



# Guidelines

for the preparation of an  
ENVIRONMENTAL IMPACT STATEMENT

## **Expansion of the Olympic Dam operations at Roxby Downs Proposal**

Second Declaration by BHP Billiton Olympic Dam Corporation Pty Ltd



*Development  
Assessment  
Commission*





# Guidelines

for the preparation of an  
ENVIRONMENTAL IMPACT STATEMENT

## **Expansion of the Olympic Dam operations at Roxby Downs Proposal**

Second Declaration by BHP Billiton Olympic Dam Corporation Pty Ltd

### **Department of Planning and Local Government**

136 North Terrace, Adelaide  
GPO Box 1815  
South Australia 5001

### **Development Assessment Commission South Australia**

[www.planning.sa.gov.au/dac](http://www.planning.sa.gov.au/dac)

ISBN 978 1 876702974  
FIS 22908

**November 2008**



**GUIDELINES  
FOR AN ENVIRONMENTAL IMPACT STATEMENT  
ON THE PROPOSED EXPANSION OF THE OLYMPIC DAM OPERATIONS  
AT ROXBY DOWNS**

**NOVEMBER 2008**

**(First released February 2006)**

**FOREWORD**

**Background**

The Australian Minister for the Environment, Heritage *and the Arts* and the South Australian Ministers for Mineral Resources Development *and Urban Development and Planning* will be collaboratively assessing the environmental impacts of a proposed expansion of the existing *BHP Billiton Olympic Dam Corporation Pty Ltd* (the proponent) Olympic Dam mining operation. Olympic Dam is located approximately 570km north north-west of Adelaide in South Australia.

*Operations at Olympic Dam are regulated by the Roxby Downs (Indenture Ratification) Act 1982, which was enacted by the South Australian Parliament in 1982 and amended in 1996 and 1997, and the Indenture the subject of that Act. The existing operation has Commonwealth and South Australian Government environmental approvals (with conditions) to produce up to 350,000 tpa of copper and associated products.*

The proposed expansion would enable mining and processing at Olympic Dam within an extended Special Mining Lease boundary for a life of mine of approximately 70 years and a possible production rate over time of up to 1 million tonnes per annum (t/a) of refined copper and associated products.

**First Declaration and Guidelines**

The assessment process *for the expansion* commenced following a determination on 2 September 2005 by the Australian Minister for the Environment and Heritage that the proposed expansion was a controlled action under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). *The controlling provisions under the EPBC Act are listed threatened species, migratory species, Ramsar wetlands, Commonwealth land and nuclear actions.* In the referral document the proponent committed to the preparation of an Environmental Impact Statement (EIS) and on 8 November 2005 the Australian Minister for the Environment and Heritage determined that an EIS would be required for the proposal. An EIS is a document which describes to the Australian Government, the South Australian Government<sup>1</sup> and the community what the proponent wants to do, what the environmental impacts will be and how the proponent plans to manage these impacts.

---

<sup>1</sup> *The Northern Territory Government will also rely on the EIS for assessment of proposed activities at the Port of Darwin associated with the Olympic Dam Expansion project.*

*The Indenture the subject of the Roxby Downs (Indenture Ratification) Act 1982 modifies in certain respects the provisions contained in Division 2 of Part 4 of the South Australian Development Act 1993 (the Major Developments process) as they apply to the land the subject of the Special Mining Lease (SML), and land reasonably required for the transport or provision of water, power and petroleum (including gas). On 15 September 2005 the South Australian Minister for Mineral Resources Development, acting in pursuance of these provisions, made a declaration in the State Government Gazette that the proposed expansion of Olympic Dam would be a Major Development. Because of the interaction between the Indenture and the Development Act, however, the first declaration is limited to development on the Special Mining Lease (SML) and land reasonably required for the provision or transport of water, power, gas and petroleum.*

*Following the making of that declaration and the subsequent lodgement by the proponent of a development application, and in pursuance of the Indenture, the South Australian Minister for Mineral Resources Development assumed the role of the Development Assessment Commission in developing the joint Guidelines/Issues Paper. The joint Guidelines/Issues Paper was prepared in collaboration with the Australian Government and released in February 2006 (first Guidelines document).*

### **Second Declaration and Guidelines**

*Under the provisions of the Development Act 1993, the South Australian Minister for Urban Development and Planning made a second Major Development declaration on 21 August 2008. The second declaration was necessary to capture activities not covered by the first declaration, for activities proposed to occur outside the SML and the infrastructure corridors for water, power and petroleum. Activities captured under the second declaration include a landing facility, a rail line from Pimba to Olympic Dam, a new airport and workers accommodation.*

*The proponent subsequently lodged a second ‘updated’ development application for activities captured by both declarations. Accordingly the formulation of a second Guidelines document has been necessary.*

*Under the Development Act 1993 the Development Assessment Commission (Commission), an independent statutory authority, has the responsibility for setting the level of assessment for the proposal under the Development Act 1993 and for formulating the relevant Guidelines.*

*Following a thorough review of the proposal as described in the latest development application, and of the existing Guidelines issued in February 2006, the Commission has endorsed an EIS as the appropriate level of assessment. Furthermore, the Commission also endorsed the framework of the existing Guidelines, including the format, and the specific requirements for the EIS prescribed in sections 4 and 5, as the Commission considered the existing Guidelines comprehensively covered all issues associated with the project components.*

*However the Commission has made some modifications to the introductory sections of the Guidelines, including the Forward and sections 1-3, to better reflect the current project description and assessment process. To assist in reading and applying the two sets of Guidelines together, changes have been made in italics to*

*assist the proponent and the public in easily identifying the differences and any additional requirements to be addressed in the EIS.*

*All development covered by the two Major Development Declarations are components of a single project for the expansion of the Olympic Dam operations. Therefore, although the interaction between the Indenture and the Development Act mandates that two sets of Guidelines will apply to the expansion project, it is intended that a single EIS will address the requirements of both sets of Guidelines, for assessment and decision by the State<sup>2</sup> and Commonwealth Governments.*

The EIS shall encompass those issues clearly related to the expansion of the existing Olympic Dam development and the potential impacts on the region. These issues include, among others, the construction, operation and rehabilitation of the mine site and associated infrastructure, including power, water, gas, rail, airport and port, ore processing operations, the management of tailings and waste rock and transport of uranium oxide within Australia for export. The scope of the assessment will not include broader issues relating to the use of exported uranium in the nuclear fuel cycle. Issues relating to the use of exported uranium in the nuclear fuel cycle are beyond the control of the proponent and it would be impractical for the proponent to address these issues in the EIS.

An opportunity for public comment will occur when the completed EIS is released for comment. *When the EIS is ready for public release*, an advertisement will be placed in The Advertiser, The Australian and relevant local newspapers to indicate where the EIS is available and the length of the public exhibition period, *details of the public meetings and details about how written submissions can be made.*

---

<sup>2</sup> *Including assessment by the Northern Territory Government against Guidelines issued under the NT Environmental Assessment Act 1994.*



# CONTENTS

<b>1.</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	Background .....	1
1.2	Proposed expansion.....	1
<b>2.</b>	<b>ENVIRONMENTAL ASSESSMENT AND APPROVAL PROCESS.....</b>	<b>3</b>
2.1	Background .....	3
2.2	Collaborative environmental impact assessment process .....	3
2.3	Purpose of Guidelines .....	5
2.4	Opportunities for public input.....	5
2.5	General Content, Format and Style of the EIS.....	5
<b>3.</b>	<b>DESCRIPTION OF THE PROJECT.....</b>	<b>7</b>
3.1	The current and proposed project area .....	7
3.2	Description of proposed activities.....	8
3.3	Timeframe .....	11
<b>4.</b>	<b>CONTENT OF THE EIS .....</b>	<b>17</b>
<b>5.</b>	<b>SPECIFIC REQUIREMENTS – CONTENTS OF THE EIS .....</b>	<b>19</b>
5.1	Executive Summary.....	19
5.2	Glossary of terms .....	19
5.3	Introduction.....	19
5.4	Existing Operations .....	20
5.5	Project Justification.....	20
5.6	Description of the Expanded Project.....	20
5.7	The Approvals Process / Legislative Obligations .....	24
5.8	Public Consultation.....	24
5.9	Hazard and Risk .....	25
5.10	Land Use and Planning.....	26
5.11	Meteorological Environment and Climate .....	28
5.12	Air Quality .....	28
5.13	Topography, Geology and Soils.....	29
5.14	Flora .....	31
5.15	Fauna .....	32
5.16	Groundwater.....	33
5.17	Surface Water.....	34
5.18	Noise and Vibration .....	35
5.19	Cultural Heritage.....	36
5.20	Social impact assessment.....	37

5.21	Visual Amenity.....	38
5.22	Waste Materials Management.....	39
5.23	Economic Assessment .....	41
5.24	Rehabilitation and Decommissioning .....	41
5.25	Draft Environmental Management Plan .....	42
5.26	References and Appendices .....	42

# 1. INTRODUCTION

## 1.1 Background

The Olympic Dam mine deposit, located approximately 570 km NNW of Adelaide in South Australia, was discovered in 1975 by the exploration division of WMC Resources. A joint venture to facilitate development of the project was formed in 1979 between WMC Olympic Dam Corporation Pty Ltd and the BP Group. WMC Olympic Dam Corporation Pty Ltd purchased the partner's share in April 1993. WMC Olympic Dam Corporation Pty Ltd has *since* become a member of the BHP Billiton Group, *and is now called BHP Billiton Olympic Dam Corporation Pty Ltd.*

Following environmental, social and cultural heritage studies documented within an Environmental Impact Statement (EIS) in 1982, mining at Olympic Dam commenced in 1988 at a production rate of 45,000 tonnes per annum (tpa) of copper plus associated products. Between 1989 and 1995 the production rates at Olympic Dam increased as a result of two optimisation programs. The first optimisation of the operation in 1992 saw the production rate increase to 66,000 tpa of copper plus associated products, the second in 1995 saw the production rate increase to 85,000 tpa of copper plus associated products.

A major expansion was investigated and approved through a second EIS in 1997 and this enabled production rates to be increased to the current levels of *approximately 200,000 tpa of copper plus associated products (being 4,000 tpa of uranium oxide, 80,000 ounces of gold and 800,000 ounces of silver).* *It is anticipated that optimisation of the underground operations will occur over approximately the next 20 years to increase production within the scope of the existing approval. This project is not subject of the current EIS.*

An intensive drilling program has confirmed a very large ore body on the existing Olympic Dam Special Mining Lease (SML). The extent of this mineral resource has led the proponent to request a further expansion to the existing mining and processing approvals (see Section 3.2 for anticipated production rates).

The operation currently provides employment for approximately *1700 permanent staff and 2450 contractors* on site. The township of Roxby Downs, 16km south of the mine, was first occupied in 1987 and houses over 4,000 people.

Existing infrastructure associated with the current mining and processing operation include a series of groundwater bores in the Great Artesian Basin, water supply pipelines from these wellfields to Olympic Dam, transmission lines from Port Augusta to Olympic Dam, an airport and construction camp at Olympic Dam Village, an on-site desalination plant and mine processing plant and associated infrastructure (including tailings retention systems, evaporation ponds, a quarry and waste handling facilities).

## 1.2 Proposed expansion

The proponent proposes to expand the existing Olympic Dam copper, uranium, gold and silver mine and processing plant, including all associated infrastructure. The project is in the planning phase, with several options for major infrastructure being investigated.

