- workshop and store; and
- access road.

Trucks from the Atlas-Campaspe Mine would arrive at the Ivanhoe Rail Facility via the access road, which runs from the Balranald Ivanhoe Road along the existing railway line (Figure 3).

Mineral concentrate would be placed directly onto a mineral concentrate stockpile on the hardstand area. The mineral concentrate would then be loaded into containers on rail wagons, with a front end loader. A forklift would be used to remove/replace covers on the rail wagons.

The Ivanhoe Rail Facility would also involve the construction of a rail siding at the Ivanhoe Railway Station. The rail siding would be approximately 1.1 km long and would be located on the northern side of the exiting railway.

Water Supply and Management

As a part of the Project it is proposed to implement a water management system at the Atlas-Campaspe Mine which would be designed to divert upcatchment water around the site or away from disturbed areas and contain any runoff water which has originated from Atlas-Campaspe Mine development and operational areas.

Diversion of upcatchment and collection and storage of runoff water would be achieved through the use of a network of channels, diversion banks, sediment basins and storage dams. This water management system would include permanent features that would continue to operate post-operations and temporary structures that would only be required until the completion of rehabilitation works.

It is proposed that the Atlas-Campaspe Mine water management system would be developed progressively as operations at the Atlas-Campaspe Mine progress and the water management requirements change over time.

Any runoff water collected as a part of this water management system would be utilised to supplement the Atlas-Campaspe Mine water supply requirements.

The majority of Atlas-Campaspe Mine water supply requirements are proposed to be supplied by the Atlas-Campaspe Mine borefield. The Atlas-Campaspe Mine borefield is proposed to be located at the north-western end of the Atlas open pit. It is proposed that the borefield would supply process water to the following:

- DMU;
- primary gravity concentration unit;
- RO plant (for potable water and salt washing);
- salt washing facility and WHIMS circuit via the RO plant; and
- dust suppression.

Water supply requirements for the Ivanhoe Rail Facility would be limited to a potable supply, and would be met by connection with the town water supply.

Reverse Osmosis Plant

An RO plant is proposed to be constructed as part of the Project to supply potable water to the accommodation camp, administration buildings and ablutions. The RO plant would also supply potable water to the WHIMS circuit.

Brine and waste product generated by RO plant operations would be disposed within the sand residues and placed into the mine void.

Employment

The Project would facilitate the employment of approximately 100 employees during operations.

Employment of approximately 150 personnel would be required for the construction of the Project with a maximum of 200 during peak construction activities. Construction activities are expected to occur for approximately nine months.

Access Road

The proposed Project would require the construction of a 1 km southern access road which would connect the site with Link Road to the south (Figure 2).

In addition, a second access road would be constructed that would connect the south-eastern end of the Campaspe open pit with the intersection of Magenta and Hatfield-The Vale Roads (the northern access road). Additional detail regarding the northern access road is provided below.

Mineral Concentrate Transport Route

The Project would involve the transportation of mineral concentrate from the Atlas-Campaspe Mine, approximately 175 km, to the Ivanhoe Rail Facility via the proposed mineral concentrate transport route (Figure 3).

The northern access road would be constructed to link the south-eastern end of the Campaspe open pit with the intersection of Magenta and Hatfield-The Vale Roads (Figure 4).

The mineral concentrate transport route would involve transport east along the northern access road and Hatfield-The Vale Road to the Balranald Ivanhoe Road, a distance of approximately 30 km.

Mineral concentrate would subsequently be transported north along the Balranald Ivanhoe Road approximately 135 km to the Ivanhoe Rail Facility.

The southern access road would be used primarily for Project access (e.g. employees and deliveries).

Any additional road upgrades (outside the Development Application Area) required would remain the subject of a separate approvals process (Section 1.3).

Following the closure of the Ginkgo and Snapper Mines, process waste from the MSP would be backloaded to the Ivanhoe Rail Facility for transport by road via the mineral concentrate transport route (Figure 4) for disposal in the Campaspe open pit at the rear of the active mining area.

