

# Section 1

## Introduction

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### PREAMBLE

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*The section introduces the Proposal and:*

- *outlines of the scope of this Environmental Impact Statement;*
  - *introduces the Applicant, Perilya Broken Hill Limited;*
  - *describes the Mine Site;*
  - *provides relevant background to the Proposal, including a review of the history of mining and exploration in the Mine Site, an overview of the resources and reserves and an overview of the products and need for the Proposal;*
  - *outlines the format of this Environmental Impact Statement; and*
  - *identifies the personnel involved in the Proposal design, document preparation and specialist consultant investigation.*
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## 1.1 SCOPE

This *Environmental Impact Statement* has been prepared by R.W. Corkery & Co. Pty Limited on behalf of Perilya Broken Hill Limited (“the Applicant”) to describe the proposed recommencement of mining operations at the Broken Hill North Mine (“the Proposal”). The Broken Hill North Mine (“the Mine”) is located on the Line of Lode, Broken Hill, within Consolidated Mining Leases (CML) 4 and 5 (**Figure 1.1**). All activities would be undertaken within an area identified as the “Mine Site” (see Section 1.3).

In brief, the Applicant proposes to undertake the following activities.

- Recommence mining operations using the existing Cosmopolitan Decline to extract ore to a depth of between 1 750m and 2 250m below surface over a period of approximately 25 years.
- Crush extracted ore within a surface ROM pad using a mobile crusher.
- Transport crushed ore via the public road network to the Company’s Southern Operations using A-double Road Trains.
- Undertake ancillary activities associated with the proposed mining works, including re-establishment and refurbishment of a range of existing infrastructure, construction and operation of a Paste Fill Plant, including a tailings harvesting area, and construction of a haul road.

The Mine Site is located within the Broken Hill Local Government Area for which the *Broken Hill Local Environment Plan 2013* is relevant. The Mine Site is zoned as follows (**Figure 1.2**).

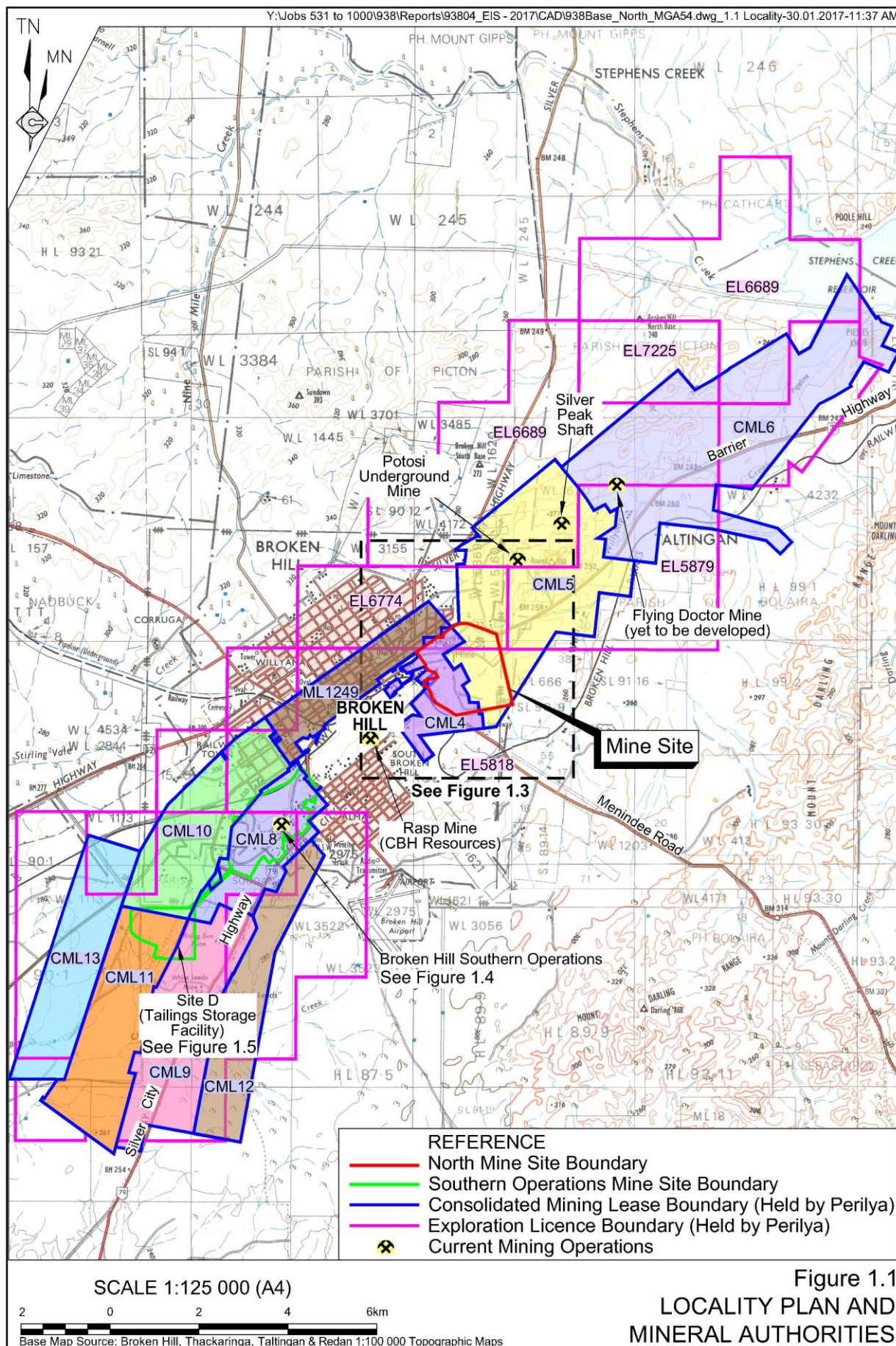
- SP1 – Mining.
- R1 – General Residential.
- RU2 – Rural landscape.

The proposed activities are permissible with Consent under each of these zones (see Section 3.3.5 for further discussion re permissibility).