The principal components of the proposed expansion currently under investigation include (see Figures 2 and 3 for locations):

- the mining and processing of copper, uranium, gold and silver within an expanded *SML* boundary (this would allow for a possible increased annual production rate from the currently approved 350,000 tpa copper up to 1M tpa copper if required)
- sourcing and supplying additional water (via a water pipeline from one or more of various options including water extraction from the Great Artesian Basin (GAB) *within licence limits*, a coastal seawater desalination plant, local or regional saline aquifers)
- sourcing and supplying additional energy (via a transmission line from the existing State electricity grid and/or from an on-site gas fired power station supplied by a natural gas pipeline *and supplemented by a co-generation facility to recover waste heat from processing*)
- construction, relocation or upgrades to transport infrastructure (including rail, road, airport, *landing facility* and port)
- additional infrastructure and services associated with expanded accommodation needs at Roxby Downs and potentially other local townships *to house the permanent and temporary workforce*.

Further details of the proposed expansion are provided in section 3.

## 2. ENVIRONMENTAL ASSESSMENT AND APPROVAL PROCESS

### 2.1 Background

*The proposed Olympic Dam expansion EIS will be assessed under two legislative regimes, namely<sup>3</sup>:*

- *The Major Development assessment process under the South Australian Development Act 1993 (as affected by the Indenture the subject of the Roxby Downs (Indenture Ratification) Act 1982).*
- *The Commonwealth Environment Protection and Biodiversity Conservation Act 1999 for assessment of Matters of National Environmental Significance.*

### 2.2 Collaborative environmental impact assessment process

As the proposed expansion triggers both Australian and State legislation, the environmental assessment of the expanded project will be conducted under a collaborative assessment process between the Australian and State Governments. The proponent shall produce a single EIS to meet the requirements of both the Australian and State Governments. It is therefore a requirement of the EIS that it identifies all Australian and State legislative Acts and Regulations relevant to the project, and obtains all relevant permits and licenses under these Acts and Regulations.

The key stages of the collaborative assessment process are as follows:

- referral under the EPBC Act submitted to Australian Department of the Environment and Heritage (Australian DEH)
- decision that the proposal is a controlled action under the EPBC Act
- decision on the assessment approach (level of assessment)
- project proposal submitted to South Australian Minister for Mineral Resources Development
- Draft Guidelines / Issues Paper placed on public exhibition (4 weeks), written submissions invited and compiled by State Government
- Australian and State Government prepare final Guidelines giving consideration to written submissions
- *Joint Guidelines finalised, provided to the proponent and made available to the public by way of advertisement*
- *Second Major Development Declaration made by the South Australian Minister for Urban Development and Planning, for activities on land outside the SML and not for the transport or provision of water, power, or petroleum.*
- *The Development Assessment Commission reviews the existing Guidelines and prepares a second Guidelines document (necessary because of the second Major Development Declaration).*

---

<sup>3</sup> *The NT Government will assess the EIS (only for the activities proposed at the Port of Darwin) under the NT Environmental Assessment Act.*

- *The Minister for Urban Development and Planning issues the second Guidelines document to the proponent and makes it available to the public by way of advertisement.*
- the proponent prepares the Draft EIS document
- public exhibition of Draft EIS (8 weeks), written submissions invited, compiled by State Government and then provided to the proponent<sup>4</sup>
- public meetings may be held at Roxby Downs, the Upper Spencer Gulf and Adelaide during the exhibition period to assist people in the preparation of their submissions
- the proponent prepares and lodges Supplementary EIS / Response Document to respond to public and Government submissions
- Government assessment of Supplementary EIS / Response Document and preparation of assessment reports for Australian and State Ministers
- Government decisions *required* on the proposal, *from the State (SA and NT) and Commonwealth Governments.*

This document has been prepared to service both legislative requirements and to provide consistency for the assessment process<sup>5</sup>. The Draft EIS required under the EPBC Act is the same document as the EIS required under the Development Act 1993<sup>6</sup>. In this document reference to Draft EIS should be taken to also mean an EIS under the State process. Similarly, reference to a Supplementary EIS as required under the EPBC Act should be taken to also mean a Response Document under the State process as both documents serve the same purpose. It should be noted that the Final EIS under the EPBC Act comprises the Draft EIS and Supplementary EIS documents.

---

<sup>4</sup> *Note all submissions to be made to Planning SA*

<sup>5</sup> *The NT Government will issue a separate Guidelines document, which only deals with activities proposed for the Port of Darwin.*

<sup>6</sup> *And the Northern Territory Government's EIS*

## 2.3 Purpose of Guidelines

The purpose of the Guidelines is to establish the matters that should be addressed in the proponent's EIS.

This document is not intended to address policy issues about the appropriateness of uranium mining or the broader issues relating to the use of exported uranium in the nuclear fuel cycle. Rather, it is intended to set the scope of environmental, social, cultural heritage and economic studies required in the EIS to allow for an assessment and decision on the appropriateness of an expansion to the existing Olympic Dam mining and processing operation.

## 2.4 Opportunities for public input

There are numerous opportunities for public input throughout the environmental impact assessment process.

The following are statutory requirements for public input:

- when the Project EPBC Act Referral was lodged on 15 August to the Australian Department of the Environment and Heritage (Australian DEH) and placed on the Australian DEH web site
- during the four week public exhibition period for the *first* Draft Guidelines/Issues Paper that ran from 21 November to 16 December 2005.<sup>7</sup>
- during the eight week period for public comment when the Draft EIS has been completed and submitted to the Commonwealth and State Governments.

It is proposed to hold public meeting(s) during the EIS consultation period to enable the proponent to present details of the proposed Olympic Dam Expansion Project and the Australian and State Governments to provide information on the environmental impact assessment process. In addition to the above statutory requirements, the proponent may seek to engage the community in consultation throughout the development of the EIS. The nature and level of this engagement is at the discretion of the proponent. Preliminary consultations have commenced, including discussions with Olympic Dam staff, the Roxby Downs community and Aboriginal communities.

## 2.5 General Content, Format and Style of the EIS

The document should place emphasis on the major environmental issues associated with the proposed expansion. Matters dealt with in previous EIS' and Reviews should be considered and dealt with to the extent that they are relevant to the current proposed expansion. Matters of lesser concern should be dealt with only to the extent required to demonstrate that they have been considered.

It is envisaged that the EIS will be based on the results of available research, studies and data as appropriate, with further studies being conducted where necessary and practicable. The extent to which the limitations, if any, of available information may influence the decisions of the environmental assessment should be discussed.

---

<sup>7</sup> Note: It was not a legislative requirement to publicly exhibit the second Guidelines document.

In these Guidelines, the terms 'description' and 'discussion' should be taken to include both quantitative and qualitative materials as practicable.

The main text of the EIS should be written in a clear, concise style that is easily understood by the general reader. Technical jargon should be avoided wherever possible. Detailed technical information necessary to support the main text should be included as appendices issued with the EIS so that the EIS is complete and self-contained. Where appendices include results of studies conducted in preparing the proposal, the public availability of studies should be indicated.

The documentation should include references and a list of individuals and organisations consulted. Relevant maps and illustrations should be included. The cost of the EIS to the public should be minimised.

While every attempt has been made to ensure these Guidelines address all of the major issues associated with this proposal, they are not necessarily exhaustive and should not be interpreted as excluding from consideration matters deemed to be significant but not incorporated in them, or matters that emerge as important or significant from environmental studies or otherwise during the course of the preparation of the EIS.

### 3. DESCRIPTION OF THE PROJECT

The expanded project is in its planning phase. Several options for major infrastructure components are being investigated. As a result, the description of the expanded project is broad. In the description that follows details of the infrastructure requirements (water supply, energy, transport, area of the proposed development components) are provided on the basis of an expansion to 750,000 tonnes per annum (of *refined copper equivalent plus* associated products). However, it is possible that the production rate of the expanded mine could be up to 1 million tonnes per annum.

Engineering studies are being undertaken by BHP Billiton to define the water, energy, transport and other requirements for an expansion of up to 750 000 tonnes *per annum of refined copper plus associated products* and the revised infrastructure needs would be incorporated in the EIS document.

#### 3.1 The current and proposed project area

The current operations include the existing SML, the Olympic Dam Village, township of Roxby Downs and several linear infrastructure corridors as shown on Figure 1. The SML is located approximately 570 km NNW of Adelaide in South Australia. Olympic Dam Village is 6km south of the mine and the township of Roxby Downs is 16 km south of the mine.

The SML covers an area of approximately 17,800 ha. Figure 2 shows the current extent of the SML and the proposed extended boundary of the SML. The location and extent of the footprint for the expanded project is under investigation, and this investigation will continue throughout the early stages of the project's EIS. The entire area of the expanded SML boundary will be investigated as a potential footprint for the mine development and associated on-site infrastructure. The total area of the expanded SML is approximately 49,700 ha.

The project's infrastructure options are being investigated, and therefore preferred options for the various infrastructure components are yet to be finalised. The main infrastructure options being investigated include:

- *Seawater desalination plant at Point Lowly*
- 320km water supply pipeline from a seawater desalination plant in the Upper Spencer Gulf
- 270km energy supply transmission line from Port Augusta to *Olympic Dam*
- On-site gas fired power station *and gas pipeline from Moomba (between 400 – 560 km of pipeline)*
- 105km rail line from Pimba to *Olympic Dam and new rail/road intermodal freight terminal at Pimba;*
- accommodation footprint at Roxby Downs *for up to 10, 000 people*
- accommodation footprint at the *relocated and expanded construction camp for up to 10 000 people (Hiltaba Village)*
- Relocation of the existing airport
- *Landing facility south of Port Augusta to off-load pre-assembled infrastructure and connector road to the Port Augusta pre-assembly yard*

- *Upgrading of facilities at the Port of Darwin to allow for the secure export of Copper Concentrate via rail from Olympic Dam<sup>8</sup>.*

It is possible that the planning studies may identify further options for infrastructure, additional area requirements and additional processing of non mine site products and materials.

## 3.2 Description of proposed activities

### Mine expansion and associated infrastructure

#### *Mining and production rates*

The proponent is seeking approval for mining and processing activities within the extended SML boundary as shown on Figure 2. The existing mining method is underground mining (sub-level open stoping) of approximately 10 million tonnes per annum (Mtpa) of ore. The location and extent of the mineral resource to be mined as part of the expanded project warrants open pit mining, and an anticipated increase of mined ore to at least 72Mtpa. *This quantity of ore would yield 2.4Mtpa of copper concentrate, which when refined would produce 750,000 tpa copper equivalent (this is likely to increase in the future as mining technology advances).*

In the description that follows details of the infrastructure requirement (water supply, energy, transport, area of the proposed development components) are provided on the basis of an expansion *up to 2.4Mtpa of copper concentrate.*

Engineering studies are being undertaken by BHP Billiton to define the water, energy, transport and other requirements for an expansion up to 1 million tonnes per annum if required and the revised infrastructure needs would be incorporated in the EIS document.

The mineral composition of the ore body being mined currently and that to be mined for the expanded project is different. The differences in mineral composition result in changes to the quantity and production rate, of copper, uranium, gold and silver between the current and expanded project. Table 1 provides an example of the differences in production rates from the existing and future mineral resource for data relating to 10Mtpa and 72Mtpa of ore respectively.

**Table 1: Example of mined tonnages as a result of mineral composition**

<b>Mineral</b>	<b>Indicative Current production rate (based on 10Mtpa)</b>	<b>Indicative proposed expansion production rate (based on 72Mtpa)</b>
Copper	220,000 tpa	750,000 tpa
Uranium	4,000 tpa	19,000 tpa
Gold	80,000 ounces	800,000 ounces
Silver	800,000 ounces	2,900,000 ounces

Current predictions suggest that the open pit would be approximately 3.5 km long, 4.1 km wide and 1.1km deep *at year 40 (approximately 1010 hectares)*. Initial design of the waste rock stockpile indicates that it may cover an area of up to 7350 ha (based on

<sup>8</sup> *The SA Government will not be assessing the part of the EIS dealing with the proposed facilities at the Port of Darwin. This is a matter for the Northern Territory Government.*

a 150m high waste rock stockpile). The open pit and waste rock stockpile would be located entirely within the boundaries of the expanded SML.