3.3 PROJECT JUSTIFICATION OVERVIEW

Alternatives Considered

Alternatives to the proposed location, scale, mining methods, mining and processing rates and product transportation were considered by Bemax in the development of this document. An overview of the alternatives considered is provided in the points below:

- **Project Location** – the location of the Project has been determined by the presence of mineral sands able to be economically mined.
- **Scale** – Bemax has evaluated the Project at a range of scales. An optimum sized project was selected with a total ore production of 100 Mt at an average grade of 5.8% heavy minerals.
- **Mining Method** – the location of the Project mineral deposit relative to the water table means that the resource is amenable to conventional mining methods (i.e. dozers and/or loaders).

Project Justification

The proposed Project would facilitate the employment of some 100 employees and the employment of an additional 50 to 100 employees during the construction phase. This would have flow-on employment benefits to local and regional businesses. The Project would provide economic stimulus to the local and regional economy and provide NSW export earnings and royalties.

Full justification of the Project on social, environmental and economic grounds, including consideration of the principles of Ecologically Sustainable Development (ESD), would be included in the EIS.

4 PLANNING PROVISIONS AND PROJECT APPROVAL CONSIDERATIONS

4.1 APPLICABILITY OF PART 4.1 OF ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

Approval for the Project will be sought under the State Significant Development provisions (Division 4.1) under Part 4 of the EP&A Act. The EP&A Act and EP&A Regulation set the framework for planning and environmental assessment in NSW.

Clause 5 of Schedule 1 of the State and Regional Development SEPP provides:

5 Mining

- (1) *Development for the purpose of mining that:*
 - (a) *is coal or mineral sands mining, or*
 - ...
 - (3) *Development for the purpose of mining related works (including primary processing plants or facilities for storage, loading or transporting any mineral, ore or waste material) that:*
 - (a) *is ancillary to or an extension of another State significant development project...*

The Project represents development for the purpose of mineral sands mining and development for the purpose of mining related works.

In view of the foregoing, it is anticipated that the NSW Minister for Planning and Infrastructure would form the view that the Project is a project to which Division 4.1 of Part 4 applies.

Development Consent will be sought from the NSW Minister for Planning and Infrastructure.

4.2 PLANNING PROVISIONS

State Environmental Planning Policies

The following State Environmental Planning Policies (SEPPs) may potentially be relevant to the Project:

- *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP);
- *State Environmental Planning Policy No. 33 (Hazardous and Offensive Development)* (SEPP 33);
- *State Environmental Planning Policy No. 44 - Koala Habitat Protection*;
- *State Environmental Planning Policy No. 55 (Remediation of Land)*;
- *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP); and
- State and Regional Development SEPP.

Relevant provisions and objectives of the above SEPPs would be considered in preparation of the EIS.

Local Environmental Plans

The Project area is located within the Balranald and Central Darling LGAs (Figure 1).

The Atlas-Campaspe Mine is located within land zoned RU1 Primary Production in the Balranald LEP.

Open cut mining is permitted with development consent on lands zoned RU1 Primary Production under the Balranald LEP.

The Ivanhoe Rail Facility is located within land zoned 1(a) Rural and 2(t) Townships in the Central Darling LEP.

The Ivanhoe Rail Facility is considered to be a "freight transport facility" under the Central Darling LEP.

"freight transport facility means a facility used principally for the bulk handling of goods for transport by road, rail, air or sea, including any facility for the loading and unloading of vehicles, aircraft, vessels or containers used to transport those goods and for the parking, holding, servicing or repair of those vehicles, aircraft or vessels or for the engines or carriages involved."

Construction and operation of freight transport facilities is permitted with development consent on lands zoned 1(a) Rural and 2(t) Townships under the Central Darling LEP.

Commonwealth Environment Protection and Biodiversity Conservation Act, 1999

The Project would be referred to the Commonwealth Minister for the Environment for consideration as to whether the Project is a 'Controlled Action' and requires approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*.

Mining Act, 1992

Bemax will lodge a MLA separately with the Division of Resources and Energy (DRE) (within the NSW Department of Trade and Investment, Regional Infrastructure and Services) for Project development areas shown on Figure 2.

Under the NSW *Mining Act, 1992*, environmental protection and rehabilitation are regulated by conditions included in all mining leases, including requirements for the submission of a Mining Operations Plan prior to the commencement of operations, and subsequent Annual Environmental Management Reports.

Under section 89K of the EP&A Act, if the Project is approved, mining leases granted under the *Mining Act, 1992* cannot be refused and would be substantially consistent with any Development Consent under Part 4 of the EP&A Act.