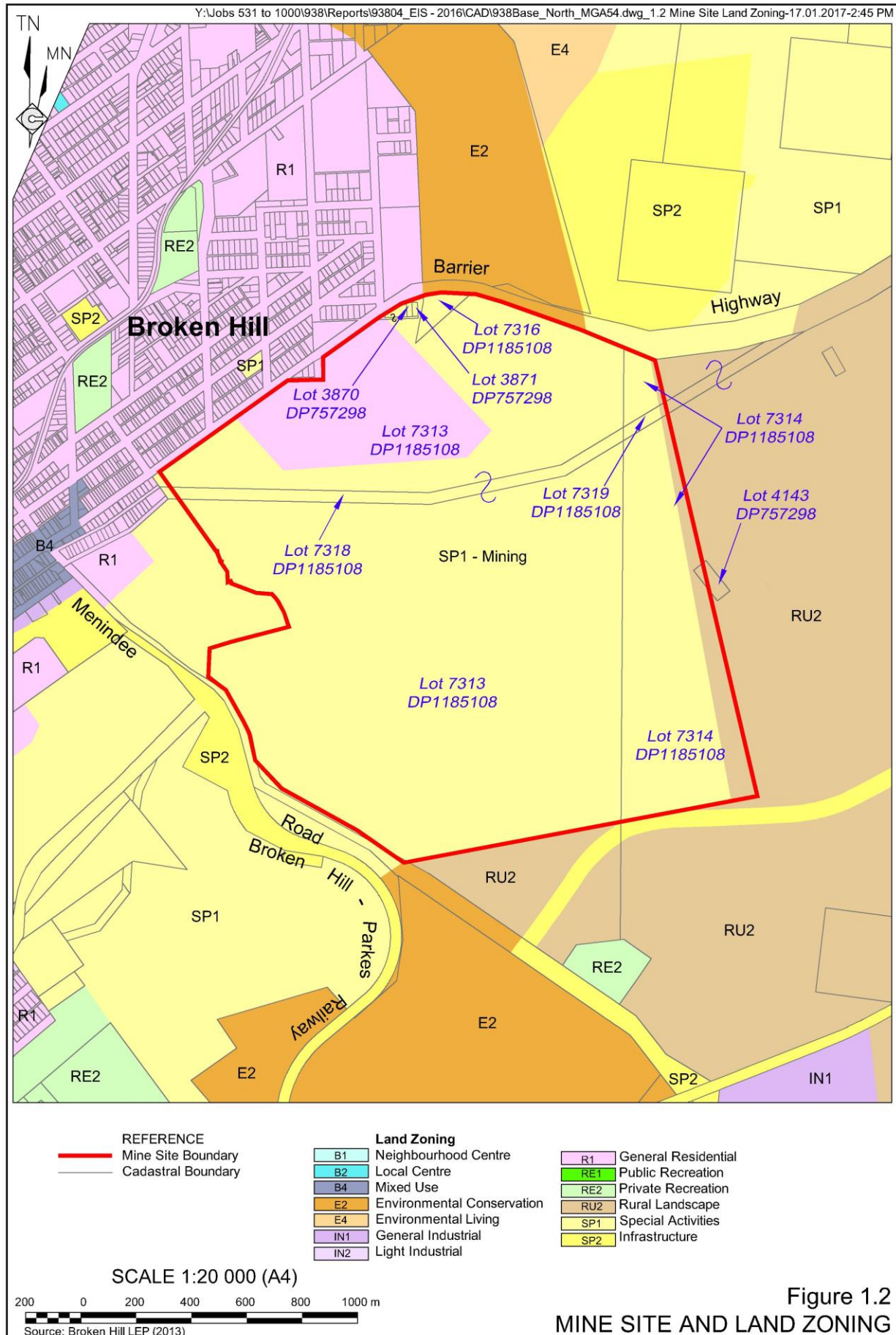
The Proposal is classified as State Significant Development in accordance with Clause 5 of Schedule 1 of *State Environmental Planning Policy (State and Regional Development) 2011* (State and Regional Development SEPP) as it would have a capital investment value of more than \$30 million. As a result, development consent is required in accordance with Division 4.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Section 89D of the Act nominates that the Minister for Planning or the Minister’s delegate such as the Planning Assessment Commission as the consent authority for the Proposal. An EIS is required to be submitted to support the development application in accordance with Section 89G(1)(a) of the EP&A Act. This document has been prepared in satisfaction of that requirement and in accordance with:

- the requirements of Section 79C of the EP&A Act;
- Schedule 2 of the *Environmental Planning and Assessment Regulations 2000*;









- the Secretary's Environmental Assessment Requirements (SEARs) issued by the Department of Planning and Environment (DPE) dated 6 May 2016 and incorporating submissions from and other relevant State and local government agencies;
- *Mine Application Guideline* dated October 2015; and
- the experience of R.W. Corkery & Co. Pty Limited in the preparation of documentation for similar projects throughout NSW.

A copy of the SEARs is provided in **Appendix 1** whilst **Appendix 2** presents a table recording where each requirement is addressed in this document.

## 1.2 THE APPLICANT

The Applicant is Perilya Broken Hill Limited, a wholly owned subsidiary of Perilya Limited, with headquarters in Perth. Perilya Limited was established in 1987 and operates mines in Broken Hill, as well as the Cerro De Maimon copper, gold and silver mine in the Dominican Republic. Perilya Limited is advancing major resource projects in Broken Hill, South Australia, Queensland and Quebec, Canada. Perilya Limited also has interests in exploration projects in the areas of Broken Hill in NSW, Rockhampton and Mt Isa in Queensland and overseas in Malaysia and the Dominican Republic.

In December 2013, Shenzhen Zhongjin Lingnan Nonfermet Company Limited (Zhongjin Lingnan), a publicly listed company based in Shenzhen, China, and listed on the Shenzhen Stock Exchange, acquired 100% control of Perilya Limited. Zhongjin Lingnan specialises in the production of non-ferrous metals including the mining, processing, smelting and manufacturing of lead, zinc, silver, cadmium, aluminium and nickel products. Its key operations are located in Guangdong province China, including the Fankou lead-zinc mine, the Shaoguan lead-zinc smelter and the Danxia zinc smelter. The Fankou mine, a low-cost underground lead-zinc mine which began commercial production in the 1960s, earned green mine certification from the Chinese Government in 2012. In 2011, Zhongjin Lingnan made significant upgrades to its Shaoguan lead-zinc smelter to improve environmental performance.

Zhongjin Lingnan is operated by a board and management team with significant experience in the resources and metals industries. Zhongjin Lingnan's Board of Directors are:

- MA Jianhua – Acting Chairman of the Board
- YU Gang – President and Director
- PENG Ling – Vice President and Director
- ZHANG Shuijian - Director
- WANG Lixin – Director
- WU Shenghui – Director
- REN Xudong – Non-executive Director
- LI Yingzhao - Non-executive Director

- ZHOU Yongzhang - Non-executive Director
- LIU Fanglai - Non-executive Director

Section 1.5.3 presents a detailed overview of the Applicant's current Broken Hill operations. In summary, however, Perilya Broken Hill Limited operates the Broken Hill South Mine and Site D (collectively referred to hereafter as the Southern Operations), an underground mine, concentrator and tailings storage facility (**Figure 1.1**). The Company also operates the North Mine and the Potosi Mine (located approximately 2km northeast of the North Mine) and holds development consent for the undeveloped Flying Doctor Mine, located a further 2km northeast of the Potosi Mine (**Figure 1.1**). The development consents for the Potosi Mine and the Flying Doctor Mine, once developed, allow ore to be transported to the Southern Operations for processing. Lead and zinc concentrate is transported by rail to Port Pirie. With substantial investment in Broken Hill, Perilya Broken Hill Limited has an ongoing commitment to the community of Broken Hill.

Perilya Broken Hill Limited is operated by a board and management team with very substantial experience in operating mining projects. Key Perilya Broken Hill Ltd personnel are as follows.