*An option of co-disposing the waste rock and the tailings in the same area is being investigated. This material handling method would avoid the need for additional tailings retention systems. The details of the material handling methods and footprint areas will be further investigated during the EIS.*

The current mining method of sub-level open stoping will *be optimised to increase production to a rate of approximately 235 000 tonnes per annum, then will begin to reduce as construction of the open pit commences and continue for approximately 20 years, but at a reduced rate.* Once this area of the ore body has been exhausted, the infrastructure supporting the underground mine will be used for the expanded operation where possible, or decommissioned. Some areas of the ore body may be better suited to a different mining method, such as block caving, and therefore a combination of mining methods are likely to be implemented throughout the life of the mine.

### *Processing*

*New processing facilities will be required to process the additional ore. Ore from the proposed open pit is expected to have a lower copper to sulphur (Cu:S) ratio than ore currently mined from the existing underground mine. All ore recovered will be processed to concentrate in processing facilities at the mine. The lower grade ore will likely require a two stage smelting option. Smelting capacity for the concentrate produced from ore recovered by the open pit may be produced at the mine or at another location (potentially outside of South Australia).*

*In general, the processing of ore would be similar to that currently used, with each component suitably scaled to meet the increased ore throughput, but otherwise not differing significantly in technology or function.* Further, as noted in the Roxby Downs (Indenture Ratification) Act 1982, non mine site products and materials may also be processed at Olympic Dam and the expanded project will continue to consider these products in the design of the relevant infrastructure.

### *Tailings Retention System*

The existing operation utilises a paddock tailings retention system for tailings and water liquor and this occupies an area of approximately 550 ha. *This tailings system may be expanded, or alternatively a new tailing storage system may be established to support the expanded operations. A number of tailings options are being investigated and will be addressed in the EIS, including co-disposal of the tailings and the mine waste rock as a thickened paste, which would significantly reduce the area required for the storage of tailings.* The restriction on the height of the tailings retention system is being investigated as this also presents an opportunity to significantly reduce the footprint area for tailings storage. Irrespective of the tailings retention system adopted, all tailings would be located entirely within the extended boundaries of the SML.

## **Water supply and associated infrastructure**

The current water licence provides for 42 ML/d from the GAB, of which approximately 32 - 36 ML/d is currently used. Water is supplied from Wellfield A (approximately 6 ML/d) and Wellfield B (approximately 28 ML/d) (refer Figure 1 for locations). For the expanded mine operation, it is estimated *that between 235 – 260 ML* of additional water *may* be required. *A number of options will be investigated in the EIS including:*

- seawater desalination in the Upper Spencer Gulf,
- *desalination facilities on the SML,*
- *new local and regional saline aquifer wellfields,* and
- further on-site recycling of water (*including de-watering of the pit*).

Pipelines to transport the water from the *seawater desalination plant and saline wellfields* would be required and form a component of the expanded project.

The existing operation has an on-site desalination plant with a capacity of 14.7 ML/d (refer Figure 2 for location). An expansion to the existing on-site desalination plant may be required. It is also likely that the plant would need to be relocated to accommodate the proposed open pit and waste rock stockpile.

## **Energy supply and associated infrastructure**

The current operation is connected to the State grid via a 275 kV power line from Port Augusta and a 132 kV transmission line from Pimba. At present, the average load is approximately 125 MW. For the proposed mine expansion, the demand is expected to increase *to a maximum demand of about 800 MW* (to be investigated further during the EIS). Options being considered to provide the additional energy supply include:

- additional transmission line (s) from the State grid
- *Gas pipeline*
- *on and off site power generation (including on-site cogeneration).*

## **Transport infrastructure**

Currently, transport of materials to and from Olympic Dam is via road. The construction of a rail line between Pimba and Olympic Dam, which would connect to the existing State network from Pimba to Port Adelaide, is being investigated and forms a component of the expanded project. During operation of the expanded mine, materials would be transported *by rail and road*, from the mine to a port (with several ports being investigated including, but not limited to, Port Adelaide and Darwin). The number, size and haulage capacity of trains between Port Adelaide (and/or Darwin) and Olympic Dam is being investigated and will be discussed within the project's EIS.

The increased quantity of material transported to *and from* ports is likely to also necessitate an upgrade of existing, *or the construction of new transport and storage infrastructure*. *Examples may include new or upgraded port infrastructure, landing facilities, access corridors, intermodal facilities, storage facilities and laydown areas.* The details and environmental assessment of any such upgrades *and/or new infrastructure* would be included within the project's EIS.

The existing airport at Olympic Dam would be relocated as the mine expansion progresses. Studies are currently being undertaken to determine the most appropriate location for the new airport and the timing of the relocation.

## **Accommodation and associated infrastructure**

The township of Roxby Downs, 16 km south of the mine, houses approximately 4,500 people. The construction camp at Olympic Dam 6 km south of the mine houses approximately 1650 people. During the construction and operation of the proposed expansion, the workforce will increase significantly and it is estimated that in the order of 10,000 people would be housed at Roxby Downs and *up to 10,000* people at construction camp/s.

An expansion to the existing Roxby Downs Municipal Lease would not be required. Additional service and community infrastructure would also form a component of the project. Planning studies that establish the location and extent of the increased footprints and associated infrastructure will be undertaken during the EIS.

It is also likely that additional pre-fabrication yards would be required and these may be located within the expanded Roxby Downs Municipal Lease, Port Augusta, Port Adelaide or elsewhere.

### **3.3 Timeframe**

Project timing is under investigation and projected timeframes will change. The proponent has indicated the following schedule, which would be subject to the proposal obtaining environmental approval:

- construction of the necessary infrastructure would commence immediately upon environmental approval of the expanded project
- pre-feasibility and preliminary engineering studies would occur concurrent with the environmental assessment
- construction of the various infrastructure components would be staged, commencing after environmental approval is obtained
- mining would commence as soon as practicable after and subject to all relevant approvals been obtained
- the actual ore body is expected to be reached in the order of 5 years after commencement of mining
- mining of the resource would continue until the resource within the extended SML boundary was exhausted. The proponent has anticipated that this equates to a life of mine of approximately 70+ years.



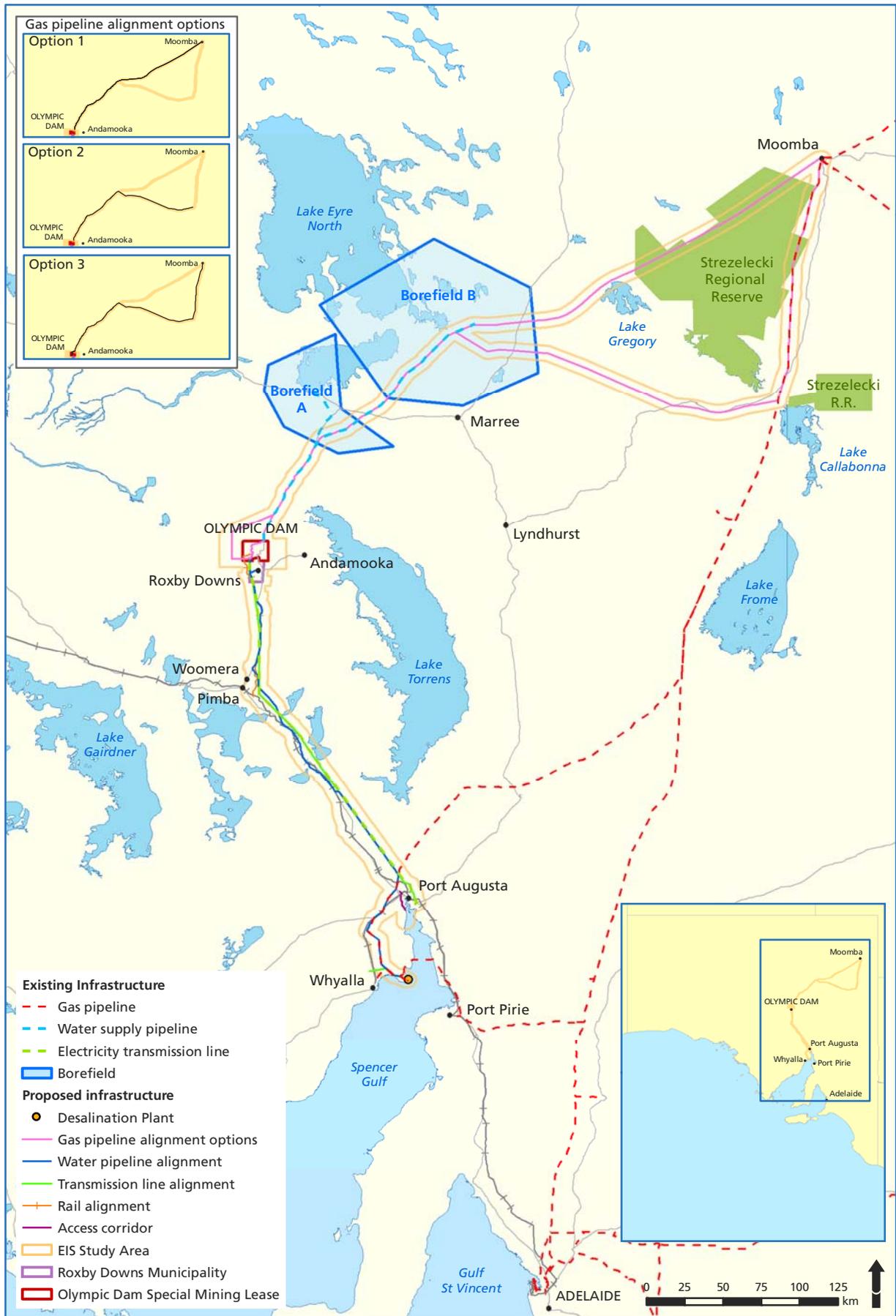


Figure 1: Olympic Dam Development Study - regional layout and infrastructure options