Protection of the Environment Operations Act, 1997

The NSW *Protection of the Environment Operations Act, 1997* (PoEO Act) and the NSW *Protection of the Environment Operations (General) Regulation, 2009* set out the general obligations for environmental protection.

Bemax will apply for an Environment Protection Licence (EPL) for the Project separately.

Under section 89K of the EP&A Act, if the Project is approved, an EPL under the PoEO Act cannot be refused and would be substantially consistent with any Development Consent under Part 4 of the EP&A Act.

Roads Act, 1993

If the Project is approved, Bemax would apply for the necessary consents under section 138 of the NSW *Roads Act, 1993* associated with the construction of the following:

- an intersection of the southern access road with Link Road;
- construction of the intersection of the northern access road with the existing Hatfield-The Vale Road;
- the upgrade of Hatfield-The Vale Road;
- the upgrade of the existing intersection of Hatfield-The Vale Road and Balranald-Ivanhoe Road; and
- an intersection of the Ivanhoe Rail Facility access road with the Balranald Ivanhoe Road.

Under section 89K of the EP&A Act, if the Project is approved, consent under section 138 of the *Roads Act, 1993* cannot be refused and would be substantially consistent with any Development Consent under Part 4 of the EP&A Act.

Water Management Act, 2000

The Atlas-Campaspe Mine falls within the area covered by the Water Sharing Plan for the NSW Murray-Darling Basin Porous Rock Groundwater Sources (the Water Sharing Plan) under the *Water Management Act, 2000*.

The Water Sharing Plan would be considered in the planning of the Project and the preparation of the EIS.

4.3 PLANNING STRATEGIES

The *Lower Murray Darling Catchment Management Authority Catchment Action Plan* (Lower Murray Darling Catchment Management Authority, 2008), and the *Lachlan Catchment Management Authority Catchment Action Plan* (Lachlan Catchment Management Authority, 2006) would be considered in the planning of the Project and the preparation of the EIS.

4.4 PERMISSIBILITY OF THE PROJECT

Section 89E of the EP&A Act provides that development consent may not be granted under Division 4.1 of Part 4 if the development is wholly prohibited by an environmental planning instrument, but may be granted despite the development being partly prohibited by an environmental planning instrument.

Section 4.2 describes the permissibility of the Project under the Balranald and Central Darling LEPs.

5 PRELIMINARY ENVIRONMENTAL ASSESSMENT

5.1 OVERVIEW

The following Preliminary Environmental Assessment has been prepared to identify the key potential environmental issues associated with the construction and operation of the Project. This information has been prepared to assist the Department of Planning and Infrastructure (DP&I) with the issuing of the DGRs for the Project under clause 3 of Schedule 2 of the EP&A Regulation.

This Preliminary Environmental Assessment has drawn on:

- experience from key environmental management and impact assessment issues at the operational Ginkgo and Snapper Mines (Figure 1);
- experience from key environmental management and impact assessment issues at the operational MSP (Figure 1);
- experience from previous environmental management and approvals processes throughout NSW; and
- a preliminary risk assessment.

5.2 LEVEL AND SCOPE OF ASSESSMENT

The key potential environmental issues associated with the construction and operation of the proposed Project identified by this Preliminary Environmental Assessment are summarised in Table 2 along with proposed level and scope of the EIS.

In addition to consideration of the key potential environmental impacts (Table 2), the following studies would be undertaken as a component of the EIS to address other potential impacts:

- non-Aboriginal heritage assessment;
- MSP waste assessment;
- rehabilitation strategy; and
- preliminary hazard analysis in accordance with SEPP 33.