- Mr Paul Arndt (*BSc, MSc, Grad Dip Eng*) – Managing Director and Chief Executive Officer.
- Mr Paul Marinko (*LLB Hons*) – Director and Company Secretary.
- Mr Angelo Christou (*BCom*) – Director and Chief Financial Officer.
- Mr Bruce Byrne (*BEng*) – Director and General Manager Broken Hill Operations.
- Mr Geoff Hender (*MMinEng*) – Director and Deputy General Manager Broken Hill Operations.

### 1.3 MINE SITE

The Mine Site for this application comprises an area of approximately 307ha and incorporates all areas of Proposal-related activities. **Table 1.1** and **Figure 1.2** present land titles within the Mine Site.

**Table 1.1**  
**Mine Site Land Titles**

Lot	DP	Lot	DP
7313 <sup>1</sup>	1185108	7319 <sup>1</sup>	1185108
7314 <sup>1</sup>	1185108	3870	757298
7316	1185108	3871	757298
7318 <sup>1</sup>	1185108	4143 <sup>1</sup>	757298
Unnamed Crown road reserves			
Note 1: Part Lot only			

## 1.4 EXISTING MINERAL AUTHORITIES, IDENTIFIED RESOURCE AND PRODUCTS

### 1.4.1 Existing Mineral Authorities and Approvals

**Figure 1.1** presents all mineral authorities held by the Applicant in the vicinity of Broken Hill. **Figure 1.3** presents the mineral authorities held over the Mine Site. It is noted that a range of exclusions zones exist within CML4 and CML5. These exclusion zones act to limit or exclude the Applicant's rights under the *Mining Act 1992* within those zones. Typically, the exclusion zones are identified as follows (**Figure 1.3**).

- Surface to a specified depth – the Applicant's rights under the Act exist only below the identified depth, with no surface rights. Surface rights may be held by another.
- Below a specified depth – the Applicant's rights under the Act exist only from the surface to the identified depth, with no rights below that depth.

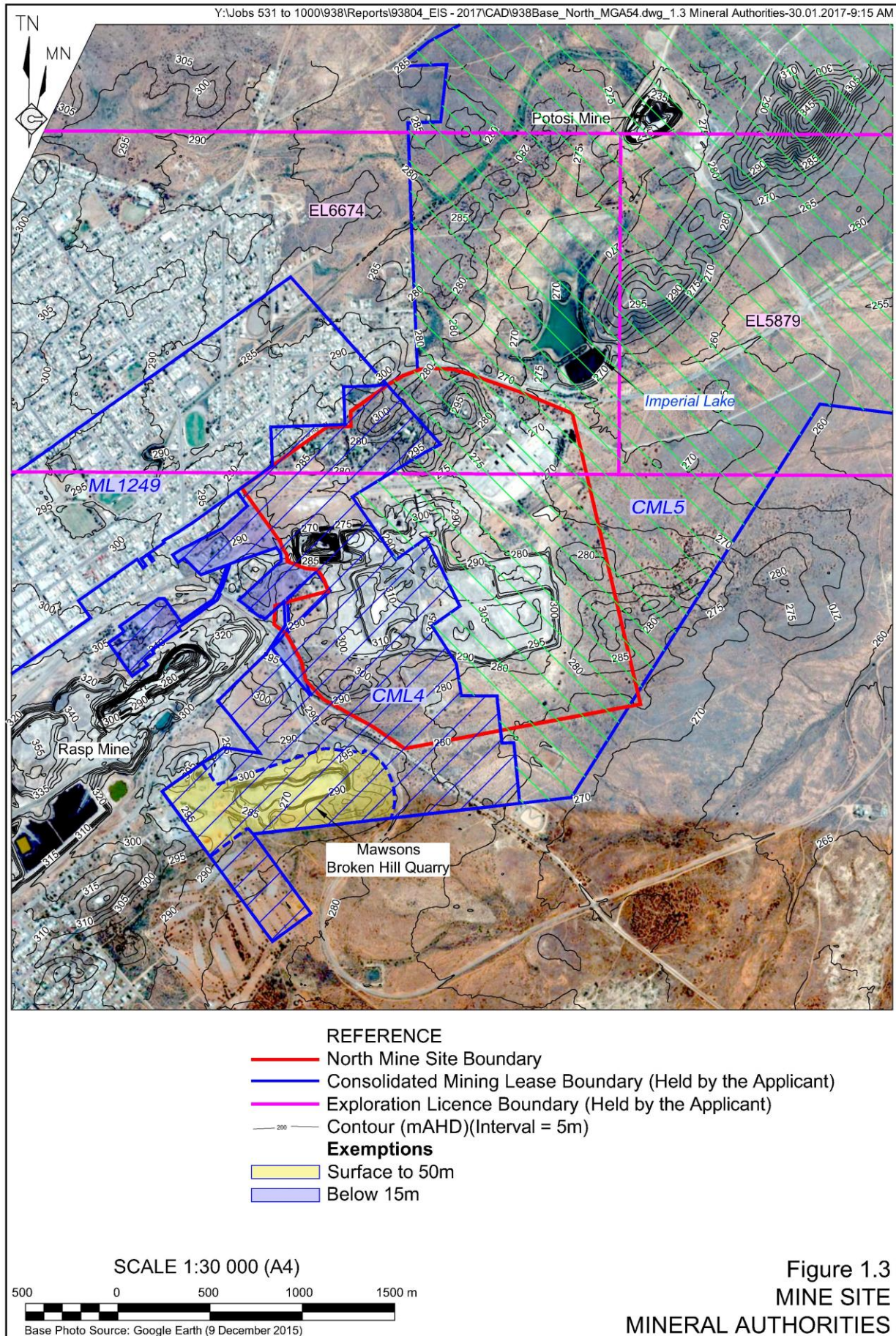
### 1.4.2 Resource

A Joint Ore Reserve Committee (JORC) compliant resource statement for the North Mine was prepared by J. Broome, the then Geology Superintendent, Perilya Broken Hill Limited (Member – Australian Institute of Geoscientists) and C. Mroczek, the then Technical Services Manager, Perilya Broken Hill Limited (Member – Australian Institute of Mining and Metallurgy) in 2007. **Table 1.2** presents a summary of the resources identified within that statement.

**Table 1.2**  
**North Mine Resources and Reserves Summary**

Category	Tonnes	Zn	Pb	Ag	Pb + Zn
<b>North Mine Uppers (Above 26 Level)</b>					
Measured	400 000	7.4%	8.0%	155g/t	15.4%
Indicated	300 000	7.3%	8.4%	150g/t	15.7%
Inferred	300 000	7.0%	11.0%	109g/t	18.0%
<b>Subtotal</b>	<b>1 000 000</b>	<b>7.3%</b>	<b>9.0%</b>	<b>140g/t</b>	<b>16.3%</b>
<b>North Mine Deeps (Below 26 Level)</b>					
Measured	2 100 000	11.4%	13.9%	216g/t	25.3%
Indicated	1 200 000	11.7%	13.6%	239g/t	25.3%
Inferred	-	-	-	-	-
<b>Subtotal</b>	<b>3 300 000</b>	<b>11.5%</b>	<b>13.8%</b>	<b>224g/t</b>	<b>25.3%</b>
<b>Total</b>	<b>4 300 000</b>	<b>10.5%</b>	<b>12.7%</b>	<b>205g/t</b>	<b>23.2%</b>
Source: Perilya Broken Hill Limited					







### 1.4.3 Products and Need for the Proposal

#### 1.4.3.1 Introduction

The Proposal would produce crushed ore that would be transported from the Mine Site to the Southern Operations. That material would be blended with ore from the Applicant's other operations and processed to produce a lead-rich and a zinc-rich concentrate which would be transported via rail to Port Pirie for further processing or shipping to overseas customers. The following presents an overview of the uses and market for lead, zinc and silver.