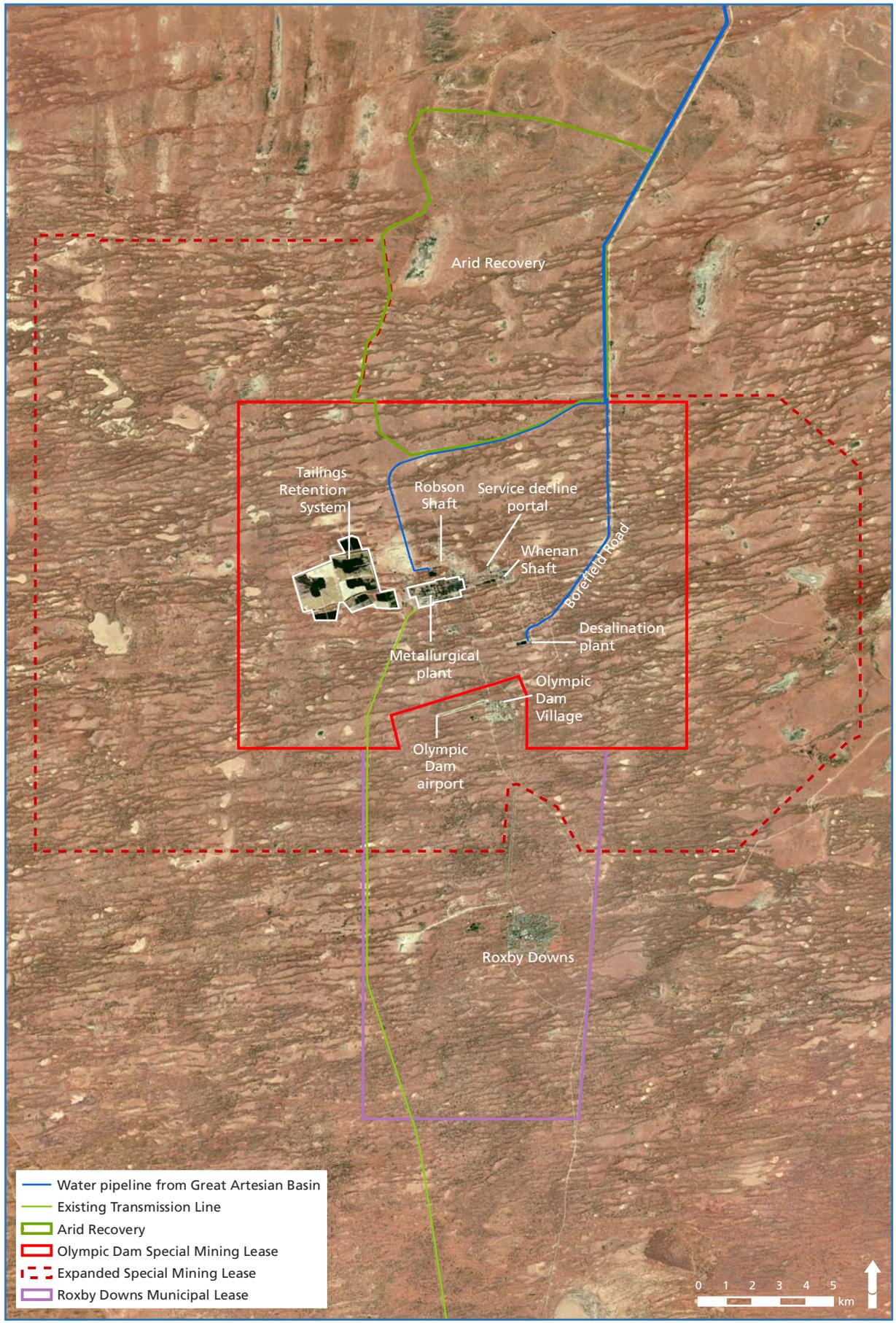


Figure 2 Olympic Dam Development Study - existing operation



## 4. CONTENT OF THE EIS

The objective of both the environmental impact assessment provisions of the Australian and South Australian Governments is to ensure that those matters that could potentially have a significant environmental, social or economic impact are fully examined and taken into account in decisions by both Governments. The terms 'environment' and 'environmental' as used herein refer to all aspects of the surroundings of human beings, whether affecting human beings as individuals or in social groupings, and including the natural environment, the built environment (present and historic), and economic and social aspects of our surroundings. This definition covers such factors as air, water, soils, vegetation, fauna, buildings, roads, employment, housing and recreational facilities.

The EIS is required to:

- Provide information of the existing operations, the proposed expanded operations and the alternatives considered in establishing the expanded project. The expanded project being defined as all works associated with the proposed expanded operations including works on the SML, municipality of Roxby Downs and all associated infrastructure such as water and energy supply and transport and traffic infrastructure. From this information interested individuals and groups may gain an understanding of the proposed expansion, the need for the expansion, the alternatives, the environment which it could affect, the impacts that may occur and the measures to be taken to minimise the impacts;
- Identify the existing biological, physical, social and cultural environment, impacts which may occur on this environment (both beneficial and adverse) and the measures proposed to mitigate adverse impacts. Discussion of impacts is to include an analysis of the significance of the relevant impacts and a statement as to whether any relevant impacts are likely to be unknown, unpredictable or irreversible;
- Provide a forum for public consultation and informed comment on the proposal;
- Provide a framework in which decision-makers may consider the environmental, economic and social aspects of the proposal;
- Specifically address all relevant matters under the requirements of the *Environment Protection and Biodiversity Conservation Act 1999*;
- Be generally consistent with the principles of assessment, reporting and consultation processes for a major development under the *South Australian Development Act 1993*;
- Recognise the provisions of the *Roxby Downs (Indenture Ratification) Act 1982*.

The EIS is also to include:

- the title of proposed development
- the name and address of proponent
- an executive summary
- a glossary of terms
- a table of contents and list of tables, figures and appendices
- a description of the existing operations
- project justification
- a description of the proposed expanded project

- a description of the alternatives investigated, including the no-expansion option
- a description of the community consultation process undertaken
- an assessment of the existing environment, potential impacts on that environment and mitigation measures proposed to ameliorate impacts
- a Draft Environmental Management Plan (Draft EMP)
- a means of cross-referencing the relevant sections of the EIS with the corresponding sections of the final Guidelines
- appendices that include:
  - the final Guidelines
  - the key personnel of the study team
  - a list of the stakeholders consulted
  - technical reports that supplement the EIS (including the source, currency, reliability and any uncertainties in relation to the information).

The specific requirements to be addressed in the EIS are provided in Section 5. It is on these requirements that public comment is sought, with the earlier sections of this document providing the context.

As noted above, the EIS is not to address policy issues about the appropriateness of uranium mining. The scope of the assessment will also not include broader issues relating to the use of exported uranium in the nuclear fuel cycle. Issues related to the use of exported uranium in the nuclear fuel cycle are beyond the control of the proponent and it would be impractical for the proponent to address these issues in the EIS.

## 5. SPECIFIC REQUIREMENTS – CONTENTS OF THE EIS

The EIS is to address the following requirements and may use the same or similar format as shown below.

### 5.1 Executive Summary

The executive summary is to be written as a stand-alone document, able to be reproduced on request for interested parties who may not wish to read or purchase the full EIS. The structure of the executive summary is to follow that of the EIS, although focussed strongly on the key issues allowing the reader to obtain a clear understanding of the existing Olympic Dam operations, the proposed expanded project and the environmental, social, cultural and economic impacts, both beneficial and adverse, of the expanded project. The executive summary is also to provide a brief discussion of the alternatives, reasons for selecting the preferred option and a concise account of the management measures proposed to avoid or minimise potential adverse impacts.

### 5.2 Glossary of terms

A glossary of technical terms and commonly used acronyms is to be provided.

### 5.3 Introduction

The introduction is to explain clearly the purpose of the EIS, why it has been prepared and what it sets out to achieve. It is to define the audience to whom the EIS is directed and contain an overview of the structure of the document. It is to identify clearly the scope of the project as being an expansion to an existing mining and processing operation.

The introduction is to provide:

- A background to the project – this section is to include a statement of the objectives which have led to the proposal for an expanded project and a brief outline of the events leading up to the project's formulation, including alternatives, envisaged time scale for implementation, project life, anticipated establishment costs and actions already undertaken within the project area.
- Company profile - provide an overview of the project proponent, including the nature and extent of relevant business activities and environmental record (including details of any proceedings taken against the proponent under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources) including the proponent's environmental policy and planning framework.
- The environmental impact assessment process – provide an outline of the impact assessment process steps, likely timing and decisions to be made for relevant stages of the project. The introduction should briefly describe the studies/surveys/consultations that have been conducted in developing the expansion and preparing the EIS. Results of studies and detailed comments resulting from consultation should be included as appendices. Also outline the relevant legislation and policies controlling the environmental impact assessment process.
- Public consultation process - provide an outline of the public consultation process that has taken place during the preparation of the EIS, and outline further opportunities for public input throughout the assessment process.

- Introduction to the existing operations at Olympic Dam – provide a general overview of the existing operations.
- Introduction to the proposed expanded project – provide a general overview of the expanded project.
- The format of the EIS – provide an outline of how the EIS has been prepared and demonstrate consistency with the requirements of the Guidelines.

## 5.4 Existing Operations

A description of the key elements of the existing operations at Olympic Dam is to be provided and illustrated to give context to the expanded project. The location of the existing operations and associated infrastructure is to be described and indicated on relevant plans. The description is to include issues such as the geology of the deposit, the resource and ore reserves, the mining process, the metallurgical process, tailings management, major infrastructure (such as the township of Roxby Downs, water supply, energy, telecommunications, transportation and waste management) and an overview of existing environmental management practices for the mine operation including the Arid Recovery Reserve north of the mine.

## 5.5 Project Justification

The need for the project is to be described, with particular reference made to the economic, environmental, social and cultural impacts (beneficial and adverse), including employment and spin-off business development, which the expanded project may provide.

The need for the project is to be discussed in an international, national, state and regional context. The consequences of not proceeding with the project, an indication of the project timeframe and a clear outline of the objectives of the project are also to be included.

## 5.6 Description of the Expanded Project

This section is to provide a detailed description of the expanded project through its lifetime of planning, construction, operation and decommissioning (including rehabilitation).

This section is to identify the relationship of the EIS to the project evaluation work including descriptions of the alternatives investigated, and the 'do nothing' option, in the context of conceptual, technological and locality alternatives. Alternatives are to be discussed in sufficient detail to enable an understanding of the reasons for preferring certain options and rejecting others, and to enable an assessment of the alternatives as they significantly relate to the matters of national environmental significance (NES) protected under Part 3 of the EPBC Act.

The interdependencies of the project's components are to be explained, particularly in regard to how each element relates to the viability of the project. Issues such as mining method, tailings management, water supply, hydrometallurgical process, smelting, refining, waste management, road, rail and airport infrastructure, landform and land rehabilitation, energy supply, accommodation and finished product transport are to be discussed.

The description of the expanded project is to include, but not be limited to, the areas outlined below.

## **RESOURCE**

The results of studies and surveys undertaken to identify and delineate the mineral resource are to be summarised. The location, tonnage and quality of each mineral resource proposed to be mined are to be described. The geological resources are to be defined using formal terminology as recommended by the Australian Stock Exchange, the Australasian Institute of Mining and Metallurgy and/or the Australian Mining Industry Council.

Plans are to be provided showing the general location of the project area, and in particular:

- the location of the resource to be explored, developed or mined
- the location and boundaries of the existing SML and any proposed expansion to that lease
- the location of any proposed buffers surrounding the resource.

## **MINE OPERATIONS**

The preferred mining option and mine alternatives are to be discussed and the location and extent of the expanded mine excavations and associated ore crushing, transfer facilities and waste rock stockpiles are to be illustrated. Discussion is to be provided on probable mining pit boundaries, mine access, dewatering, mine development timeframes and any final void to be left at cessation of mining. The rationale for the preferred operational program is to be explained.

Plans are to be provided showing the general location of the project area, and in particular:

- the location of existing mine excavations
- the location and extent of excavations, tailings retention systems, overburden stockpiles and waste rock and ore stockpiles associated with the expanded project
- key environmental and aboriginal heritage sites recorded within the SML unless culturally inappropriate
- the area disturbed at each major stage of the project.

## **PROCESSING PLANT**

The capacity of the plant and equipment is to be described, together with the chemicals to be used and stored. The existing and proposed processing plant site is to be illustrated on appropriately scaled plans. Any proposed processing of non-mine site materials should be discussed. The criteria for selecting the plant site for the expanded operation is to be described and the rationale for the preferred option explained. Integration of the existing and newly proposed plants is to be discussed, indicating major components associated with the expansion, together with timeframes of proposed decommissioning. Significant changes from currently used processes are to be clearly identified and described.

## **LAND USE**

The existing land uses, tenures and the location of project components, including infrastructure corridors that could be affected by the expanded project are to be described and indicated on appropriate plans. The plans are also to identify areas of conservation value, the location of existing dwellings and the zoning of affected lands according to existing town or strategic plans.