Table 2
Key Potential Environmental Issues and Required Level and Scope of Environmental Assessment

Key Potential Environmental Issue	Likely Extent and Nature of Potential Impacts	Proposed Level and Scope of Environmental Impact Statement
Aboriginal cultural heritage	<ul style="list-style-type: none"> • Potential impacts resulting from disturbance to places and items that are of significance to Aboriginal people. 	<ul style="list-style-type: none"> • Assessment of impacts on items of Aboriginal heritage and Aboriginal cultural values in accordance with Department of Environment, Climate Change and Water (DECCW) (2010) and NSW Department of Environment and Conservation (2005).
Flora	<ul style="list-style-type: none"> • Potential impacts resulting from vegetation clearance and modification. 	<ul style="list-style-type: none"> • Assessment of potential impacts on critical flora habitats, threatened flora species, populations, ecological communities and native vegetation. • Measures to ensure that there is no net loss of flora values in the area in the medium to long-term, including a comprehensive vegetation offset strategy.
Fauna	<ul style="list-style-type: none"> • Potential impacts resulting from fauna habitat clearance and modification. 	<ul style="list-style-type: none"> • Assessment of potential impacts on critical fauna habitats, threatened fauna species, populations, ecological communities and native vegetation. • Measures to ensure that there is no net loss of fauna values in the area in the medium to long-term, including a comprehensive biodiversity offset strategy.

Table 2 (Continued)
Key Potential Environmental Issues and Required Level and Scope of Environmental Assessment

Key Potential Environmental Issue	Likely Extent and Nature of Potential Impacts	Proposed Level and Scope of Environmental Impact Statement
Hydrogeology	<ul style="list-style-type: none"> Potential impacts (i.e. drawdown, quality and recharge) of the Project on groundwater levels and groundwater dependent surface water features and ecosystems. 	<ul style="list-style-type: none"> Modelling of potential impacts on the natural groundwater levels and flows. Development of a site water balance. Measures proposed to minimise impact on natural groundwater features and landholder water supply.
Road transport related impacts on the surrounding community.	<ul style="list-style-type: none"> Potential impacts resulting from increased road traffic movements associated with haulage of mineral concentrate and back-loaded MSP waste materials. 	<ul style="list-style-type: none"> Assessment of potential traffic impacts, including transport infrastructure requirements.
Noise	<ul style="list-style-type: none"> Potential impacts resulting from Project related mining activities as well as road and rail movements. Potential impacts resulting from loading and unloading activities at the Ivanhoe Rail Facility. 	<ul style="list-style-type: none"> Assessment of potential noise impacts, including road and rail traffic.
Air Quality	<ul style="list-style-type: none"> Potential impacts resulting from Project activities. Potential greenhouse gas emissions resulting from the combustion of diesel fuel. Potential impacts resulting from loading and unloading activities at the Ivanhoe Rail Facility. Potential impacts resulting from road and rail movements at the Ivanhoe Rail Facility. 	<ul style="list-style-type: none"> Assessment of potential air quality impacts. Assessment of potential greenhouse gas emissions (Scope 1, 2 and 3).
Socio-economics	<ul style="list-style-type: none"> Continued employment of approximately 100 personnel, including flow-on effects to the regional and NSW economy. Employment of approximately 150 to 200 construction personnel. Continued payment of royalties to the State and other tax payments. 	<ul style="list-style-type: none"> Socio-Economic Assessment of potential impacts on the regional and NSW community and economy, including a cost-benefit analysis. Project justification, including consideration of alternatives, principles of ESD and the objects of the EP&A Act.
Land Resources	<ul style="list-style-type: none"> Potential impacts on land use/capability resulting from the Project. Potential land contamination impacts from MSP waste disposal and hydrocarbon spillage. Potential impacts on soils and erosion potential resulting from the Project. 	<ul style="list-style-type: none"> Estimate of the productivity of agricultural land pre- and post-mining. Assessment of the potential impacts associated with transport, handling and disposal of back-loaded MSP waste materials. Measures to avoid, mitigate and/or remediate potential impacts on soil and land resources during operations and rehabilitation of the Project site.

6 STAKEHOLDER CONSULTATION

6.1 CONSULTATION UNDERTAKEN TO DATE

Consultation undertaken to date in relation to the Project has included:

- Consultation with local landowners.
- Conceptual Project Development Plan meeting with representatives of DRE and DP&I in August 2011.
- Consultation with the Balranald Shire Council and the Central Darling Shire Council.

6.2 STAKEHOLDER ENGAGEMENT PROGRAMME

A stakeholder engagement programme has been developed for the Project. Key objectives of this programme are to:

- inform government and public stakeholders about the progress and nature of the Project;
- recognise and respond to local interest or concerns regarding the Project; and
- continue the ongoing dialogue between local landholders and Bemax.