#### 1.4.3.2 Lead

Lead is a bluish-grey, dense, malleable metal with a low melting point that has been used since ancient times for a range of purposes, including:

- statues and figurines as early as 6 500BC;
- plumbing in Roman-era buildings and infrastructure;
- ammunition and shot; and
- for alloying with other metals.

In the 20<sup>th</sup> Century, lead was used for a range of industrial purposes. Recognition of the health implications of environmental lead has resulted in lead being removed from a range of products, including petrol, paints, cosmetics, etc. The International Lead Association<sup>1</sup> identifies that in 2012 approximately 10Mt of lead was consumed, principally for the following purposes.

- Lead-acid batteries (85.1%).
- Pigments and other compounds (5.5%).
- Rolled and extruded products, including radiation shielding (3.6%).

Lead is relatively simply recycled, with UNEP International Resource Panel<sup>2</sup> estimating in 2011 that worldwide, newly manufactured lead products contained between 42% and 63% recycled lead and that recycling rates for lead products at the end of their life are between 52% and 95%, depending on the location. As a result, annual global demand for “new” lead is around 5Mt.

#### 1.4.3.3 Zinc

Zinc is a bluish-white, hard, brittle metal that alloys easily with other metals. Zinc has been mixed historically with copper to make brass and zinc oxides were used for medicinal purposes in 11<sup>th</sup> Century India.

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<sup>1</sup> <http://www.ila-lead.org/lead-facts/lead-uses--statistics> – accessed 8 July 2016.

<sup>2</sup> UNEP International Resource Panel (2011). Recycling Rates for Metals - A Status Report – after Appendix D.

Zinc is currently the fourth most widely consumed metal in the world (after iron, aluminium, and copper).<sup>3</sup> It has strong anticorrosive properties and, as a result, approximately 50% of zinc used worldwide is used for zinc galvanizing to prevent rusting. Other uses include the manufacture of:

- brass for industrial, electrical and other uses; and
- zinc oxide for rubber manufacture and medicinal purposes.

The US Geological Survey estimated that in 2013, annual world-wide consumption of zinc was approximately 13Mt, with zinc consumption in 2014 predicted at that time to exceed annual consumption by 0.43Mt.<sup>4</sup>

#### 1.4.3.4 Silver

Silver is a white precious metal that has historically been used as a store of value, as well as for jewellery. The US Geological Survey estimated in 2013 that the global silver consumption was 33 200t<sup>5</sup> in that year principal uses for silver in 2013 were as follows.<sup>6</sup>

- Electrical and electronics (35%).
- Coins and medals (25%).
- Photography (10%).
- Jewellery and silverware (6%).

## 1.5 BACKGROUND TO THE PROPOSAL

### 1.5.1 Introduction

The discovery and subsequent development of the Line of Lode and of Broken Hill itself has been well documented. This subsection provides a brief overview of the background of that development, particularly as it relates to the North Mine, to enable the Proposal to be placed in its historical context. The subsection also includes a description of the Applicant's current operations in Broken Hill, as well as those at the CBH-operated Rasp Mine.

### 1.5.2 History of Mining Operations

#### 1.5.2.1 Discovery of the Line of Lode – pre 1900

The mining potential of Broken Hill was first identified in 1883 by Charles Rasp, who collected the first mineral samples from the Line of Lode. On 21 September 1883, Rasp and six other collaborators were granted seven 40 acre leases along the Line of Lode. In 1885, the Broken

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<sup>3</sup> <http://geology.com/usgs/uses-of-zinc/> - Accessed 8 July 2016.

<sup>4</sup> US Geological Survey – 2013 Minerals Yearbook – Zinc (advance release)

<sup>5</sup> US Geological Survey – 2013 Minerals Yearbook – Silver (advance release)

<sup>6</sup> <http://geology.com/usgs/uses-of-silver/> - Accessed 8 July 2016.

Hill Proprietary Company was formed. Initial assay and smelting results demonstrated the high metal concentrations of the resource and smelters were constructed at Broken Hill, with profits funding rapid development of the mine.

A rail line was constructed in 1884 to connect the Broken Hill mining district to Port Pirie for smelting and export.

Concentrating plants to recover lead and silver were first constructed at Broken Hill 1889 in response to decreasing metal grades with depth and more complex ores which included sulphides. The concentrating plants could not recover the contained zinc and it was discarded with the tailings and waste rock.

“Block 17”, located at the northeastern end of the original Line of Lode leases, was pegged in 1883 and was known originally as the “Cosmopolitan Mine”. The Mining Lease was sold to the Broken Hill North Silver Mining Company in 1885 and was renamed as the “North Mine”. Two shafts were sunk and carbonate ore was discovered in 1888. A concentrator to treat the carbonate ore was constructed on site in 1890. However, in 1894, easily treatable carbonate ore was largely exhausted and the operators were unable to treat the sulphide ore. As a result, operations ceased and the mine was sold to Broken Hill North Silver Mining NL. The North Mine was worked intermittently until approximately 1902 when operations ceased.

#### **1.5.2.2 Mining Operations – 1900 to 1914**

A number of zinc concentration techniques were trialled in at Broken Hill mines in the early 1900s, including a pilot treatment plant at the North Mine constructed in 1905. The new processing techniques were a major breakthrough that allowed more complex ores at greater depths at Broken Hill to be processed, as well as allowing the reprocessing of tailings.

Between 1907 and 1909 there was an extensive reconstruction of the North Mine, including a new mill, electrical plant, boilers, offices and ventilation fans, allowing mining at greater depth. No. 1 Shaft at the Broken Hill North Mine was worked in the early 1900s. By 1912, mining was occurring at a depth of approximately 1 400 feet (425m).

#### **1.5.2.3 Mining Operations – 1914 to 1945**

The commencement of Word War 1 caused a dramatic cut in production at Broken Hill due to sales of concentrate to Germany ceasing. To allow continuing production, a cooperative, including the Broken Hill North Mine, was set up to purchase the Port Pirie smelters to refine lead and zinc, enhancing mineral processing capacity. In addition, a long-term contract was secured to sell product to the British Government. In 1918, the North Mine erected its own flotation mill, and during the 1920s and early 1930s acquired surrounding mines, securing an important section of the Line of Lode. As the company expanded, lease holdings were pushed to the northeast, with a further shaft (No. 2 Shaft) completed at the North Mine in 1934. During the 1930s, No. 1 Mill was extensively refitted to install an all-flotation process, a crusher was erected, and a new mill (Mill No. 2) was constructed.