## **INFRASTRUCTURE**

The location of proposed infrastructure is to be illustrated on plans and described. The rationale for the preferred infrastructure elements is to be explained. This section is to include, but not be limited to, the elements outlined below.

### *Accommodation*

A description is to be provided of the proposed expansion or relocation of existing accommodation at construction camps, Roxby Downs or other relevant areas.

*Assess the potential impact of the South Australian Government Policy on Affordable Housing on expansion of the Roxby Downs Township.*

### *Transport—road/rail/ship/airport*

Details are to be included of any new roads, rail, shipping requirements or airport relocation as a result of the project, as well as any upgrade of existing transport infrastructure. The transport of plant equipment, products and personnel during both the construction and operational phases of the project are to be included. The proposal will result in a significant increase in mine production. Details of how it is proposed to transport this increased production to various markets are to be included.

### *Energy*

This section is to describe all energy/power supply requirements, including electricity, natural gas, and/or solid and liquid fuel requirements for the construction, operation and decommissioning phases of the expanded project. The feasibility of using alternative renewable fuel sources and energy efficiency initiatives to enhance sustainability objectives are to be discussed in this section. The locations of any easements or corridors are to be shown on infrastructure plans.

### *Water supply and storage*

This section is to provide information on any required infrastructure for additional water supply or storage. In particular, the proposed source of water supply is to be described (e.g. coastal desalination plant, extraction from the GAB or saline aquifers) and the means of transporting this water to Olympic Dam (e.g. size and location of water pipelines). Estimated rates of supply from each source (average and maximum rates) are to be given.

In addition this section should describe the proposed desalination plant (in the event of the desalination plant being the preferred option for water supply), intake structure for saline water and disposal options for waste brine (including assessment of the pros

and cons of marine disposal *and the environmental implications for the receiving marine environment* versus land based options).

This section is also to provide discussion of the investigation of water conservation measures, such as recycling and re-use initiatives.

#### *Telecommunications*

This section is to describe any impacts on existing telecommunications infrastructure (such as optical cables, microwave towers, etc.) and identify the owners of that infrastructure. Any newly proposed telecommunications (procedures or processes or technologies) are to be described and impacts (both beneficial and adverse) on existing networks discussed.

#### *Sewerage*

This section is to describe any newly proposed sewerage infrastructure and any potential impacts (both beneficial and adverse) on existing sewerage networks and treatment plants.

#### *Solid waste disposal / handling*

The proposed location, site suitability, dimensions and volume of stockpiles (overburden, waste rock and tailings), including their design, method of construction, operation and any changes in technologies proposed to be utilized, is to be discussed and illustrated on appropriately scaled plans. This is to include staging or sequencing of these stockpiles throughout the proposed life of the mine. This section is also to discuss the investigation of reduction and recycling/re-use of solid wastes from domestic and commercial/industrial activities.

#### *Liquid waste disposal / handling*

The proposed location, site suitability, dimensions and volume of liquid disposal/storage ponds, including their design, method of construction and operation, changes in technologies proposed to be used, management of runoff from overburden and waste rock stockpiles, mine water disposal, and management of liquid wastes from tailings retention systems, associated seepages and evaporation ponds, is to be discussed and illustrated on appropriately scaled plans.

### **CONSTRUCTION**

The extent and nature of the project's construction phase is to be described. The description is to include the type and methods of construction to be employed, the construction equipment to be used and the items of plant to be transported by each proposed means to the construction site.

The estimated numbers of persons to be employed for the construction phase are to be given.

### **MATERIALS HANDLING**

This section is to describe the proposed methods and facilities to be used for materials storage (e.g. imported diesel, sulfur, acid etc) and for transferring materials to, from

and within the mine site. Discussion is to include any environmental design features of these facilities including bunding of storage facilities. Appropriately scaled plans that identify the location of relevant infrastructure and storage areas are to be included.

## **REHABILITATION AND DECOMMISSIONING**

Proposals for decommissioning of both the existing underground operation and the proposed expanded project are to be described. The description is to include proposed timing, rehabilitation methods, the anticipated final landform (including the final open pit void) and any special consideration for the long-term containment of radioactive or other hazardous materials. The description should also include estimates of long-term effects (including radiological) on groundwater in contact with the decommissioned mine, and on the surface environment resulting from the presence of rehabilitated tailings retention systems, waste rock stockpiles and the final open pit void. Altered stormwater drainage patterns are also to be discussed.

### **5.7 The Approvals Process / Legislative Obligations**

The purpose of this section is to make clear the methodology and objectives of the EIS under the relevant legislation. This section is to include a description of the impact assessment process steps, timing and decisions to be made for relevant stages of the expanded project. In particular, this section is to outline mechanisms in the process for public input, identify the timing of the public release of the Draft EIS and specify that responses to public submissions will be considered and addressed in a separate Supplementary EIS/Response Document.

The information in this section is required to ensure:

- that relevant legislation is addressed
- that there is awareness of the process to be followed
- that stakeholders are aware of opportunities for input and participation.

The approval processes and legislative requirements for both the whole of project approval and the permits / licenses for activity approvals are to be described. The legislation (Acts and Regulations), policies, licenses and permits controlling the approvals process are to be outlined. Reference is to be made to the Australian *Environment Protection and Biodiversity Conservation Act 1999*, the *Roxby Downs (Indenture Ratification) Act 1982*, the *Development Act 1993* and other relevant Australian and South Australian legislation.

This section is also to discuss the project's consistency with existing policy frameworks for the area (e.g. as reflected in regional and local plans), and with relevant standards or recognised codes of practice.

### **5.8 Public Consultation**

An appropriate public consultation program to secure approval for a controlled action requiring an EIS under the Australian *Environment Protection and Biodiversity Conservation Act 1999*, and a Major Development requiring an EIS under the State's *Development Act 1993* must be provided.

The public consultation program is to provide opportunities for community involvement and education throughout the EIS assessment and approvals process. It may include

public meeting(s), interest group meetings, production of regular summary information sheets and updates, and other consultation mechanisms to encourage and facilitate appropriate public consultation and participation.

The reader is to be informed as to how public submissions on the Draft EIS are to be addressed.

The results of the public consultation program are to be presented in this section, with a detailed report of responses and persons consulted provided as an appendix to the Draft EIS and Supplementary EIS, as appropriate.

## 5.9 Hazard and Risk

This section is to address those hazards and risks associated with human health i.e. public and environmental health, as well as occupational health and safety management practices and procedures associated with the current mining and processing operation and discuss, where relevant, proposed changes to these procedures to account for the expanded project.

This section is to include a risk assessment that addresses, but is not limited to, the following:

- occupational health and safety for the workforce and potentially affected communities associated with the proposed expansion
- the implications for, and the impacts on, surrounding land uses and land users as a result of the expanded project
- exposure sources and potential exposure to pollutants (including any potential increased levels of ionizing radiation) at all stages of the operation (including mining, processing, waste management systems, product transportation to the port and storage prior to and during transportation to the port) and post mine closure for employees, nearby communities and the environment
- estimates of radiation doses to employees, nearby communities arising from the proposed expansion
- unplanned process materials, tailings or other storage discharges
- road, rail *and marine* transport accidents
- fire (including bushfires), explosion and blasting hazards
- physical security (including uranium production *and export*) issues.

The review and reporting against the existing management procedures is to include, but not be limited to:

- relevant hazards (minor and major) and current competencies in emergency response management of human casualties
- the likely frequency and severity of potential hazards, accidents and spillages occurring during all stages of the project (recognising that some hazardous liquids are standard in the mine's metallurgical process streams)
- an indication of cumulative risk levels to surrounding residents and land users
- the duration of any identified hazards
- hazardous substances to be used, stored, processed or produced and the rate of usage.

This section is also to describe how hazards and risks will be managed to an acceptable level, and how the achievement of the objectives will be monitored, audited and reported.

This section of the EIS is also to provide:

- safeguards proposed for the transport, storage, use and handling of hazardous materials
- the capacity and standard of bunds to be provided around the storage tanks for classified dangerous goods and other goods likely to impact adversely upon the environment in the event of an accident or spill
- the procedures to reduce spillages and the emergency plans to manage hazardous situations
- description of quality control and equipment maintenance systems in place to minimize failures leading to spillage
- contingency plans for spills or accidental releases of process materials, tailings or other waste or hazardous materials
- any existing exemptions relevant to hazardous materials as a result of the nature of operations and process streams at Olympic Dam.

## 5.10 Land Use and Planning

The EIS is to provide a description of existing land uses relevant to the project (including associated infrastructure), the potential impacts on these uses as a result of the expanded project and the compliance of the proposed expansion with current planning schemes or similar planning instruments.

### **LAND USE**

This section is to provide a description of current land tenures and land uses, including details of the status of any native title claims, in the project area. The locations of the native title claims in relation to the project area are to be shown. The potential for the construction and operation of the expanded project to impact existing land uses is to be provided.

Post operations land use options are to be discussed, including suitability of the area to be used for agriculture, pastoralism, industry, tourism or nature conservation. The factors favouring or limiting the establishment of the above options are to be given in the context of land use capability or suitability and the potential liabilities for long-term management.

Consideration of the proposed expansion of the Cultana Defence facility should also be included where relevant.

Appropriately scaled plans are to be provided to support the descriptions in this section of the EIS.

### **PLANNING**

This section is to discuss the compliance of the newly proposed land uses and infrastructure requirements with current planning instruments, for the construction, operation and decommissioning phases of the project. Particular attention is to be afforded to accommodation (both short-term at construction camps and long-term at

Roxby Downs and other relevant townships), the workforce and newly proposed infrastructure.

### *Accommodation*

A description is to be provided of proposed expansion or relocation of existing accommodation at construction camps, Roxby Downs or other areas. Concept master plans for the proposed expansion of accommodation and service infrastructure at Roxby Downs are to be provided. Consistency of these expansions with Development Plans is to be discussed.

### *Workforce*

The size, make-up (e.g. permanent and contractors) and location of the workforce is to be described. The potential environmental, social, cultural and economic impacts associated with this increased workforce are to be discussed.

### *Infrastructure*

This section is to identify the various infrastructure components proposed for the expanded project and assess these for compliance against the appropriate planning instruments. Issues to be addressed include:

Roads – predictions are to be made for any new roads, road realignments, *upgrades* or proposed road closures required as a result of the expanded project. This section is also to include an analysis of the probable impact of identified construction and operational traffic generated by the project, with particular attention paid to impacts on road infrastructure, road users and road safety. Mitigation measures necessary to address any adverse road impacts are to be provided; this will require a comparison between the existing and predicted traffic and road conditions.

- Rail – any impact (adverse and beneficial) to the rail network, including any increased delays at traffic crossing points, is to be discussed. The consistency of any newly proposed rail infrastructure with state, regional and local plans are also to be addressed.
- Airport - any changes to the existing operation of the Roxby Downs airport as a result of the expanded project, including additional capacity requirements, relocation of the airstrip and compliance with relevant airport planning and operation policies / procedures is to be provided. Compliance with relevant national and state policies and standards is also to be discussed.
- Port – transport of finished product is currently through the Port of Adelaide. Any changes to the existing operation or capacity requirements of this port, or the use of other ports, as a result of the expanded project, are to be discussed.
- Energy – energy / power supply requirements, including electricity, natural gas, solid and liquid fuel for the construction and operation phases of the project are to be identified and compliance with relevant standards and policies discussed. Energy conservation is to be described in the context of relevant government policies.
- Water supply and storage – water supply requirements, including footprint areas for plant and associated infrastructure, for the construction and operation phases of the project are to be identified and compliance with relevant standards and policies discussed. In addition, an estimate of industrial and

domestic water demand is to be made for the project, including the temporary demands during the construction period. Details are to be provided of any changes to existing town water supply to meet such requirements. Water storage and treatment proposed on site for use by the site workforce is to be described in relation to compliance with relevant planning instruments.