The programme includes the use of a variety of consultation mechanisms which in summary include actions such as:

- public exhibition of key documents (e.g. this document and the EIS);
- meetings with the general community including Aboriginal groups;
- meetings with relevant government agencies;
- public information displays; and
- community information brochures.

The consultation would include, but not necessarily be limited to, the following government agencies and authorities:

- DP&I;
- Office of Environment and Heritage (OEH) (including the NSW Office of Water);
- DRE;

- RMS;
- Department of Primary Industries;
- Balranald Shire Council;
- Central Darling Shire Council; and
- Commonwealth Department of Sustainability, Environment, Water, Population and Communities.

Consultation with the Aboriginal community would be conducted in consideration of the requirements of the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010).

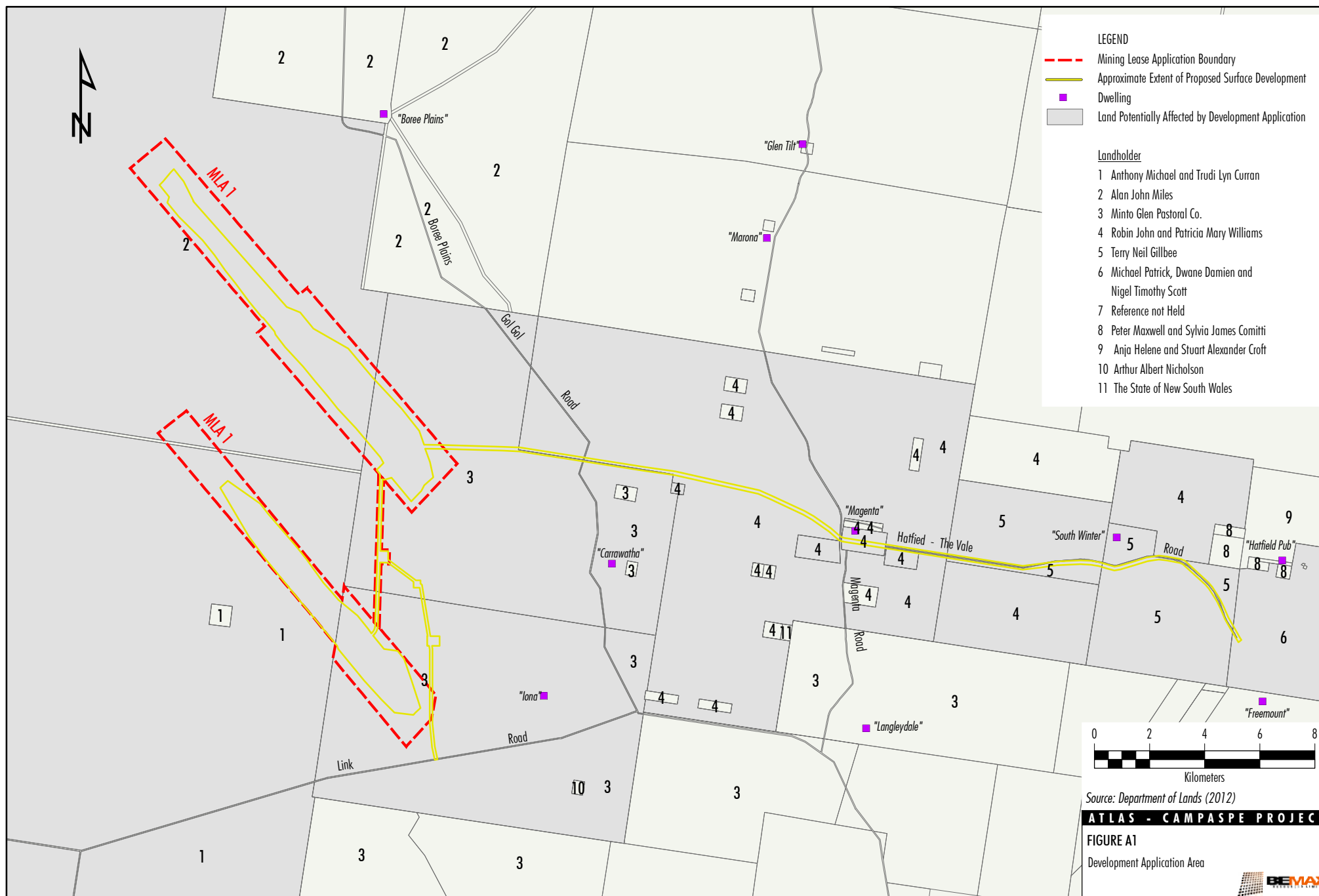
The issues raised and outcomes of the consultation programme would be reported in the EIS.