New contracts to sell zinc, including from the North Mine, were secured in 1930, and a central power supply for Broken Hill mines was commissioned in 1931. Rail infrastructure continued to be developed during this period.



World War 2 resulted in substantially less disruption to mining operations in Broken Hill than World War 1, with adequate manpower the principal constraint. At the end of World War 2, the North Mine, Broken Hill South and the Zinc Corporation were the only operational mines in Broken Hill.

#### **1.5.2.4 Mining Operations – 1945 to 2002**

A further shaft at Broken Hill North Mine, No. 3 shaft, was constructed between 1948 and 1956, with the first working level at 3 070 feet (935m). Mining operations were relocated to the area around No. 3 shaft, including construction of a ventilation shaft, conveyors, and surface workshops, offices and amenities. Mining remained focussed on developing the Line of Lode to the north.

In 1958, the No. 2 Mill was modified to an all flotation process.

In 1976, the North Mine was restructured, becoming North Broken Hill Holdings Limited. The Company merged with the Australian Smelting and Mining Company in 1988 to form Pasminco Limited, with assets including three zinc mines and three smelters in Australia.

Most of the infrastructure at the No. 1 Mill was demolished to allow development of an open cut mine in 1990. The Fitzpatrick area, a newly discovered ore body located at depth and to the north of the previous workings, kept the mine operating until the mid-1990s. Mining ceased at the North Mine in 1998. Pasminco became insolvent, and in 2002 Perilya Limited acquired Pasminco's Broken Hill assets, including the North and South Mines.

#### **1.5.2.5 Mining Operations – 2002 to 2016**

Operations recommenced at the Broken Hill North Mine in 2003, with ore crushed at the North Mine and transported to Southern Operations for processing. The North Mine was placed under care and maintenance following operational restructuring in August 2008.

### **1.5.3 Current Broken Hill Mining Operations**

#### **1.5.3.1 Introduction**

Three underground mines are currently operating in Broken Hill, namely the Southern Operations and Potosi Mine operated by the Applicant and the Rasp Mine operated by CBH Resources Limited (**Figure 1.1**). In addition, the North Mine remains on care and maintenance and the Flying Doctor Mine has received development consent but remains undeveloped. Both of these operations are held by the Applicant. The following subsections provide a brief overview of the activities undertaken or approved at these operations. Information is provided in sufficient detail to enable the reader to develop a basic understanding of the operations and to facilitate an assessment of cumulative impacts.

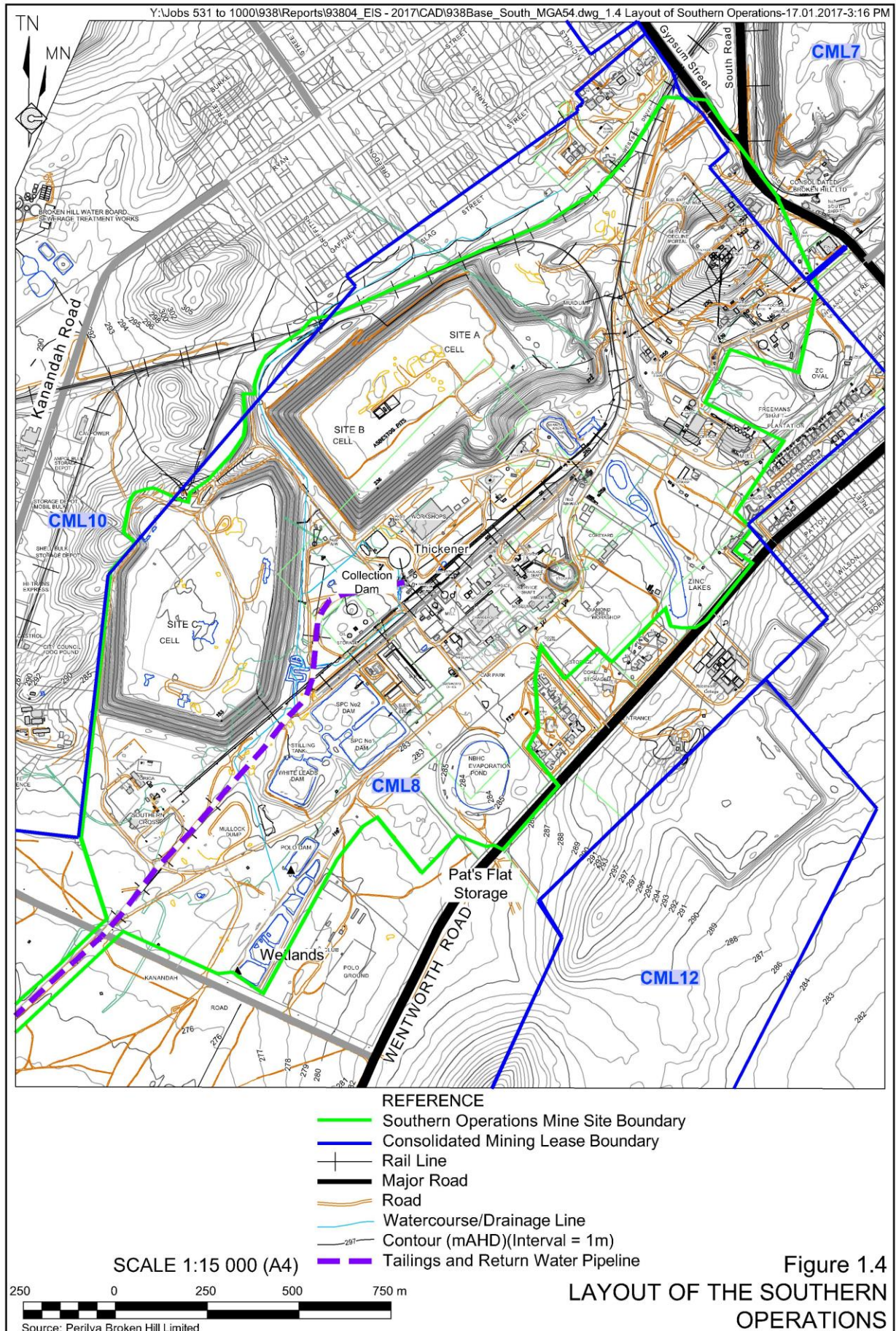
### 1.5.3.2 Southern Operations

The Southern Operations is operated by the Applicant and comprises two components, the South Mine and Site D. For the purposes of this document, all activities at the Southern Operations are undertaken within the Southern Operations Mine Site.

The South Mine operates under the continuing use rights conferred by Section 109(1) of the EP&A Act. **Figure 1.4** presents the layout of the South Mine. Activities that are undertaken at the South Mine include the following.