- Sewerage – volume estimates of industrial and domestic effluent are to be provided and the proposed method of disposal / recycling is to be described. This is to include the physical and chemical characteristics of such effluent. If discharging into an existing sewerage system, an assessment of the capacity of the existing system to accept the effluent is to be provided.

## 5.11 Meteorological Environment and Climate

The EIS is to describe the temperature, humidity, wind speed and direction, and any other factors (e.g. temperature inversions) likely to affect the meteorological environment within the region of the project. Rainfall patterns including magnitude and seasonal variability of rainfall are to be included. Extremes of climate (e.g. floods, droughts, cyclones) and natural hazards (e.g. lightning strikes, bushfires and earthquakes) are to be discussed with particular reference to the relative frequency, magnitude and risk of these events resulting in significant environmental impact throughout the life of the project.

This section is also to discuss the potential for climate change and, where relevant (e.g. for a seawater desalination plant), sea level rise over the life of the project. Information about trends in changing climate patterns at a national, state and regional level is also to be provided for the life of the project.

Information provided in this section is to be adequately cross-referenced to other relevant sections of the EIS. For example, the implications of rainfall intensity is to be included in the discussion of erosion potential; wind speed and direction is to be included in the discussion of air quality.

## 5.12 Air Quality

This section is to describe the existing air environment, which may be affected by the project. A description of the existing air quality conditions of the project area is to be provided having regard for particulates, gaseous and odorous compounds. The background levels and sources of suspended particulates, PM10, SO<sub>x</sub>, NO<sub>x</sub>, radon progeny, radioactive dust and any other major constituent of the air environment which may be affected by the project are to be discussed.

Sufficient data on local meteorology and ambient levels of pollutants are to be gathered to provide a baseline for later studies or for the modeling of air quality environmental impacts, if any, within the project's air shed. Parameters are to include air temperature, wind speed and direction, atmospheric stability, mixing height/depth and other parameters necessary for input to predictive models. This section is to be cross-referenced to the Meteorological Environment and Climate section of the EIS.

This section is to define and describe the objectives and practical measures for protecting environmental values for air, to describe how nominated quantitative standards and indicators may be achieved, and how the achievement of the objectives will be monitored, audited and managed. The origins, quantities and composition of

airborne emissions from the project during construction, operation and decommissioning is to be addressed.

The objectives for airborne emissions are to be stated in accordance with relevant standards, emission guidelines and legislation. The potential for interaction between the emissions from the processing plant and mine (including emissions from blasting operations) and existing particulates in the air shed, are to be considered and the likely health and environmental impacts, if any, from any such interaction. The assessment should consider the impacts of deposition of dust on adjacent areas.

The proposed levels of emissions are to be compared with the current Draft National Environmental Protection Measures (1998) for ambient air quality, the National Health Medical Research Council (NHMRC) National Guidelines for control of emissions from stationary sources, radiation dose limits and other relevant state guidelines. Emission levels are also to be discussed in relation to those that trigger reporting thresholds under the National Pollutant Inventory (NPI) for those industries relevant to the expanded project.

Where appropriate, the maximum ground level concentrations for major air borne pollutants are to be predicted using appropriate computer modeling. These predictions are to be made for expected maximum emission conditions. The techniques used to obtain the predictions are to be referenced and key assumptions and data sets explained. The pollutants to be modeled must include any significant mass emissions including volatile organic compounds associated with the processing plant.

#### *Sustainability and Greenhouse Gas Emissions*

An assessment of greenhouse gas emissions for the project is to be provided, including:

- predicted annual emissions for each greenhouse gas and total emissions expressed in terms of 'CO<sub>2</sub> equivalents'
- the intended measures to reduce greenhouse emissions
- discussion of alternative technologies, processes and equipment to reduce greenhouse gases and how these have been considered in selecting the preferred project options
- methodologies by which estimates were made.

This assessment is to include sufficient detail to enable comparison of the greenhouse gas implications of the expanded project with other energy sources.

The above assessment is to be undertaken with due consideration of relevant protocols, agreements and strategies including: 'The National Greenhouse Strategy', 'National Greenhouse Gas Inventory', 'The Kyoto Protocol' and 'The Framework Convention on Climate Change', '*Tackling Climate Change, SA's Greenhouse Strategy 2007 - 2020*' and voluntary programs developed by the Australian Greenhouse Office.

### **5.13 Topography, Geology and Soils**

This section is to describe the existing environment of the land that may be affected by the expanded project. Issues to be addressed include those outlined below.

## **TOPOGRAPHY/GEOMORPHOLOGY**

Plans are to be provided that identify the location of the major infrastructure components of the expanded project. These plans are to include the topography of the project area, shown at appropriate contour increments and with respect to Australian Height Datum (AHD), and significant features of the landscape.

## **GEOLOGY**

The EIS is to provide a description and a series of cross-sections of the ore reserve. The physical and chemical properties of surface and sub-surface materials and geological structures within the proposed areas of disturbance are to be included. Geological properties that may influence ground stability (including seismic activity and risks, if relevant), safety, environmental monitoring and rehabilitation programs, or the quality of wastewater leaving any area disturbed by the project are to be described.

In locations where the age of the rock and the nature of the geology is such that fossil specimens may be uncovered during the construction or operation of the mine, the EIS is to address the potential for finds, provide a procedure to establish the significance of the find, and identify the management procedure to record and notify of any significant find.

## **SOILS**

A soil survey of the sites affected by the expanded project is to be conducted at a suitable scale, with particular reference to the physical and chemical properties of the materials which will influence erosion potential, stormwater run-off quality and site stability. Background chemical and radiological composition of soils should be established for the areas likely to be affected by the expanded operations.

An acid sulfate soil investigation, carried out according to applicable national and state guidelines, is to be undertaken in areas where any excavations or disturbance works are proposed in coastal areas <5m AHD (e.g. for a seawater desalination plant and associated water pipeline).

Soil types are to be mapped at a suitable scale, and soil profiles from representative samples of each soil type are to be described according to the Australian Soil and Land Survey Field Handbook (McDonald et al, 1990) and Australian Soil Classification (Isbell, 1996). For each soil type identified, erosion potential (wind and water) and erosion management techniques are to be outlined.

The EIS is to include an assessment of likely erosion effects, especially those resulting from the removal of vegetation, for disturbed areas such as:

- the mine site, including the expanded tailings retention systems, waste rock stockpile and any material stockpiles
- access roads, rail, energy and water supply corridors.

Methods proposed to minimise or control erosion are to be specified and are to be developed with regard to preventing soil loss in order to maintain land capability / suitability and minimise degradation of downstream waterways or water impoundments.

An overview of the current monitoring, auditing and management practices for the control of erosion, sedimentation and contamination for the existing Olympic Dam operations are to be provided, with any required amendments to these practices to account for the expanded project identified and discussed.

## **5.14 Flora**

The EIS is to discuss matters relevant to the existing vegetation communities and the potential impacts on these communities as a result of the expanded project. The EIS is to identify issues relevant to locations with sensitive flora assemblages, or areas that may have low resilience to environmental change. Areas of sensitivity include the marine environment and wetlands, any significant habitat for State and / or Australian Government listed threatened species and endangered ecological communities, with particular attention being required on GAB springs. The capacity of the environment to assimilate disturbance is to be assessed.

Surveys of flora are to be conducted at those times that are appropriate to maximize the detection of significant species and communities. Key flora indicators for future monitoring are to be identified.

### **TERRESTRIAL FLORA**

This section is to describe the existing terrestrial vegetation communities of those areas potentially impacted by the expanded project, including associated infrastructure, the direct and indirect impacts on this environment, any impacts of regional importance and measures proposed to mitigate impacts. The potential environmental impact, if any, to the ecological values of the area arising from the construction, operation of the mineral processing plant and mine and decommissioning of the project including clearing, salvaging or removal of vegetation is to be described. Mitigation measures and / or offsets are to be proposed for adverse impacts including beneficial re-use options of cleared vegetation.

Vegetation mapping is to be included for relevant project areas including new infrastructure corridors. Mapping of vegetation types is to be at a suitable scale as to be clearly understood and accompanied by descriptions of each representative vegetation type. Sensitive or important vegetation types are to be highlighted, including any preferred habitat for State and / or Australian Government listed threatened flora or endangered ecological communities and / or locally significant communities (e.g. duricrust).

The existence of important regional and local weed species is also to be discussed. Weed control strategies aimed at containing existing weeds and reducing the risk of new invasive weeds being introduced to the project area are required. Reference is to be made to national, state and local government pest management plans when determining appropriate control strategies.

### **AQUATIC FLORA**

This section is to describe the existing aquatic vegetation communities of aquatic areas potentially impacted by the expanded project, the direct and indirect impacts on this environment and measures proposed to mitigate adverse impacts (including sea water intake and discharge structures for the desalination plant). Appropriate modeling of the

discharge of wastewater from the desalination plant to the marine environment is to be undertaken if this option is considered.

Aquatic flora occurring in areas potentially affected by the project are to be described, noting the patterns and distribution in the waterways and/or associated lacustrine and marine environments. Particular attention is to be provided for State and / or Australian Government listed threatened species and endangered ecological communities.

## 5.15 Fauna

The EIS is to discuss matters relevant to the existing faunal communities and the potential impacts on these communities as a result of the expanded project. The EIS is to identify issues relevant to sensitive fauna habitats, or areas which may have a low resilience to environmental change. Areas of sensitivity include the GAB springs, the marine environment and wetlands, wildlife breeding or roosting areas, any significant habitat or relevant bird flight paths for migratory species, bat roosting and maternity caves and habitat of listed threatened animals.

The occurrence of pest animals in the project area is to be included. Key fauna indicators are to be identified for future monitoring. Surveys of fauna are to be conducted at those times that are appropriate to maximize the detection of significant species, including migratory species).

### **TERRESTRIAL FAUNA**

This section is to describe the existing terrestrial faunal communities of areas potentially impacted by the expanded project, the direct (e.g. clearing) and indirect (e.g. increased recreational use of natural areas by more people) impacts on this environment and measures proposed to mitigate adverse impacts. This should include an assessment of the potential impact of an increase in pets and the impacts this may have on the environment.

The terrestrial fauna occurring in the areas affected by the project are to be discussed. The description of the fauna present or likely to be present in the area is to include:

- species richness (i.e. a species list) and conservation status of animals, including amphibians, birds, reptiles, mammals (including microchiropteran bats)
- habitat requirements and sensitivity to change, including the effect of pollutant emissions, movement corridors and barriers to movement
- the existence of feral or exotic animals
- existence of any listed threatened species in the project area (vertebrate and invertebrate), including discussion of the species conservation status, range, habitat, breeding, recruitment, feeding and movement requirements
- use of the area by, and potential impacts on, migratory, nomadic and vagrant birds and include a discussion on potential exposure of fauna to tailings retention systems
- where relevant, discussion of arachnids, gastropods and the unique fauna associated with the GAB springs.

Feral animal control strategies aimed at containing existing feral species and reducing the risk of new feral species being introduced to the area is to be included. Reference

is to be made to national, state and local government pest management plans when determining appropriate control strategies.

## **AQUATIC FAUNA**

This section is to describe the existing aquatic faunal communities of those aquatic areas potentially impacted by the expanded project, the direct and indirect impacts on this environment and measures proposed to mitigate impacts (including sea water intake and discharge structures for the desalination plant). Appropriate modeling of the discharge of wastewater from the desalination plant to the marine environment is to be undertaken if this option is considered.