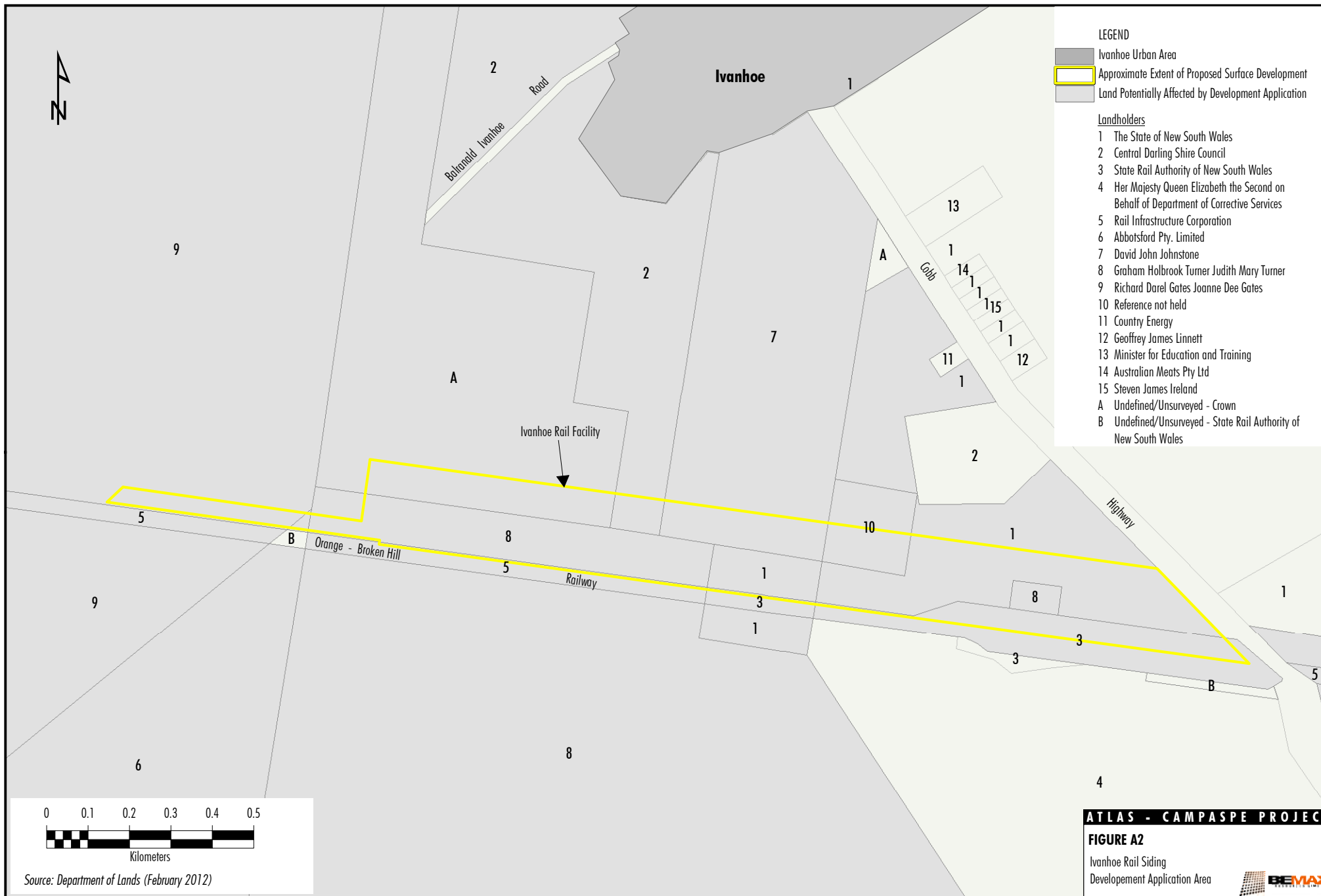
7 REFERENCES

- Australian Museum Business Services (2012) *Atlas-Campaspe Mineral Sands Project Flora Assessment*. In Preparation.
- BEMAX Resources Limited (2010) *Review of Environmental Factors Campaspe and Atlas Deposits 2010*.
- Bowler, J.M., Johnston, H., Olley, J.M., Prescott, J.R., Roberts, R.G., Shawcross, W. and Spooner, N.A. (2003) *New ages for human occupation and climatic change at Lake Mungo, Australia*. *Nature* 421, 837-840.
- Bowler, J.M., Jones, R., Allen, H. and Thorne, A.G. (1970) *Pleistocene human remains from Australia: a living site and human cremation from Lake Mungo, western New South Wales*. *World Archaeology* 2, 39-60.
- Cupper, M.L. and Duncan, J. (2006) *Last glacial megafaunal death assemblage and early human occupation at Lake Menindee, southeastern Australia*. *Quaternary Research* 66, 332-341.
- Department of Environment and Conservation, (2005) *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation*.
- Department of Environment, Climate Change and Water (2010) *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*.

- Lachlan Catchment Management Authority (2006)
Lachlan Catchment Action Plan 2006,
February 2006.
- Landskape. (2011) *Campaspe Mineral Sands
Project Willandra East EL5359 Preliminary
Cultural Heritage Assessment* Prepared for
Bemax Resources Limited.
- Lower Murray Darling Catchment Management
Authority (2008) *Lower Murray Darling CMA
Catchment Action Plan*, January 2008.
- New South Wales Office of Water (2012a) *Water
Sharing Plan NSW Murray Darling Basin
Porous Rock Groundwater Sources*,
December 2010.
- New South Wales Office of Water (2012b) *Water
Sharing Plan NSW Murray Darling
Unregulated and Alluvial Water Sources*,
December 2010.
- Olley, J.M., Roberts, R.G., Yoshida, H. and Bowler,
J.M. (2006) *Single-grain optical dating of
grave-infill associated with human burials at