- Extraction of ore using underground mining methods. Ore and waste rock (referred to hereafter as mullock) is removed from the mine using both shaft haulage and via a decline. The historic rate of extraction of ore from the Mine has been between 0.9 million tonnes per annum (Mtpa) and 1.75Mtpa, however, at the time of finalisation of this document, the actual rate of extraction was approximately 1.08Mtpa, with mining expected to be completed in 2030.
- Crushing and screening of ore and stockpiling of the crushed ore on a crushed ore stockpile.
- Receipt of ore from the Applicant's other operations, including the Potosi Mine and, previously, the North Mine. Approval exists for ore from the Flying Doctor Mine to be transported to the South Mine as well.
- Transfer of crushed and imported ore material to the South Mine Concentrator for grinding and separation to produce separate lead and zinc concentrates.
- Transportation of lead and zinc concentrates from the Southern Operations Mine Site to Port Pirie by rail.
- Transfer of tailings to Site D and return of recovered water.
- Operations within the Southern Operations Mine Site are undertaken 24-hours per day, 7 days per week.
- Ancillary activities, including but not limited to the following.
  - Storage and processing of mullock at surface for a range of purposes, including sheeting of roads and backfilling of completed stopes.
  - Operation of a sandfill plant using imported cement and selected tailings.
  - Operation of a cement batching plant in the vicinity of the Southern Cross Shaft for the production of shotcrete and other materials.
  - Maintenance of plant and equipment at a range of locations, including the mobile plant workshop.
  - Storage and use of reagents and hydrocarbons.
  - Operation of a water management system to prevent discharge of contaminated water and to facilitate the controlled harvesting of surface water.





- Operation of a landfill facility for:
  - asbestos;
  - general solid waste (non-putrescible); and
  - tyres<sup>7</sup>.
- Operation of a range of offices, workshops, a change house, storage buildings, etc.
- Operation of a range of electrical and other services-related infrastructure.

Site D incorporates the tailings storage facility for the South Mine (**Figure 1.5**). The site is located approximately 2.5km to the southwest of the South Mine Concentrator and is on unincorporated lands outside the Broken Hill Local Government Area. Approval for Site D was granted by the Minister for Mineral Resources in September 1985. Site D is divided into four cells (Cells 1 to 4). Cells 1 and 2 are complete and have been covered. Cell 3 has been partially constructed and is in use. The footprint of Cell 4 is currently used by Essential Water for a brine storage pond. That pond has been constructed in a manner that it is able to be converted to tailings storage when Cell 4 is commissioned. The Applicant estimates that the volume remaining in the approved design for Cells 3 and 4 is approximately 6.2 million cubic metres (Mm<sup>3</sup>). During the life of the Proposal, the Applicant anticipates that approximately 5.7Mm<sup>3</sup> of tailings will be produced as follows.

- North Mine – 1.0Mm<sup>3</sup>.
- South Mine – 3.6Mm<sup>3</sup>.
- Potosi Mine – 1.1Mm<sup>3</sup>.

As a result, the approved design of Site D includes sufficient volume for all tailings requiring placement into the facility for the life of the Proposal.

### 1.5.3.3 Potosi Mine

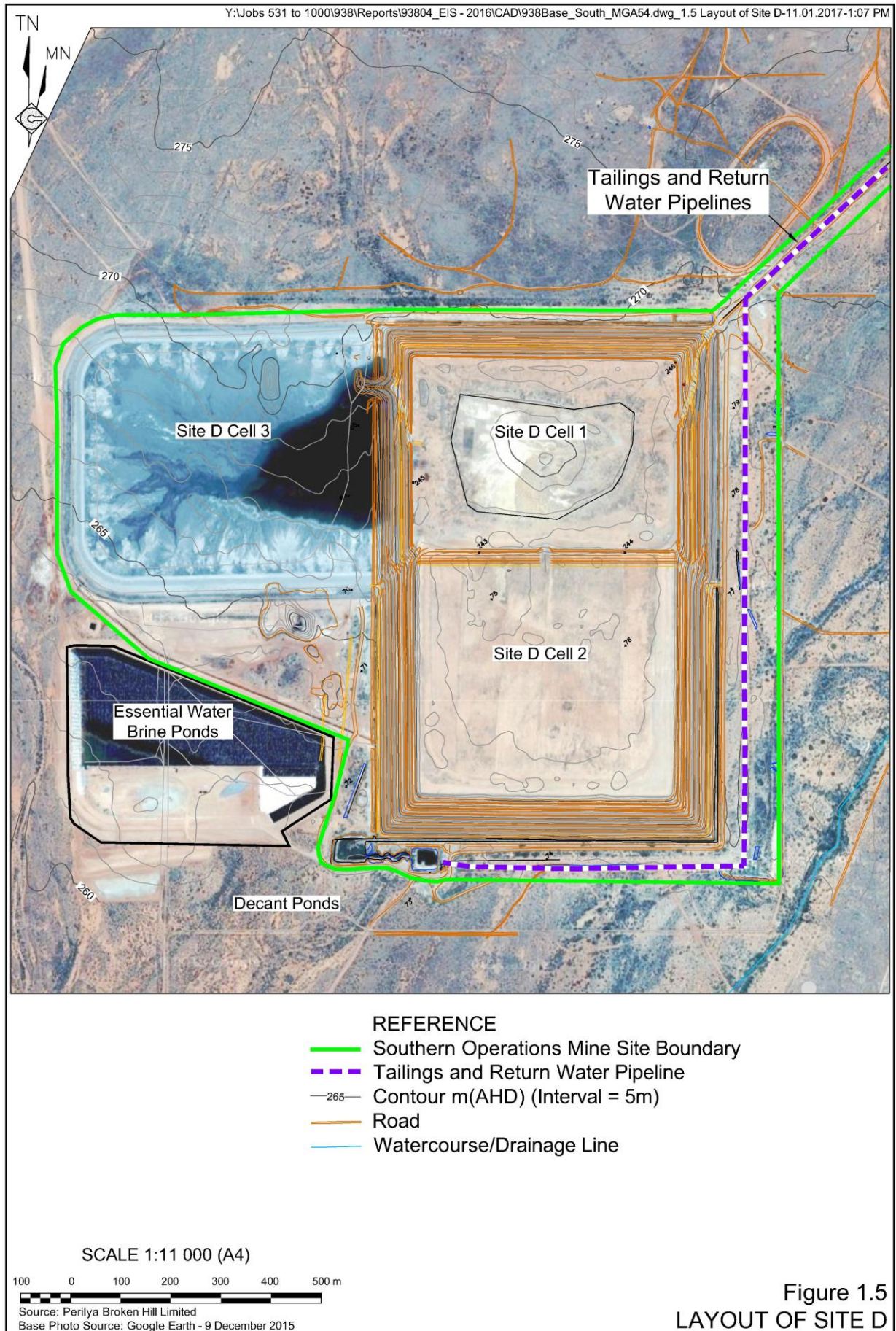
The Potosi Mine is operated by the Applicant under DA448/2004 originally approved by the NSW Land and Environment Court, and modified most recently on 12 May 2014. That approval permits the following.