Aquatic fauna occurring in areas potentially affected by the project are to be described, noting the patterns and distribution in the waterways and/or associated lacustrine and marine environments. Specific attention is to be provided to listed threatened species, particularly GAB spring fauna (if the GAB water source is considered) and the cuttlefish in Spencer Gulf (if a seawater desalination plant is considered).

### **5.16 Groundwater**

The EIS is to identify and describe the location, quantity and quality of groundwater that could be considered as an additional source for the life of the expanded project and the impacts of sourcing this water on applicable sources such as the GAB, regional saline aquifers and the local groundwater associated with the mine site. A description of the GAB springs and their connection to groundwater is required.

The information to be gathered for analysis is to include:

- location of the groundwater source
- pumping parameters
- draw down and recharge at proposed extraction rates
- seasonal variations (if records exist) of groundwater levels.

Observation points / bores that would satisfactorily monitor groundwater resources prior to construction, during operation and post-operation are to be developed if this option for water supply is assessed as sustainable for the life of the expanded project.

When discussing groundwater conditions and the proposed groundwater monitoring regime, reference is to be made to:

- the nature of the aquifer(s) including:
  - geology/stratigraphy - such as alluvium, volcanic, metamorphic
  - aquifer type - such as confined, unconfined, artesian
  - depth to and thickness of the aquifers
  - sustainability of the aquifer
- hydrology of the aquifer(s) including:
  - depth to water level and seasonal changes in levels
  - groundwater flow directions (defined from water level contours)
  - interaction with surface water
  - interaction with seawater (in the desalination plant option)

- possible sources of recharge
- vulnerability to pollution.

The data obtained from the groundwater survey are to be sufficient to enable the major ionic species present in the groundwater to be specified, and pH, electrical conductivity and total dissolved solids to be measured.

The EIS is to include an assessment of the potential environmental impacts, if any, caused by the expanded project to national, state, regional and local groundwater resources. The impact assessment is to define the extent of the area within which groundwater resources are likely to be affected by the expanded operations and the significance of the project to groundwater depletion, aquifer recharge or inflow and discharge. The potential impact on existing and potential future groundwater users within the project area is to be considered and strategies to mitigate these impacts are to be considered.

This section is to be cross-referenced to the Flora and Fauna sections of the EIS, particularly in relation to potential impacts on GAB springs. Management options and strategies available to monitor, mitigate and implement corrective action of these effects are to be included.

The EIS is to discuss post-mining groundwater recovery, rehabilitation and decommissioning of the borefield areas and regional and / or local groundwater resources and its impact on underground, open pit or subsidence depression of the mine area.

The potential impact of the expanded project on the local groundwater regime caused by the altered porosity and permeability of any land disturbance is to be considered, together with the potential re-use of the water from mine de-watering.

The potential to contaminate groundwater resources from sources such as seepage from mine and plant areas, tailings retention systems and the waste rock stockpiles is to be included. Measures to control, mitigate and remediate such contamination are also to be discussed.

A discussion of chemical, radiological and physical properties of any wastewater (including concentrations of constituents) at the point of entering groundwater is required.

An overview of the current monitoring, auditing and management practices for the control of groundwater quality associated with the existing Olympic Dam operations are to be provided, with any required amendments to these practices to account for the expanded project identified and discussed in the Draft EMP.

## 5.17 Surface Water

This section is to discuss the surface waterways and water impoundments in the area affected by the expanded project with reference made to the significance of these waters to the catchment system in which they occur. Information provided is to include a description of existing surface drainage patterns, water quality, catchment size and flows in major waterways and wetlands. The likelihood of flooding, history of flooding including extent, levels and frequency, and a description of current water uses and users downstream of the areas potentially affected by the project is to be included.

The discussion on flooding may be cross-referenced to Section 5.11 (Meteorological Environment and Climate). Potential impacts of post mine drainage patterns and flooding is to be addressed. Given the potential 70+ years mine life, and assessment should be undertaken of the potential impact of climate change on rainfall patterns and impacts on surface water runoff from the waste rock and tailings stockpiles.

Water quality is to be described, including an appropriate range of physical, radiological, chemical and biological parameters to gauge the environmental impact, if any, on potentially affected creek or waterway systems. The discussion is to include:

- sustainability, including both quality and quantity
- physical integrity, fluvial processes and morphology of watercourses, including riparian vegetation
- any water resource plans, land and water management plans relevant to the affected catchments.

Water quality parameters to be investigated are those appropriate to the catchment type as per the applicable parameters and levels provided in relevant policies and guidelines (e.g. South Australian Environment Protection (Water Quality) Policy 2003 and Australian and New Zealand Environment and Conservation Council (ANZECC) Guidelines for Fresh and Marine Water Quality 2000)). Chemical, radiological and physical properties of any waste water (including concentrations of constituents) at the point of entering natural surface waters is to be discussed along with toxicity of effluent constituents to flora and fauna.

Options for mitigation and the effectiveness of mitigation measures are to be discussed with particular reference to sediment, acidic liquor, hazardous or toxic materials, salinity and brine discharge (if the seawater desalination plant is considered).

An overview of the current monitoring, auditing and management practices for the control of surface water quality associated with the existing Olympic Dam operations are to be provided, with any required amendments to these practices to account for the expanded project identified and discussed.

## 5.18 Noise and Vibration

This section of the EIS is to discuss the background noise and vibration levels, changes to these levels as a result of the expanded project and the mitigation measures and management strategies proposed to minimise any adverse impacts. Sufficient data are to be gathered to provide baseline information for monitoring, where relevant, during the construction and operational phases.

The location of noise and vibration sensitive receptors is to be identified on an appropriately scaled plan. The daily variation of background noise levels at sensitive receptors is to be investigated and reported in accordance with relevant State policies and guidelines. Information, including noise contours from a suitable acoustic model is to be provided for significant noise generating activities (e.g. blasting, desalination plant operation). Noise and vibration levels are to be compared, where possible, to recognized national and state standards.

Discussion specific to the township of Roxby Downs is to be included, as is discussion on any other township or community in close proximity to the proposed expansion works, including infrastructure corridors. This will include consideration of the impacts

on townships of road, rail and aircraft routes as a result of the expansion. The potential environmental impact, if any, on terrestrial and marine animals and avifauna, particularly migratory species, is also to be considered.

Information is to be supplied on blasting which might cause ground vibration or fly rock on, or adjacent to, the SML. The magnitude, duration and frequency of any vibration generating activity are to be discussed. Mitigation measures for identified noise and vibration impacts are to be provided, together with consideration of how these measures will be monitored, audited and managed. Timing schedules for the construction, operation and decommissioning phases are to be provided together with a discussion on how these timeframes may influence noise and vibration impacts.

This section is also to describe any project-related noise and vibration sources, potential impacts as a result of these sources and mitigation measures to ameliorate impacts. Examples to be included in this discussion, where relevant, are road and rail infrastructure, power plant, seawater desalination plant and gas pipeline and associated compressor stations.

## 5.19 Cultural Heritage

### **INDIGENOUS CULTURAL HERITAGE**

This section of the EIS is to describe the existing indigenous cultural heritage sites and values that may be affected by the expanded project.

A list of all existing cultural heritage reports held by WMC Olympic Dam Corporation Pty Ltd should be included. This section should also include:

- information about liaison with relevant indigenous community/communities concerning:
  - the identification of places of significance to that community/communities (including archaeological sites, natural sites, historical sites and anthropological sites etc)
  - any requirements of indigenous peoples relating to confidentiality of site data is to be identified
- a summary of the results of all previous cultural heritage assessments conducted within the project area including (subject to any indigenous confidentiality restrictions) the location and recording of all significant indigenous cultural heritage sites that may be affected by the project
- assessment of the significance of all cultural heritage sites located
- commentary on the impact of the proposed development on cultural heritage sites and values.

A process for the management of cultural heritage sites throughout the project area is to be explained, which addresses the following:

- a process for ensuring the ongoing involvement of indigenous communities associated with the areas of the expanded project, in the protection and management of indigenous cultural heritage sites
- a process for mitigation of any impacts, through the salvage or management and protection of identified cultural heritage sites and places in the project areas, including associated infrastructure corridors, during land disturbance activities

- a process for the management of sites, in accordance with the relevant legislation, where destruction, damage or disturbance of sites is not avoidable
- provisions for the management of the unanticipated discovery of cultural material
- cultural heritage awareness training within induction programs for all employees.

## **NON-INDIGENOUS/EUROPEAN HERITAGE**

This section of the EIS is to describe the existing cultural heritage sites and values that may be affected by the expanded project.

A list of all existing cultural heritage reports held by the proponent should be provided. This section should also include the following:

- information about liaison with relevant communities concerning:
  - the identification of places of significance to that community/communities (including archaeological sites, natural sites and historical sites)
- the results of all previous cultural heritage assessments conducted within the project area including the location and recording of any significant cultural heritage sites that may be affected by the project
- assessment of the significance of any cultural heritage sites located
- the impact of the proposed development on cultural heritage sites and values

A process for the management of cultural heritage sites throughout the project area is to be explained, which addresses the following:

- a process for mitigation of any impacts, through the management and protection of identified cultural heritage sites and places in the project areas, including associated infrastructure corridors, during land disturbance activities
- a process for the management of sites, in accordance with the relevant legislation, where destruction, damage or disturbance of sites is not avoidable
- opportunities for employment of indigenous peoples within the construction and operational phases of the expansion project

## **5.20 Social impact assessment**

Social, economic and cultural values are not easily separated and therefore it may be necessary for some material in this section to be cross referenced to other relevant sections of the EIS. The social impact assessment is to consider the information gathered in the community consultation program and the socio-economic assessment.

This section is to describe the existing social environment, with consideration given to:

- community infrastructure and services, access and mobility
- family structure and demographics of the potentially affected communities
- health services and educational facilities
- workforce characteristics, including types of skills or occupations and availability during both construction and operational phases

- accommodation type, quantity and availability (as it relates to the need for accommodation for the expanded project construction and operational workforce).

The assessment of impacts is to identify possible beneficial and adverse impacts. These impacts are to be considered at the state, regional and local level. Consideration is to be given to the following:

- the impact of the expanded project on existing pastoral land uses (mainly associated with infrastructure corridors and potential impacts on fences, water supply and stock watering points, movement of agricultural machinery), cross referenced to section 5.16
- potential impacts and timing on access to the general public and Arid Recovery Reserve associated with relocating public roads, such as the bore field road
- the impact on any affected land holders
- the potential and mechanisms for local and statewide communities and businesses to tender contracts for services and supplies for any relevant components of the construction, operation and decommissioning phases of the project
- the impact of accommodation requirements during the construction and operational phases, including secondary construction workforce (e.g. workers involved in town expansion and other accommodation development), contractors employed on an as need basis for periodic shut downs and refurbishments and staff that would work in the shops and other service providers
- the impact of the construction workforce on local human services (e.g. housing, education and health services) and local community social and recreational environments
- any potential impacts on the health of the surrounding community (this may be cross-referenced to Section 5.9) and the need for health services specifically relating to families (obstetric and paediatric services), provision of family friendly open space and public spaces, provision of youth centres and community meeting places
- the potential positive and negative social impacts that could result from an increased population at the town
- impact on town expansion and services of other development projects in the region that have publicly available information of relevance to this proposal.
- *Impact of housing/construction camp expansion on the Aboriginal community and any training needs that have been identified by the company.*

## 5.21 Visual Amenity

This section is to describe the existing landscape character of the project area and the surrounding area. Discussion, plans, photographs and the like are to be used to address the following:

- identification of elements within the project and surrounding area that contribute to the image of the area as discussed in any local government strategic plan or similar government planning instrument
- major views, existing viewing outlooks, ridgelines and other features contributing to the visual amenity of the area

- focal points, landmarks (built form or topography), gateways associated with the project area and immediate surrounding areas, waterways and other features contributing to the visual quality of the area
- character of the local and surrounding areas including character of built form (scale, form, materials and colours) and vegetation (natural and cultural vegetation)
- where relevant, the value of existing vegetation as a visual screen.