Lake Mungo, Australia*. Quaternary Science
Reviews 25, 2469–2474.
- Thorne, A., Grün, R., Mortimer, G., Simpson, J.J.,
McCulloch, M., Taylor, L. and Curnoe, D.
(1999) *Australia's oldest human remains: age
of the Lake Mungo Skeleton*. Journal of
Human Evolution 36, 591-692.

ATTACHMENT A
DEVELOPMENT APPLICATION AREA





ATTACHMENT B
SCHEDULE OF LANDS

Tenure Type	Lot Number	Deposited Plan Number
Atlas-Campaspe Mine		
Crown Land (Western Lands Lease 1849)	Part of 4727	767893
Crown Land (Western Lands Lease 2609)	Part of 613	761600
Crown Land (Western Lands Lease 2611)	Part of 614	761601
Crown Land (Western Lands Lease 2604)	Part of 616	761603
Freehold	4	754034
Crown Land (Western Lands Lease 3227)	Part of 4733	762575
Freehold	Part of 3	754040
Freehold	Part of 2	754040
Crown Land (Western Lands Lease 4109)	Part of 1942	763846
Crown Land (Western Lands Lease 5501)	Part of 3256	765482
Crown Land (Western Lands Lease 5503)	Part of 3254	765480
Crown Land (Western Lands Lease 5504)	Part of 2	793395
Freehold	Part of 8	754040
Roadway	Road located within and between the above parcels of land	761603
Roadway	Road located within and between the above parcels of land	762575
Roadway	Road located within and between the above parcels of land	763846
Roadway	Road located within and between the above parcels of land	765482
Ivanhoe Rail Facility		
Crown Land (Western Lands Lease 3339)	Part of 931	761988
Crown Land (NSW State Infrastructure Corporation)	Part of 4	1145130
Freehold	Part of 1	754502
Crown Land (Central Darling Shire Council)	Part of 40	608816
Crown Land (Western Lands Lease 283)	Part of 4568	768560
Freehold	Part of 13	717252
Crown Land (State of New South Wales)	Part of 1	441119
Crown Land (NSW State Rail Authority)	Part of 1	441293
Crown Land (State of New South Wales)	Part of 2	815263
Reference Not Held	Part of 36	754687
Crown Land (Western Lands Lease 283)	38	754687
Crown Land (NSW State Rail Authority)	Part of 1	1007457