- Operation of an underground mine to extract ore from the Potosi and Silver Peak ore bodies. The approved average rate of extraction of ore from the Mine is 400 000tpa, however, at the time of finalisation of this document, the actual rate of extraction was 450 000tpa, with mining expected to be completed in 2021. The average rate of production over the life of the Potosi Mine has been approximately 372 500tpa.
- Transportation of ore and mullock to the surface via two declines.
- Storage and crushing of ore at surface using mobile crushing equipment.

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<sup>7</sup> Tyres are currently removed from site, however, Condition L4.3 of Environment Protection Licence 2688 permits on-site disposal of tyres.





- Loading of crushed ore into covered B-double trucks for transportation to the Southern Operations Mine Site via the following route.
  - Potosi Site Access Road.
  - Barrier Highway/Argent Street.
  - Iodide Street/Silver City Highway.
  - Crystal Street/Silver City Highway.
  - Gypsum Street.
- Operations within the Potosi Mine Site are undertaken 24-hours per day, 7 days per week, with the exception crushing and transportation operations which are undertaken 12 hours per day (7:00am to 7:00pm), 7 days per week.
- Ancillary activities, including but not limited to the following.
  - Storage and processing of mullock at surface for a range of purposes, including sheeting of roads and backfilling of completed stopes.
  - Maintenance of plant and equipment within a workshop.
  - Storage and use of hydrocarbons.
  - Operation of a water management system to prevent discharge of contaminated water and to facilitate the controlled harvesting of surface water.
  - Operation of an office, a change house, storage buildings, etc.
  - Operation of a range of electrical and other services-related infrastructure.

An application to amend DA448/2004 to permit transportation using A-double Road Trains and the transportation route proposed in Section 2.7.4.3 is currently before Broken Hill City Council.

#### 1.5.3.4 Rasp Mine

The Rasp Mine is operated by CBH Resources Limited, a company that is unrelated to the Applicant. The Rasp Mine is located on the central section of the Line of Load, between the Applicant's Southern Operations and the North Mine. As a result, a brief description of the operation of that Mine is provide here to facilitate assessment by readers of the anticipated cumulative impacts associated with the Proposal.

The Rasp Mine is operated under Project Approval 07\_0018 approved by the delegate of the Minister for Planning on 31 January 2011. The approval has subsequently been modified three times, most recently on 17 March 2015.

The approved operations include the following.<sup>8</sup>

- Operation of an underground mine to extract ore at maximum rate of 750 000tpa, with mining expected to continue until 31 December 2026.
- Transportation of ore and mullock to the surface.

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<sup>8</sup> CBH Resources Limited (2014). *Environmental Assessment Modification 3 Mining Extension*

- Crushing, grinding and processing of ore material using an on-site processing facility to produce approximately 44 000tpa lead concentrate and 87 000tpa zinc concentrate.
- Placement of tailings within an on-site tailings storage facility.
- Operations within the Rasp Mine Site are undertaken 24-hours per day, 7 days per week.
- Ancillary activities, including but not limited to the following.
  - Storage and processing of mullock at surface for a range of purposes, including sheeting of roads and backfilling of completed stopes.
  - Operation of a Paste Fill Plant using imported cement and selected tailings.
  - Maintenance of plant and equipment within a workshop.
  - Storage and use of reagents and hydrocarbons.
  - Operation of a water management system to prevent discharge of contaminated water and to facilitate the controlled harvesting of surface water.
  - Operation of an office, a change house, storage buildings, etc.
  - Operation of a range of electrical and other services-related infrastructure.

The Applicant currently liaises and works with CBH Resources in relation to operational and other matters that affect both operations. The Applicant would continue to liaise with CBH Resources and does not anticipate that the Proposal would adversely impact the operation of the Rasp Mine or that the operation of the Rasp Mine would impact on the Proposal. Indeed, the two operations are mutually supportive in that they facilitate a combined larger industry, including support services, within Broken Hill.

#### 1.5.3.5 North Mine

Between 2003 and 2008, the Applicant operated the North Mine under DA54/2003 granted by Broken Hill City Council on 6 March 2003. The consent permitted the following activities.

- Underground mining operations within the upper levels of the existing mine for a period of approximately two years.
- Crushing of the ore within the existing Cosmopolitan Open Cut.
- Transportation of crushed ore to the Applicant's Broken Hill Southern Operations via the existing rail network.

Mining under that development consent ceased in 2008.

Since the completion of activities under DA54/2003, the North Mine has been under care and maintenance. Activities undertaken within the Mine Site have been consistent with those permitted under the rights conferred by CML4 and CML5 and have included the following.

- maintenance of surface and underground infrastructure, including pumps, electrical infrastructure, security fencing, etc; and
- use of buildings for the storage of drill core and maintenance of vehicles.



Finally, approval was granted by the Division of Resources and Energy on 5 April 2016 for prospecting activities within CML4 and CML5. The purpose of the proposed activities is to:

- permit further drilling to define the extent of remanent ore within the upper sections of the mine; and
- to enable extraction of a bulk sample for metallurgical and other testing at the Southern Operations.

Approved activities include the following:

- Underground diamond drilling.
- Extraction of a bulk sample up to 20 000t.
- Ancillary activities, including:
  - make safe and refurbish underground access to the 12 Level;
  - rehabilitate the decline and develop diamond drill platforms to undertake exploration from underground;
  - stockpile waste rock either underground or within the Cosmopolitan Open Cut;
  - establish access to facilitate extraction of the bulk sample; and
  - transport ore to the pre-existing ROM pad and to road trucks for transportation to the Southern Operations.
- Testing and batch processing of the bulk sample at the Southern Operations is an activity that is consistent with the existing use of that site.

The Applicant proposes to undertake the approved activities concurrently with preparation and assessment of the application for development consent.

#### 1.5.3.6 Flying Doctor Open Cut

Development consent DA366/2008 for the Flying Doctor Open Cut, located approximately 1.5km to the northeast of the Silver Peak Shaft and associated Potosi Mine workings was granted by Broken Hill City Council on 21 November 2012 (**Figure 1.1**). That development consent permits the following.

- Construction of the Potosi – Flying Doctor – Potosi Haul Road.
- Staged removal of soil and vegetation material within the proposed area of disturbance and stockpiling of that material for later use during rehabilitation.
- Construction of a facilities area, including a workshop and lay down area, hydrocarbon store, a store, ablutions facilities, crib room, heavy and light vehicle parking, a site office and associated infrastructure.
- Extraction by open cut mining techniques, loading and transportation of ore and waste rock material to a stockpiling and crushing Area and the Waste Rock Emplacement respectively.



- Campaign crushing of stockpiled ore at the Stockpiling and Crushing Area using a mobile crusher and stockpiling of crushed material.
- Loading and transportation of crushed ore material from the Stockpiling and Crushing Area to the North Mine using road registered B-double trucks via the proposed Potosi – Flying Doctor – Potosi Haul Road and the existing Potosi – North Mine Haul Road, crossing the Barrier Highway at the existing crossing.
- Loading and transportation by rail of crushed ore material from the Broken Hill North Mine to the Southern Operations Concentrator.

It is noted that the Flying Doctor Open Cut remains undeveloped and that a modification to the development consent would be required to permit road transportation of crushed ore to the Southern Operations because the option of rail transportation of ore is no longer available.