The visual impact in terms of the extent and significance of the changed skyline as viewed from places of residence, work and recreation, from road, cycle and walkways, from the air and other known vantage points, day and night, during all stages of the project as it relates to the surrounding landscape is to be considered. Sketches, diagrams or computer imaging and photographs are to be used, where possible, to portray the near and far views of the completed structures (including expanded ore processing plant, waste rock dumps, desalination plant, power station and other major infrastructure components) and their surroundings from visually sensitive locations.

Management measures proposed to minimise any adverse affects on visual amenity are to be discussed. The opportunity to establish viewpoints for the general public as a tourist feature should be considered as part of establishment of the waste rock stockpiles.

## 5.22 Waste Materials Management

The EIS is to identify and describe those sources of radioactive and non-radioactive waste associated with construction, operation and decommissioning of the expanded project. This section is to include, but not be limited to, the following:

- the amount and physical, radiological and chemical characteristics of solid and liquid waste produced as a result of the expanded project (both on and off the SML) and the processes generating the wastes including those produces by the processing on non-mine site materials
- a summary of key issues in relation to radioactive waste management plans and associated monitoring and reporting programs
- any proposed waste treatment process for disposal of construction, operational and decommissioning waste
- consideration of waste minimisation and cleaner technology options during the construction and operational phases (including solid and gaseous wastes such as nitrogen oxides, sulphur oxides, particulates and carbon dioxide)
- the methods proposed to avoid stormwater contamination by raw materials, wastes or products and the means of containing, recycling, reusing and where appropriate treating of stormwater
- contingency measures in the event of incidents or equipment or operational failures
- the expected total volumes of each waste produced, including an inventory of the following per unit volume of product produced:
  - the tonnage of products processed
  - the amount of resulting process wastes
  - the volume and tonnage of any by-products

- natural resource use efficiency (e.g. energy and water), integrated processing design, and by-product reuse as shown in a material/energy flow analysis.

The potential impact of waste materials to be generated is to be discussed with details of each material discussed in terms of:

- operational handling, storage and disposal of wastes
- on-site treatment methods proposed for waste materials
- methods of disposal and storage (including the need to transport waste off-site for disposal) proposed to be used for any trade wastes, liquid wastes and solid wastes
- the potential level of impact on environmental values as a result of waste storage and disposal
- proposed discharge/disposal criteria for solid, liquid and gaseous wastes
- methods to control seepage and contamination of groundwater from tailings' retention systems, waste rock stockpiles or any other relevant source
- where appropriate, market demand for recyclable materials.

Further to the above, the potential impacts of additional wastes resulting from the expansion project and the disposal and handling of these wastes is to be considered, including opportunities for coordinating waste management practices for the mine and township of Roxby Downs.

### ***Solid waste disposal / handling***

The proposed location, site suitability, dimensions and volume of stockpiles or disposal facilities (overburden, waste rock and tailings), including their method of construction, is to be discussed and illustrated on appropriately scaled plans. The discussion should include details of any tailings and solid waste management options, including co-disposal of tailings with waste rock, generation and use of thickened tailings and possible changes in design and operation of the paddock tailings retention system.

This is to include staging or sequencing of these stockpiles or disposal facilities throughout the proposed life of mine. Methods to minimise the risk of acid formation, seepage and contamination are to be provided. Measures to ensure containment of wastes and stability of the stockpiles or disposal facilities and impoundments, if required, are to be described. The information provided is to be supported by appropriate testing and analysis, seepage analysis and slope stability assessment.

### ***Liquid Wastes***

A description of the origin, quality and volume estimates of liquid wastes originating from the project is to be provided, including, but not limited to management of runoff from overburden and waste rock stockpiles, mine water disposal and management of liquid wastes from tailings retention systems and evaporation storages and associated seepages. The design, construction and operation of liquid waste retention systems and evaporation storages are to be discussed. Particular attention is to be given to the capacity of wastes to generate radioactive, acid, saline or sodic wastewater. A water balance for the project and processing plant is required to account for the estimated usage of water. The extent to which existing waste disposal systems and treatment plants are to be used or modified for the expanded project is also to be discussed.

## 5.23 Economic Assessment

The existing economic environment that may be affected by the project is to be discussed in the national, state, regional and local context. The character and basis of the regional and local economies is to be described, including:

- existing housing market, particularly rental accommodation which may be available for the project workforce
- economic viability (including economic base and economic activity, current regional and local economic trends).

The EIS is also to define and describe the objectives and practical measures for protecting or enhancing economic values and to describe how relevant quantitative standards and indicators may be achieved for economic management.

The effect on state, regional and local labour markets is to be discussed with regard to the source of the workforce. This information is to be presented according to occupational groupings of the workforce.

Direct and indirect impact of the expanded project on the national, state, regional and local economies in terms of effects on employment, income and production is to be discussed. The economic analysis is to include:

- the significance of this project in the national, state, regional and local economic context
- the long and short-term beneficial (e.g. job creation) and adverse (e.g. competition with local small business) impacts that may result from the expanded project
- the cost to all levels of government of any additional infrastructure provision
- the potential economic impact of any major hazards identified.

## 5.24 Rehabilitation and Decommissioning

This section of the EIS may be presented as, or include, a summary mine closure plan. The strategies and methods for progressive and final rehabilitation of the SML and associated infrastructure corridors for the life of mine are to be discussed. The final topography of the underground and above ground mine excavations, any additional excavations outside the SML, waste areas, tailings retention systems, infrastructure corridors and evaporation ponds are to be described and illustrated.

This section is to include, but not be limited to, the following:

- the means and proposed timing of decommissioning the project, in terms of the removal of plant equipment, structures and buildings
- the methods proposed for the stabilisation of affected areas
- final rehabilitation of the SML is to be discussed in terms of rehabilitation standards, engineering controls to minimize radiation and other emissions from the site, ongoing land use suitability, management of any residual contaminated land and any other land management issues such as water management and land access
- rehabilitation methods to be used for the project including backfilling, covering, re-contouring, topsoil and cleared vegetation handling and progressive and final revegetation is to be described

- method for decommissioning and rehabilitation of tailings retention systems and associated liquid waste evaporation ponds and other waste storages
- effect of choice of the tailings retention system on final land form and long term stability of rehabilitated tailings retention systems for the duration of risk to the surrounding environment
- consideration is to be given to settling or subsidence of rehabilitated areas and how this may affect the use of the land in its post mine form
- the final drainage and seepage control systems and long-term monitoring plans for these is to be described
- management of any voids remaining post operations are to be described, including proposed land use, void water quality, suitability for use by stock, safety of access and stability of void walls
- post mining impacts on local / regional groundwater resources
- decommissioning of the existing underground operation is to be addressed as well as the proposed expanded project

## 5.25 Draft Environmental Management Plan

A Draft Environmental Management Plan (Draft EMP) is to be developed from the mitigation measures detailed in the EIS for the construction, operation and decommissioning phases. The Draft EMP is to take account of the existing Olympic Dam Environmental Management Program 2005-2007 and focus on those components of the expanded project not currently addressed, or requiring update, in the existing management program.

The Draft EMP is an integral part of the EIS, but is to be capable of being read as a stand-alone document without reference to other parts of the EIS. The general content of the Draft EMP are to comprise:

- a consolidated list of the proponent's commitments to acceptable levels of environmental performance, including environmental objectives (i.e. levels of expected environmental impact, performance standards and associated measurable indicators, performance monitoring and reporting against the predicted effectiveness of mitigation measures and corrective action in the case of non-compliance)
- control strategies and estimated costs to implement the commitments
- the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program.

## 5.26 References and Appendices

All references are to be consistent and presented in a recognised format. Items in the appendices are to include:

- the final Guidelines
- the key personnel of the study team
- a list of the stakeholders consulted
- site plans
- technical reports that supplement the EIS (including the source, currency, reliability and any uncertainties in relation to the information).

# ATTACHMENT A

## MATTERS THAT MUST BE ADDRESSED IN AN EIS (SCHEDULE 4 OF THE EPBC ACT REGULATIONS 2000)

### 1. General information

1.01 The background of the action including:

- (a) the title of the action;
- (b) the full name and postal address of the designated Proponent;
- (c) a clear outline of the objective of the action;
- (d) the location of the action;
- (e) the background to the development of the action;
- (f) how the action relates to any other actions (of which the Proponent should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action;
- (g) the current status of the action; and
- (h) the consequences of not proceeding with the action.

### 2 Description

2.01 A description of the action, including:

- (a) all the components of the action;
- (b) the precise location of any works to be undertaken, structures to be built or elements of the action that may have relevant impacts;
- (c) how the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts;
- (d) relevant impacts of the action;
- (e) proposed safeguards and mitigation measures to deal with relevant impacts of the action;
- (f) any other requirements for approval or conditions that apply, or that the Proponent reasonably believes are likely to apply, to the proposed action;
- (g) to the extent reasonably practicable, any feasible alternatives to the action, including:
  - (i) if relevant, the alternative of taking no action;
  - (ii) a comparative description of the impacts of each alternative on the matters protected by the controlling provisions for the action; and
  - (iii) sufficient detail to make clear why any alternative is preferred to another;

- (h) any consultation about the action, including:
  - (i) any consultation that has already taken place;
  - (ii) proposed consultation about relevant impacts of the action; and
  - (iii) if there has been consultation about the proposed action — any documented response to, or result of, the consultation; and
- (i). identification of affected parties, including a statement mentioning any communities that may be affected and describing their views.

### **3 Relevant impacts**

3.01 Information given under paragraph 2.01(d) must include

- (a) a description of the relevant impacts of the action;
- (b) a detailed assessment of the nature and extent of the likely short term and long term relevant impacts;
- (c) a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;
- (d) analysis of the significance of the relevant impacts; and
- (e) any technical data and other information used or needed to make a detailed assessment of the relevant impacts.

### **4 Proposed safeguards and mitigation measures**

4.01 Information given under paragraph 2.01(e) must include:

- (a) a description, and an assessment of the expected or predicted effectiveness of, the mitigation measures;
- (b) any statutory or policy basis for the mitigation measures;
- (c) the cost of the mitigation measures;
- (d) an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing;
- (e) the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program; and
- (f) a consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action, including mitigation measures proposed to be taken by State governments, local governments or the Proponent.

### **5 Other Approvals and Conditions**

5.01 Information given under paragraph 2.01(f) must include:

- (a) details of any local or State government planning scheme, or plan or policy under any local or State government planning system that deals with the proposed action, including:

- (i) what environmental assessment of the proposed action has been, or is being carried out under the scheme, plan or policy; and
  - (ii) how the scheme provides for the prevention, minimisation and management of any relevant impacts;
- (b) a description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the Act), including any conditions that apply to the action;
  - (c) a statement identifying any additional approval that is required; and
  - (d) a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.

## **6 Environmental record of person proposing to take the action**

- 6.01 Details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:
- (a) the person proposing to take the action; and
  - (b) for an action for which an EIS has applied for a permit, the person making the application.
- 6.02 If the person proposing to take the action is a corporation — details of the corporation's environmental policy and planning framework.

## **7 Information sources**

- 7.01 For information given the EIS must state:
- (a) the source of the information; and
  - (b) how recent the information is; and
  - (c) how the reliability of the information was tested; and
  - (d) what uncertainties (if any) are in the information.