#### 1.5.4 Environmental Management and Performance

The Applicant acknowledges its responsibility to undertake its operations in a safe and environmentally responsible manner, particularly considering the fact that lead forms a substantial component of the material that is mined and the proximity of its operations to urban areas within the City of Broken Hill. To that end, the Applicant implements a risk-based Environmental Management System that is based on the principles of adaptive management and close consultation with the community, relevant regulatory authorities and its own workforce.

The Environmental Management System is overseen by a dedicated environmental team including the following.

- Manager Health Safety and Environment.
- Environmental Superintendent.
- Environmental Officer.

Each of the above position descriptions includes compliance with all regulatory and conditional requirements as Key Performance Indicators. Ultimately, however, responsibility for environmental management of the Applicant's Broken Hill operations rests with the General Manager.

The Applicant notes that there have been no substantial non-compliances with the various conditions of consent, licence conditions or regulatory requirements. However, consistent with the principles of adaptive management, the Applicant has recently implemented the following improvements to its operations, principally in consultation with the Environment Protection Authority and under agreed Pollution Reduction Programs under the Applicant's Environment Protection Licences.

- North Mine.
  - Upgrade of the surface water management system to contain all potentially contaminated surface water up to a 1 in 100 year rainfall event and to facilitate water from upslope of the Mine Site to pass through without further mixing with on-site water.

- Southern Operations.
  - Upgrade of the surface water management system to prevent discharge of potentially contaminated water from the Southern Operations and to facilitate water from upslope of the Mine Site to pass through without further mixing with on-site water.
  - Improved blast management system, including relocating blast monitors to ensure that they continue to accurately monitor blast impacts at surface.

In addition, the Applicant maintains a community complaints telephone line and an incidents register. The complaints telephone line is available for all community members to advise the Applicant of issues or incidents, including environmental issues. The incidents register records all identified incidents, including those raised by the community, documents the resulting investigation and status of implementation of the resulting recommendations.

The Applicant notes that no significant, substantiated issues or incidents have been raised by the community or identified by the Company. Where incidents or issues have been identified, they have been investigated and, where required, the Applicant has amended its procedures or operations to eliminate the risk of a repeat of the incident. In particular, the Applicant notes that it has received only four substantiated complaints related to transportation of ore from the Potosi Mine to the Southern Operations over 3½ years and approximately 38 500 return trips.

## 1.6 FORMAT OF THE DOCUMENT

This EIS includes five sections of text, a reference section, glossary and a set of appendices. The information presented in this document covers all aspects of the planning, development, operation, rehabilitation and environmental monitoring of the Proposal at a level of detail reflecting the environmental risk posed by each issue. The issues and their relevant importance to the assessment of the North Mine have been identified through consultation with government agencies, surrounding residents and the local community, and specialist consultant assessments.

The format of the EIS is as follows.

- **Section 1:** introduces the Proposal, the Applicant, the Mine Site and the mineral authorities held for the Proposal. Background information in relation to the estimated resources, products and previous and current mining operations is provided. The section concludes with information on the structure of the document and management of investigations.
- **Section 2:** describes the Applicant's objectives and proposed mining, processing and residue management activities, product despatch, hours of operation, infrastructure and services, water and waste management and rehabilitation activities. The section also describes the feasible alternatives considered by the Applicant during the design of the Proposal.
- **Section 3:** provides a description of the process used to identify and prioritise the key issues for assessment with reference to the Secretary's requirements, stakeholder consultation and specialist consultant assessments.

- **Section 4:** presents the environmental setting of the Mine Site, including information on topography, meteorology, land ownership and land use. The section also presents a description of a range of environmental features of the local environment that may or would be influenced by the Proposal, i.e. the key environmental issues. The operational safeguards and controls, and where appropriate, the management procedures that have been incorporated into the Proposal design to protect the local environment, are also presented. This section also analyses the potential impacts the Proposal would have on the physical, biological and social environment once the proposed safeguards and procedures are adopted.
- **Section 5:** provides a conclusion to the document including an assessment of the unmitigated and residual or mitigated risks, as well as a justification of the Proposal in terms of biophysical, economic and social considerations and ecologically sustainable development and records the consequences of not proceeding with the Proposal.
- **References:** lists the various source documents referred to for information and data used during the preparation of the EIS.
- **Glossary:** presents a list of the acronyms, symbols and units and technical terms used throughout the EIS.
- **Appendices:** present the following additional information.
  1. A copy of the SEARs for the Proposal.
  2. An itemised and tabulated summary of the SEARs, including the requirements provided by the various government agencies consulted. This appendix also includes reference to the section(s) within the EIS or *Specialist Consultant Studies Compendium* (SCSC) where each requirement is addressed.
  3. A summary of the management and monitoring measures identified in this document.
  4. A copy of the Heavy Vehicle Authorisation Permit issued by the National Heavy Vehicle Regulator for A-double Road Trains operating at higher mass limits on the proposed transportation route.
  5. A copy of a report prepared by the Applicant and accepted by the Environment Protection Authority in relation to surface water management within the Mine Site.
  6. A copy of a report prepared by C.M. Jewell & Associates Pty Ltd in relation to groundwater within the Mine Site.

A *Specialist Consultant Studies Compendium* has been placed on exhibition with the EIS. The contents of these reports are summarised into the appropriate section(s) of the EIS.

## 1.7 MANAGEMENT OF INVESTIGATIONS

The preparation of this document has involved a study team managed by Mr Mitchell Bland (B.Sc (Hons), MEcon Geol, LLB (Hons)), Principal Environmental Consultant with R.W. Corkery & Co. Pty Limited. Ms Lauren Clear (B.Sc., M.Env.), Environmental Consultant, with the same Company, assisted with preparation of the document.

In addition, Mr Geoff Hender (MMinEng) – Deputy General Manager with Perilya Broken Hill Limited assisted with the preparation of this document.

Strong emphasis has been placed upon a multi-disciplinary team approach to the design of the Proposal, the description of the existing environment, identification of key issues, development of appropriate safeguards and assessment of impacts. The following specialist consultancies were commissioned by the Applicant to prepare nominated specialist consultant studies for the Proposal.

- Air Quality, Greenhouse Gas and Health Risk – Pacific Environment Limited.
  - Ms Judith Cox (BEng (Hons) CAQP).
  - Ms Claris Obura (BFor (Hons.) Toxicology, BScMolecular Biology and Biomedical Science).
- Noise – Muller Acoustic Consulting Pty Ltd.
  - Mr Oliver Muller (BSc (REM & HGeog) (MAAS)).
- Transport – Tonkin Consulting.
  - Mr Jeff Tyler (MIEAust CPEng).
  - Mr Rob Bremert (BEng (Civil)).
- Heritage – OzArk Environmental and Heritage Management Pty Ltd.
  - Dr Jodie Benton (PhD, BA (Hons)).
- Ecology – OzArk Environmental and Heritage Management Pty Ltd.
  - Mr Phil Cameron (BSc, Ass Dip App Sci.).